



# From Code to Consent: Legal Validity of Machine-Made Declarations in International Trade

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**Abstract.** The use of artificial intelligence (AI) in supply chain management holds great potential for savings, as processes can be designed very efficiently without human intervention. However, the use of AI in cross-border trade requires that contractual declarations issued by the AI are legally valid. Unharmonized national law creates impediments with individual solutions for this problem. While prior instruments of the UN Commission on International Trade Law (UNCITRAL) address e-commerce, they fall short on AI's autonomy. A new Model Law on Automated Contracting (MLAC) shall fill this gap. This study employs a doctrinal research methodology to review the MLAC regarding its regulatory content within the framework of UNCITRAL texts, drawing on primary and secondary legal sources of the UNCITRAL as well as a comprehensive literature review. Through this approach, the article identifies both strengths and limitations of the MLAC and assesses its benefits for international businesses. Finally, the paper introduces a novel practitioner-focused framework for MLAC implementation.

**Keywords:** Artificial Intelligence, Cross-border Trade, UNCITRAL Model Law on Automated Contracting, MLAC.

## 1 Relevance of AI in International Trade

Businesses rely increasingly on artificial intelligence (AI) to raise efficiency of business operations (Fratton, 2024, pp. 407–408). The World Trade Organization (WTO, 2024, pp. 18–22) has identified several applications of AI in the international supply chain (see also Dash et al., 2019; Helo & Hao, 2022; Sharma et al., 2022; Shoushtari et al., 2021). AI can substantially improve supply chain management by enabling real-time analytics, predictive modelling, and automated decision-making. AI systems using large datasets can detect patterns and anomalies that would otherwise remain hidden. Business organizations can use this capability to monitor inventory levels and shipments, and to anticipate potential disruptions with greater speed and precision (WTO, 2024, pp. 18–22). Time efficiency and quick reaction are interrupted as soon as human action is required. Thus, businesses would prefer if AI would and could legally act, e.g. order additional products needed for continuous production or even automatically negotiate and close contracts (Dwivedi et al., 2021; Helo & Hao, 2022; Zijm & Klumpp, 2016; critical Schmidt-Kessen et al., 2022). From a legal point of view, this poses the

question of whether AI can make legally binding declarations or actions on behalf of a business entity. The background analysis in Section 2 will show that in cross-border trade further harmonization is needed. The UNCITRAL has already addressed e-commerce, but existing instruments do not address the issues of autonomous actions of AI (see Section 3). This paper shall answer the following research questions:

1. Does the new UNCITRAL Model Law on Automated Contracting (MLAC) add to the framework of UNCITRAL texts in the area of e-commerce and AI use?
2. Does MLAC provide a comprehensive framework for the use of AI in international contracting?
3. Should lawmakers and businesses adopt the MLAC?

## **2 Legal Problems regarding the Formation of Contract by AI in Cross-Border Trade**

Contractual declarations by simple automated systems with deterministic programming are common practice in electronic commerce (Frattonne, 2024, p. 408; Napitupulu, 2023, pp. 50–51; Schmidt-Kessen et al., 2022, pp. 2–3). Today, the autonomous actions of AI pose additional legal problems as they (re)act without predictable certainty. Thus, the use of AI for closing or performing a contract can already be legally challenging if both parties are in one country (Awang, 2024; Frattonne, 2024; Koos, 2021a, 2021b; Liu & Zakri, 2025, pp. 231–232; Xudaybergenov, 2023). However, legal problems arise particularly with contractual declarations of AI in cross-border trade rooted in private international law (similar Frattonne, 2024).

Under one of the generally acknowledged principles of private international law, a contractual party may always invoke its own law to declare that it had not closed a binding contract (e.g. Art. 10(2) Rome I Regulation, 2008; Art. 6(2) HCCH Principles on Choice of Law in International Commercial Contracts, 2015; Art. 8(2) African Principles of on the Law Applicable to International Commercial Contracts (Neels, 2023)). For example, if a purchaser uses an AI system, the AI may autonomously place an order for necessary parts to a seller in another country. The order placed may be valid under the law of the purchaser. However, if the law of the seller does not permit any binding contractual declaration by an autonomous system, the seller may always declare that the contract was not binding under their own law. Regarding cross-border trade, three frameworks represent the national legal treatment of contractual declarations by AI.

### **2.1 Lack of Regulation by National Law**

In many countries, the use of autonomous systems for making binding declarations of intent (offers, acceptances, notices of defects) is not regulated by statutory law. The validity of such declarations depends on the interpretation of the law by the courts, in both civil law and common law systems. Until such court decision, legal literature gives only an indication on possible validity (Martin-Bariteau & Pavlovic, 2021, p. 3). In Germany for example, the prevailing opinion treats AI as the user's tool. In the sample

case, the purchaser would have to abide by statements of the AI system if they appear to the seller as a binding declaration of intent by the purchaser. The authors argue that the will of the user encompasses all actions of the system because the commissioning of the AI indicates a general intention to act and close a contract (Kaulartz, 2021 Ch. 9.6.3, n. 16-18; Pieper, 2019; critical to a non-regulatory approach Koos, 2021b, pp. 7–9).

## **2.2 Formal Requirements on Contract Formation**

In some countries, international sales contracts must be signed in writing because these countries have declared a reservation under Art. 96 CISG, 1980. Thus, a provision permitting any other than written form would not apply if one of the parties had their place of business in the state of the declaration, e.g. Russia, Ukraine, Belarus, Chile, Argentina or Viet Nam (UNCITRAL, 2025c). As international law, this prevails even if national law allows contracts to be formed electronically. Thus, for international contracts for the sale of goods, written form is still required (e.g. for the legal situation with Russian contractual partners: Orlov, 2025, pp. 121–122; Piltz, 2017, p. 2449; Sonntag, Art. 96 CISG n. 10). If either purchaser or seller of the case sample have their business seat in such country, AI cannot make a binding declaration because the formal requirement cannot be met.

## **2.3 Different Regulations in the Country of Seller and Purchaser**

Finally, a few countries have already enacted regulations governing the use of AI in commerce and contract formation. For example, the United Arab Emirates passed the Law on Trading by Modern Technological Means (TMTM Law) to regulate trade in modern technologies that goes beyond traditional electronic commerce. This includes digital platforms, mobile applications, social media, AI, blockchain technologies and other emerging technologies (Working Group IV, 2024c, p. 2). Among other regulations, the law gives legal capacity to modern technological means (Art. 5(1) TMTM Law). If such technology trades for a business, the business owner is accountable and liable for the actions of the technology (Alkhamaiseh et al., 2025; AILouzi et al., 2024, pp. 163–165; Al-Obeidi & Hussein, 2023). For the sample case, the use of AI for contract formation may be legally valid in both countries, but they might treat unexpected declarations by AI differently, e.g. invalid vs. not avoidable.

## **3 Prior International Initiatives and AI Contracting**

As shown in Section 2, one of the central legal problems to the use of AI in international trade is the diverse landscape of national laws (Shaltout, 2025, p. 222). To promote and facilitate international trade, international organizations such as the UNCITRAL and the WTO aim to harmonize the law governing electronic commerce, as the legal certainty arising from harmonization provides security and guidelines for those acting in international business (UNCITRAL, 2025a; WTO 2024, p. 67; Liu & Zakri, 2025, pp.

232–233; Napitupulu, 2023, p. 57). In 1988, UNCITRAL formally included on its agenda the examination of the necessity to develop legal principles governing the formation of international commercial contracts through electronic means, with particular emphasis on transactions conducted via screen-based devices (UNCITRAL, 1988, paras. 46–47). Since then, UNCITRAL has launched several initiatives to harmonize the rules on the recognition of the use of electronic means. Two of those instruments already contain provisions on automated contractual declarations.

### **3.1 UNCITRAL Model Law on Electronic Commerce**

The UNCITRAL Model Law on Electronic Commerce 1996 (MLEC) contains the first rule on the attribution of messages sent by automated systems. With a model law, the UNCITRAL proposes a template for drafting national laws (Hettenbach, 2008, p. 10; UNCITRAL, 2013, pp. 13–16). According to UNCITRAL (2025b), 86 countries have transformed the MLEC in whole or in part into their national law. The MLEC aims to support and simplify commercial transactions in digital form while granting identical legal status to electronic and paper-based information (MLEC Guide, para. 5; Napitupulu, 2023, pp. 54–56; Overby, 1999; Pistorius, 2002). Art. 11(1) MLEC grants validity and enforceability to contracts closed by data message. Art. 13(2)(b) MLEC attributes a data message to the operator even if it is sent “by an information system programmed by, or on behalf of, the originator to operate automatically”. Art. 14(2) MLEC also proposes that, for the acknowledgement of receipt of a data message, “any communication by the addressee, automated or otherwise, [is] sufficient”. UNCITRAL recognized that in practice an operator of an automated system uses data messages to declare offer or acceptance without immediate human intervention and intended Art. 11 MLEC to include all kinds of data messages (MLEC Guide, para. 76). Although such data message could be sent by AI, the UNCITRAL did not consider the difference between deterministic and autonomous systems and, thus, the treatment of unanticipated message content.

### **3.2 UN Convention on the Use of Electronic Communications in International Contracts**

The UN Convention on the Use of Electronic Communications in International Contracts 2006 (ECC) contains the first set of explicit rules on the use of automated messaging systems for the conclusion of contracts. The convention applies directly in a signatory state upon ratification by the national law maker (Hettenbach, 2008, p. 10; UNCITRAL, 2013, pp. 13–16). At present, 20 countries have ratified the ECC (UNCITRAL, 2025d). It has the purpose of facilitating the use of electronic communications in international business contracts by providing legal certainty on the legal framework of such communications (ECC Preamble). Under its application, contracts and other communications concluded electronically are just as valid and enforceable as their traditional paper counterparts unless the parties agree otherwise (Art. 3, 8 and 9 ECC; Castellani, 2016, p. 141; Connolly & Ravindra, 2006; Martin, 2008). The ECC defines an “automated message system” as “a computer program or an electronic or

other automated means used to initiate an action or respond to data messages or performances in whole or in part, without review or intervention by a natural person each time an action is initiated or a response is generated by the system“ (Art. 4(g) ECC, see also ECC Explanatory Note, paras. 103-104, 209-210). Art. 12 ECC grants legal validity to a contract concluded through the exchange between an automated messaging system and a natural person, or between automated messaging systems themselves. Already at this time, the UNCITRAL considered that “at least in theory”, future generations of information systems could possess the capacity for autonomous action, not just automatic responses (ECC Explanatory Note, para. 211). Although these rules could be interpreted to include AI, it remains unclear if the UNCITRAL intended to enable the use of autonomous systems without human review (ECC Explanatory Note, paras. 211-214).

## **4 The Model Law on Automated Contracting**

Although these prior UNCITRAL texts addressed the use of automated systems for contract formation, the regulations fall short in dealing with the autonomy of AI systems. As the abovementioned regulations of the MLEC and the ECC always require the action of a natural person, international trade needs new uniform terms for electronic transactions and the use of AI and automation (Working Group IV, 2022a, para. 73; UNCITRAL, 2021, paras. 25, 234-236; MLAC Guide, paras. 16-18; compare the similar initiative of the European Law Institute 2025; Wendehorst, 2024). The UNCITRAL adopted the draft for a Model Law on Automated Contracting (MLAC) and an accompanying Guide for Enactment to fill this gap (UNCITRAL, 2024; prepared by Working Group IV, 2024a, 2024b). In December 2024, the UN General Assembly accepted the proposal for the MLAC and recommended its implementation to UN member states (UN General Assembly, 2024).

### **4.1 Objectives of MLAC**

The MLAC aims to enable the use of (rule-based or autonomous) automation for electronic contract formation and performance within a clear framework. It shall also address the concerns about the complexity of AI as the actions of an autonomous system are not clearly explainable and traceable. The regulations of the MLAC shall not replace national and international rules on contract formation by persons or e-commerce systems like contract law, the MLEC or the ECC. Rather, the MLAC shall supplement existing law to overcome potential obstacles in the application of such prior law to automated contractual declarations (MLAC Guide, paras. 24-25). It leaves room for the emerging laws on ethics and governance on the use of AI (MLAC Guide, paras. 4-6).

### **4.2 Basic Principles of MLAC**

The MLAC conforms partially to the fundamental principles of UNCITRAL in the area of e-commerce to ensure fairness, participation and adaptability in e-commerce

(UNCITRAL, 2025e; Working Group IV, 2024c, p. 2). Firstly, the MLAC is *technologically neutral* and does not include any reference to specific technologies. Thus, it can apply directly to future innovations. Under the second principle of *non-discrimination*, statements and responses of automated systems shall have the same legal validity, effect and enforceability as their paper-based or verbal counterparts throughout the contract lifecycle. The MLAC itself does not apply the principle of *functional equivalence* that grants equal treatment only if the purposes and functions of traditional paper-based transactions can be fulfilled by the technology. The UNCITRAL recognizes that automated contractual declarations do not always have a clear equivalent in a personal or written declaration. However, this principle may still apply under the transformed MLEC and the ratified ECC (Working Group IV, 2022b, paras. 78-86; MLAC Guide, paras. 12-14). The MLAC applies the principle of *party autonomy* as a general principle of commercial law (Castellani, 2016, p. 136). The parties may or may not use automated systems and may regulate the conditions for their use at their own discretion. Thus, the regulations of the MLAC are an option but not mandatory. For example, parties may agree on particulars in a framework agreement between them or in the rules of a platform operated by a third party (MLAC Guide, paras. 15; Shaltout, 2025, p. 229).

### 4.3 Provisions of MLAC

The MLAC concentrates on ten necessary provisions to create a comprehensive legal framework for automated contracting (Shaltout, 2025, p. 228) that can be grouped in basic rules concerning definitions, scope and interpretation, rules on the legal recognition of the output of automated systems, rules on the attribution of (unexpected) actions and finally rules on the relationship to other laws.

**4.3.1 Definitions, Scope and Interpretation.** The MLAC starts with a wide legal definition of “automated systems” by referring to computer systems with the capability “to carrying out actions without review or intervention of a natural person” regardless of whether it works “deterministic or non-deterministic” (Art. 1(1)(a), (2) MLAC). This acknowledges, firstly, that automated systems are comprised of software and hardware. Secondly, it does allow for the inclusion of all kinds of technology, including automated messaging systems, AI and distributed ledger technology as well as new, yet unknown technological inventions (see further MLAC Guide, paras. 26-30). The term “data message” defined in Art. 1(1)(b) MLAC is already used in prior UNCITRAL texts (e.g. Art. 2(a) MLEC; Art. 4(c) ECC). It encompasses all forms of processing information and transmitting messages, also allowing for the development of new technologies (MLAC Guide, para. 31). Under Art. 2 MLAC, the scope of application is limited to the use of automated systems to form or perform a contract throughout the whole life cycle of a contract, e.g. declaring offer and acceptance, notification of non-conformity, modification or termination of the contract (MLAC Guide, paras. 32-34). It is clarified that the MLAC, firstly, can apply to all sorts of contracts and that, secondly, it shall not interfere with other laws, e.g. regarding contractual obligations and any remedies of violation of such obligations. In addition, the MLAC is subject to any other laws or

judgements that may limit, prohibit or otherwise regulate the use of automated systems for such transactions, e.g. the EU AI Act or consumer protection laws (Art. 2(2) MLAC; MLAC Guide, paras. 36-37).

Art. 3 MLAC states that the interpretation of the implemented provisions of the MLAC shall be subject to the UNCITRAL recommendations. Any issue within the scope of the MLAC but not expressly regulated in it shall be solved in conformity with its principles. This rule is often used in UNCITRAL texts (e.g. Art. 3 MLEC; Art. 5 ECC; Art. 7 CISG; Castellani, 2016, p. 141) to ensure that the transformed provisions are interpreted uniformly in all countries that have adopted or transformed an UNCITRAL instrument. In practice, this means that, in interpreting the MLAC, a judge or arbitrator has to take into account the UNCITRAL guidelines as well as the content of judgements and arbitral awards of other countries on the pertinent topic (Diedrich, 1996, pp. 310–313; Heidemann, 2015). Finally, the law enacts the principles of party autonomy and technology neutrality in Art. 4 MLAC (see Section 4.2; MLAC Guide, paras. 42-43).

**4.3.2 Legal Recognition.** According to the central non-discrimination rule of Art. 5(1) MLAC, contracts formed entirely by automated systems are legally valid and enforceable. It is not of legal relevance if no natural person reviews, or intervenes in, the relevant declarations of a party. Thus, contracts can even be closed between automated systems (MLAC Guide, para. 46). This rule is complemented by Art. 5(3) MLAC. Any automated action—whether in forming or performing a contract—retains full legal effect, validity, and enforceability, regardless of the absence of human oversight. The MLAC adopts a deliberately expansive definition of “action” encompassing any “communication” (see Art. 2(a) ECC) – including statements, declarations, demands, notices, offers, and acceptances – as well as other outputs produced by an automated decision-making process in a contractual setting. An “action in connection with” contract performance further includes the exercise of contractual rights and remedies. This clause guarantees that automated communications enjoy full legal effect, validity, and enforceability, even in the absence of human intervention. The draft deliberately avoids the term “decision” so as not to imply that autonomous systems possess an autonomous will (MLAC Guide, paras. 50-51). Art. 5(2) MLAC provides that a contract performed entirely by an automated system remains valid and enforceable, e.g. smart contracts written in computer code and executed automatically on distributed ledger systems (Schmidt-Kessen et al., 2022, p. 3). In some jurisdictions, this is currently uncertain, but in many legal systems an explicit rule might be redundant. Therefore, this clause is presented as an optional provision (MLAC Guide, para. 47).

Contracts shall be valid and enforceable even if written in computer code (Art. 6(1) MLAC). This clause addresses another legal problem raised by smart contracts (Schmidt-Kessen et al., 2022, p. 3; MLAC Guide, para. 54). Art. 6(2), (3) MLAC ensures that the dynamic nature of data sources (e.g. information on market price or the location of an object in case of a smart contract, MLAC Guide, paras. 55-56.) cannot, by itself, undermine the legally binding nature of an electronic contract. Neither the validity nor enforceability of a contract may be challenged solely because it incorporates terms drawn from data sources that update periodically or continuously.

**4.3.3 Attribution of (Unexpected) Actions.** According to Art. 7 MLAC, an action performed by an automated system is “attributed” to a person. While the term attribution in Art. 13 MLEC establishes a presumption of the person of the originator of a data message, the MLAC uses it to determine the person behind the automated system who has to bear the legal consequences of the attributed output (MLAC Guide, para. 59, critical to this concept Rodríguez de las Heras Ballell, 2024, pp. 280–283). However, applicable substantive law determines the scope of the consequences (Art. 7(4) MLAC; MLAC Guide, paras. 62, 71). The MLAC is thus compatible with different concepts of obligation, liability, or responsibility. The attribution follows a two-tiered approach. Primarily, the actions of a system are attributed according to the procedure agreed between the parties of a contract (Art. 7(1) MLAC), e.g. in a framework agreement between the parties or by the rules of a third-party platform provider (MLAC Guide, para. 65). In the absence of such an agreement, an action performed by an automated system is attributed to the “person using the system” independently whether the other party is aware of interacting with an automated system or not (Art. 7(2) MLAC). This definition is rather wide, but the UNCITRAL gives indications how to determine this person by referring to deployment of, control over, or benefit derived from, the use of the system and the action, but also including the nature and purpose of the contract as well as trade usages and established practices (MLAC Guide, paras. 66-67). The solution of attribution also clarifies that the automated system does not act as an agent of the person closing the contract (as is discussed in Koos, 2021a, pp. 249–251; Martin-Bariteau & Pavlovic, 2021, pp. 14–16). In principle, the action is attributed to a person whether it is expected or unexpected (Art. 7(3) MLAC). However, the substantive law can determine that the tests of reasonableness and good faith limit the attribution of unexpected outputs (MLAC Guide, paras. 68-70; see further Frattone, 2024).

If such tests are not available in national law, Art. 8 MLAC offers an optional solution for unexpected output of an automated system. While a person using an automated system in contractual context generally bears the risks of using it, this burden shall be lifted if (a) that person could not reasonably have expected the action, and (b) the other party knew or could reasonably be expected to have known this (Art. 8(1) MLAC). The test of reasonableness shall be made along similar circumstances as in Art. 7(2) MLAC with reference to an objective perspective of a person in the position of the parties (MLAC Guide, paras. 81-82). This rule reflects that the influence of the user on a non-deterministic, autonomous output of AI is limited and even vulnerable to outside influences (Rodríguez de las Heras Ballell, 2024). Art. 8(2) MLAC declares the regulation of Art. 8(1) MLAC subject to the applicable rules of law or contractual agreements between the parties. The intention is not to interfere with party autonomy or with substantive law on liability, burden of proof or rules of evidence (MLAC Guide, para. 83; critical Frattone, 2024, pp. 422–423).

**4.3.4 Relationship to Other Rules of Law.** In its final provisions, the MLAC contains two rules complementing Art. 2(2) MLAC. Art. 9 MLAC clarifies that the MLAC does not impact on any rule requiring disclosure of “information on design, operation and use of automated system”. It emphasizes that additional obligations may arise under other legal regimes—such as AI ethics and governance statutes, consumer protection

laws, and data protection regulations. This approach was inspired by Art. 7, 13 ECC and promotes coherence with sector-specific rules (MLAC Guide, paras. 84-86).

In addition, Art. 10 MLAC clarifies that the use of an automated system does not permit the violation of applicable law. A user must bear the consequences of such violation by the automated system unless there are other extenuating circumstances under applicable substantive law. This applies to violation of contractual obligations as well as non-compliance with (e.g.) data protection laws, consumer protection laws, or laws regulating the ethical use and governance of AI (MLAC Guide, para. 90).

## 5 Discussion

The review of the MLAC in Section 4 shows that the addition of MLAC to international e-commerce law provides a short but detailed set of rules on the use of automated systems for contract formation and performance. The following shall explore the impact of MLAC to the UNCITRAL framework and its strengths, limitations, and implications.

### 5.1 MLAC Within the Framework of UNCITRAL E-Commerce Texts

The MLAC fills the gaps in existing UNCITRAL instruments with respect to the use of AI as can be seen in Table 1. Two aspects must be emphasized: Firstly, Art. 5 MLAC complements Art. 11 MLEC and Art. 8 ECC that only recognize contractual declarations of natural persons communicated through data messages, even if they are automatically sent by a system (MLEC Guide, para. 76; ECC Explanatory Note, para. 94, 129; MLAC Guide, para. 45). Secondly, as is required for autonomous actions of AI, MLAC concentrates on the output of the system, as input errors are already regulated by Art. 14 ECC (Frattonne, 2024, p. 422).

**Table 1.** AI Issues and UNCITRAL texts

Issues of AI use	Limitations of prior UNCITRAL texts	MLAC solution
Validity and enforceability of actions without human intervention	Art. 2(a), 8 ECC and Art. 11 MLEC require a defined human intent at least in using a deterministically programmed system	Art. 5 MLAC grants validity and enforceability to any contractual action of an automated system
Performance of a contract by AI	Art. 2(a), 8 ECC and Art. 11 MLEC do not cover contract performance	Art. 5 (2), (3) MLAC encompass performance of a contract by an automated system
Attribution of, and liability for, actions of AI	Art. 13 MLEC establishes a presumption on the originator of a data message to protect the addressee	Art. 7, 8 MLAC attribute an action of a system to the user of the system unless contractually agreed otherwise; liability shall be governed by national law
Dealing with non-deterministic actions	Art. 14 ECC regulates input errors	Art. 7, 8 MLAC concentrate on the output of the system including output errors and unexpected output

Apart from filling these gaps, MLAC generally adheres to the UNCITRAL principles as shown in Section 4.2. MLAC also follows the concept of Art. 7, 13 ECC clarifying the additional application of certain substantive rules of law, because it shall not interfere with national contract law or sector-specific rules (Section 4.3.2 and 4.3.4).

## 5.2 Strengths of MLAC

The MLAC strikes a balance between fostering innovation and preserving core contract-law principles (similar Shaltout, 2025, pp. 230–231). As detailed in Sections 4.2 and 4.3.1 above, the scope of application covers both automated and autonomous systems as well as new technologies. The technologically neutral approach offers a long-standing solution: once enacted, the MLAC does not require constant revision. However, the broad definition encompasses AI agents from simple algorithmic bots to advanced machine-learning models. It could be argued that the law maker should distinguish low-risk rule-based tools from high-risk autonomous AI systems. As regulations on ethical use of AI partially address this, businesses themselves should assess the usefulness of AI for trade and the risk associated with such use. Therefore, such a distinction is not necessary.

The mandate to apply good faith and promote uniformity equips judges and arbitrators with principles that are flexible and will be developed in time alongside the evolving technologies (see Section 4.3.1) but also incorporates the previous interpretation of other UNCITRAL e-commerce texts. This allows for a uniform basis of international trade with AI and consistency across diverse legal systems.

The MLAC establishes a clear rule: lack of human involvement alone cannot invalidate a contract or its performance (see Section 4.3.2). By allowing parties to agree on attribution procedures while supplying default rules as detailed in Section 4.3.3, the MLAC strikes a balance between contractual freedom and legal predictability. The validation of machine-executable code and references to real-time data feeds as explained in Section 4.3.2 legitimizes modern practices like smart contracts that are often used in conjunction with AI systems (Awang, 2024, p. 96; Martin-Bariteau & Pavlovic, 2021).

MLAC intentionally does not regulate contract formation or performance or the rights and obligations under a contract. As supplement to existing contract law and legal instruments in e-commerce, the rules shall interfere with applicable substantive law as little as possible. This regulatory restraint is laudable as it focuses on the essential content required to regulate the use of AI in a contractual context. The sectoral frameworks on use of AI and other legal obligations also remain untouched by MLAC (see Section 4.3.4). In particular, the non-avoidance rule in Art. 10 MLAC reinforces personal accountability to applicable law by preventing parties from sidestepping their duties through use of AI.

## 5.3 Limitations of MLAC

While allowing for great scope of party autonomy (see Section 4.3.1), less sophisticated parties may struggle to negotiate robust attribution clauses. Therefore, national law makers might consider supplementary regulation in consumer protection law or law on

general terms and conditions. Alternatively, international organizations, e.g. the International Trade Centre could provide model contracts for use of small businesses.

The local law maker is not required to adopt the MLAC in its entirety. The optional Art. 5(2), 8 MLAC risk uneven adoption. Jurisdictions must assess whether to incorporate those clauses based on local law with particular focus on the intentions of the MLAC. Incorporation into national law also requires adoption to the national legal language. Even though a uniform interpretation is required, the use of special terms of national law could interfere with this interpretation. Finally, as a model law, the MLAC will not be transformed into the law of all countries. The problems discussed in Section 2 will partially remain.

#### **5.4 Implications for Use of AI in Business**

The MLAC's recognition of machine-generated offers and acceptances removes obstacles toward AI-negotiated deals for trade finance, supply agreements, and other trade-related contracts. The validation of executable code and dynamic data feeds empowers international traders to implement AI-powered actions for smart-contracts, live-pricing, and real-time risk adjustments.

#### **5.5 Key findings**

- The rapid integration of artificial intelligence into cross-border commerce demands new legal frameworks that accommodate AI-driven negotiation, formation, and performance of contracts.
- MLACs technology-neutral design, clear recognition of machine actions and deference to specialized regimes set a strong foundation for international trade using AI.
- It validates contracts formed or performed entirely by AI systems.
- Due to MLAC's limited scope and content, the contract itself and its fulfilment are subject to the agreed contractual provisions and, in addition, to the applicable law. Thus, it minimally interferes with national contract law and does not impede on other legal obligations.
- Party autonomy may disadvantage less experienced parties like small businesses.
- As model law and with optional provisions, there is a high risk of inconsistent adoption across jurisdictions.

#### **5.6 Limitations of this Analysis**

As MLAC is a new international instrument, this review can only be a personal interpretation based on the available primary and secondary UNCITRAL resources and comprehensive literature review. So far, the test of adoption into national law through focused case studies is not available to support the interpretation. Details of the regulation might be interpreted differently by court decisions. The study is also based on the perspective of a civil law system and might be biased by its underlying principles of interpretation.

## **6 Recommendations on Transformation into National Law**

Due to the favorable assessment in Section 5, the MLAC should be transformed into national law. When implementing the Model Law domestically, legislators should consider some further aspects. The key terms such as “automated system” and “data message” should align with definitions in existing domestic laws on electronic transactions, AI governance and cybersecurity to avoid conflicting interpretations. They should conduct a comprehensive survey of consumer protection, data protection and AI-ethics laws and insert a clear cross-reference or deferral mechanism (as in Art. 9 MLAC) so that sectoral requirements remain applicable alongside the transformed rules of the MLAC. If legally necessary, the drafters should incorporate a provision mandating consideration of the law’s international origin, uniformity in application and observance of good faith, providing judges and arbitrators with binding interpretative guidance. In this context, explicit legislative notes could be included referencing the MLEC, the ECC and other UNCITRAL model laws in the area of e-commerce to promote coherence in the regulation of digital trade.

## **7 Practical Application for Businesses**

The transformation of MLAC into national law will require some time. In the interim, if enterprises aim to use AI (e.g. for formation of a purchase contract under a framework agreement or declarations of non-conformity), the parties may refer to the MLAC in addition to the general choice of law in their contract (e.g. a framework supply agreement) and thus invoke its application with the following clause: “The regulations of the UNCITRAL Model Law on Automated Contracting shall apply to any use of automated systems as defined therein for the purpose of forming and performing a contract under this Framework Agreement.” Alternatively, the parties may insert the pertinent regulations of Art. 1, 5-8 MLAC into their agreement. The incorporation into the contract ensures that the legal treatment of actions and declarations by AI is clearly regulated in the contractual relationship. In court or arbitration, the MLAC provisions are interpreted autonomously based on the guidance provided by the UNCITRAL.

## **8 Further Research Opportunities**

Further research should monitor the transformation of the MLAC into national laws, in particular, the jurisdictional uptake of optional provisions to identify best practices and areas for harmonization. In addition, the coming interpretation of the various clauses by judges and arbitrators will require researchers to create a structured framework for the autonomous interpretation of the MLAC. Interdisciplinary studies could uncover the practical and legal problems of the use of AI for international contract formation and performance and review these under the MLAC rules to reflect on the economic impact and legal usefulness of the MLAC.

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## Glossary of Abbreviations

AI	Artificial Intelligence
CISG	UN Convention on Contracts for the International Sale of Goods 1980
ECC	UN Convention on the Use of Electronic Communications in International Contracts
MLAC	Model Law on Automated Contracting 2024
MLEC	UNCITRAL Model Law on Electronic Commerce 1996
Rome I Regulation	Regulation (EC) No 593/2008 on the law applicable to contractual obligations (Rome I)
TMTM Law	Federal Decree Law No. (46) of 2021 on Electronic Transactions and Trust Services
UN	United Nations
UNCITRAL	UN Commission on International Trade Law
WTO	World Trade Organization

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