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Draft guide to enactment of the provisions on automated contracting

Note by the Secretariat

Contents

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I. About this note

1. This note contains a draft guide to enactment that accompanies the third revision of the draft provisions on automated contracting (see A/CN.9/1193). The draft guide has been prepared by the UNCITRAL secretariat at the request of the Working Group at its sixty-sixth session (A/CN.9/1162, para. 93).

II. Draft guide to enactment

A. Introduction

1. Objectives

2. Automation has long been seen as a tool to enhance trade through its potential to reduce transaction costs, increase efficiencies and produce economic benefits in connection with various trading activities. In the digital economy, the quality and availability of data and improvements in computational power have led to the deployment of automated systems to support a range of decision-making processes, including those producing legal effects. One area where this is happening is commercial contracting.

3. Contracts are formed by expressions of will that are communicated between the parties (e.g., offer and acceptance). For almost 30 years, UNCITRAL texts on electronic commerce have enabled the use of electronic means to communicate expressions of will, to conclude contracts in electronic form, and to carry out other actions throughout the contract life cycle – a practice which is sometimes referred to as "electronic contracting". The present [instrument] takes a next step by enabling the use of automation – i.e. the use of computers to communicate and to perform other actions without immediate human intervention – for electronic contracting.

4. If electronic contracting overcomes physical distance between the parties, the use of automation (i.e., the use of computers to interact without immediate human intervention) reintroduces a different kind of distance between each party and the communications and other actions carried out in the formation and performance of contracts. And while electronic contracting ordinarily involves some degree of automation, the increased sophistication and complexity of automated systems may be seen to amplify this distance. This is particularly the case for automated systems deploying techniques associated with artificial intelligence ("AI") that are designed and programmed to operate "autonomously", for which it may be difficult to explain the actions carried out by the system ("explainability") and to trace that output to the will of a particular party ("traceability"). This concern has, in turn, raised questions as to the validity of using automation to form and perform contracts and, more broadly, the applicability of existing law, notably the rules of contract law.

5. The present [instrument] responds to these questions by establishing a legal framework to enable automated contracting. It is intended to complement and supplement laws on electronic transactions, in particular those based on other UNCITRAL electronic commerce texts, and to signal potential intersections with other laws, including an emerging body of law regulating the ethical use and governance of automated systems deploying AI techniques.

6. The present [instrument] does not seek to establish a complete code for automated contracting, nor does it address legal issues related to the use of automation and AI beyond the contractual setting. Nevertheless, the concepts and principles on which the [instrument] is based may offer guidance to States on addressing these issues, including in the application of other laws governing extracontractual obligations or in implementing standards on the ethical use of AI, thus promoting coherence in the legal treatment of automated systems. Moreover, its substantive provisions may offer guidance to contracting parties in setting the conditions on which automated systems

are used in their contractual relations, including as part of agreed frameworks for automated transactions between them.

2. Key concepts and principles

(a) Automated contracting

7. Automated systems are used in trade for transactions throughout the contract life cycle, namely in the formation and performance of contracts (A/CN.9/1093, para. 57). At UNCITRAL, this practice is generally referred to as "automated contracting". Another term in use is "algorithmic contracting", which not only emphasizes the role of software components in the automation process, but also evokes the use of algorithmic processes powered by AI techniques. Automated contracting is distinguished from contracting for the supply of automated systems or AI-enabled goods and services (see A/CN.9/1093, para. 58); in broad terms, it is concerned with the use of AI and automation "to trade" rather than the use of AI and automation "in trade".

8. Automated contracting may be regarded as electronic contracting (see para. 3 above) with reduced human involvement. It is essentially the use of automated systems to generate or otherwise process data messages (i.e., "outputs" and "inputs") that are recognized as communications in connection with the formation of contracts, such as an offer or acceptance of an offer, or other actions in connection with the performance of the contract. In this sense, automated contracting is not a new phenomenon; it is a practice that was expressly recognized by UNCITRAL in 2005 with the inclusion of articles 12 and 14 in the 2005 United Nations Convention on the Use of Electronic Communications in International Contracts (ECC), and in the domestic law of a number of jurisdictions well before then. Legal issues related to use of electronic data interchange (EDI) to support automation in a contractual setting were raised within UNCITRAL in the 1990s and contemplated in the 1996 UNCITRAL Model Law on Electronic Commerce (MLEC),[1] and the use of machines in contract formation dates back much further.

9. Earlier work at UNCITRAL on automated contracting focussed on two main use cases, namely supply contracts formed by electronic communications sent between computers through EDI and sales contracts formed by a natural person placing an order through a website (i.e. interacting with the automated system operating "behind" the website).[2] Other use cases of contracts deploying EDI and Internet-based technologies subsequently gained attention, including contracts formed by "smart" devices placing orders via connected online platforms, and contracts formed by Internet bots interacting with websites (e.g. "screenscraping bots" and "shopping bots").[3] More recently, advances in AI technology and the deployment of distributed ledger technology have enabled or popularized other use cases involving automated negotiation tools (e.g., interactive "chatbots"), algorithmic trading platforms, and "smart contracts".[4]

10. During the development of the [instrument] at UNCITRAL, automated contracting was being used principally for routine low-risk transactions (A/77/17, para. 156) and transactions carried out under agreed frameworks (A/CN.9/1093, para. 66), such as

[1] As discussed in the remarks below on article 6, the MLEC contains a rule regarding the attribution of data messages sent by automated systems and the explanatory note recognizes the use of computers in contract formation: see *UNCITRAL Model Law on Electronic Commerce with Guide to Enactment 1996 with Additional Article 5 bis as Adopted in 1998* (United Nations publication, Sales No. E.99.V.4), para. 76.

[2] *United Nations Convention on the Use of Electronic Communications in International Contracts* (United Nations publication, Sales No. E.07.V.2), para. 104.

[3] A/CN.9/WG.IV/WP.179, para. 9.

[4] Ibid., paras. 11–19. In a contractual setting, "smart contracts" are generally understood to refer to computer programs that can be used to automate (in part of in full) the performance of a contract (A/CN.9/1125, paras. 34–35). They are commonly associated with distributed ledger systems, where they can be deployed with no connection to a contract. They can also be deployed in other systems, as well as outside a contractual setting.

online platforms and other digital ecosystems (A/CN.9/1125, para. 55). Nevertheless, it was anticipated that AI techniques would eventually be deployed to support tasks associated with increasingly complex decision-making processes, including devising new negotiation strategies and settling more sophisticated contract terms, which would facilitate the use of automated contracting in a broader range of transactions, including transactions carried out in the absence of any pre-existing framework.[5]

(b) Fundamental principles

11. In order to accommodate the variety of existing use cases of automated contracting, as well as innovations in technology and the development of new trade practices that might not have been foreseen at the time of its development, the [instrument] pursues the principle of technology neutrality, like other UNCITRAL texts on electronic commerce. The principle of technology neutrality dictates that the law should not mandate or favour the use of any specific technology or method, thus making the law future-proof. In the present [instrument], the principle is enshrined in article 3 of the [instrument] and informed the drafting of its provisions. In particular, the [instrument] purposefully does not refer to "smart contracts", which are commonly associated with distributed ledger technology, and instead refers in more neutral terms to contract automation (A/CN.9/1125, para. 34).[6]

12. The [instrument] also pursues the principle of non-discrimination. Unlike the MLEC, ECC and other UNCITRAL texts on electronic commerce, the present [instrument] is concerned so much with the use of electronic means (i.e. the absence of physical form) as with the use of automation (i.e. the absence of human involvement). It therefore eschews the differential treatment of contracting based solely on the use of automated systems, and thus the creation of dual regimes whereby different legal requirements apply depending on whether the contract was formed and performed with human involvement. In doing so, it refrains from giving preference to, or requiring, the use of automated systems, and does not preclude other laws that may impose specific requirements or restrictions on the use of automated systems on grounds that are peculiar to automated systems, such as requirements for human-centric design. Because of its focus on the use of automation rather than on the use electronic means, the [instrument] does not contain any provisions applying a functional equivalence approach, and therefore does not seek to identify the functions of human-centric legal requirements or to prescribe how those requirements might be met by using an automated system. Indeed, it was acknowledged when developing the [instrument] that automated contracting does not always have a clear equivalent in "traditional" paper-based or in-person contracting (A/CN.9/1093, para. 71; A/CN.9/1162, para. 13).

13. Another principle that is pursued by the [instrument] is party autonomy. In the context of automated contracting, the principle of party autonomy respects the freedom of the parties not only to use automated systems in their contractual relations, but also to regulate that use by agreement, within the limits of mandatory law. Such regulation may be contained in a framework contract between the parties (e.g., EDI agreement) that sets the conditions for automated transactions between them, or in the rules of a platform operated by a third party to which the parties have assented that sets the conditions for automated transactions on the platform (A/CN.9/1125, para. 55), and may address matters such as attribution, liability, and information disclosure. By doing so, the [instrument] seeks to promote technological innovation and the development of new trade practices.

3. Drafting history

14. The present [instrument] has its origins in exploratory work carried out by the UNCITRAL secretariat on legal issues related to the digital economy, which had been mandated by the Commission in 2018 at its fifty-first session (New York, 25 June–13 July 2018) in the context of a proposal by the Government of Czechia for

[5] A/CN.9/WG.IV/WP.179, para. 20.

[6] On the concept of "smart contract", see note 4 above.

the secretariat to monitor developments relating to the legal aspects of smart contracts and AI (A/CN.9/960).[7]

15. In 2019, at its fifty-second session (Vienna, 8–19 July 2019), the Commission was informed by the secretariat that its exploratory work had identified several lines of enquiry that might crystallize into more concrete proposals for consideration, including the validity of actions carried out by AI systems and associated liability.[8] The Commission requested the secretariat to prepare a workplan to address specific legal issues identified in the course of its exploratory work, including recommendations both for dealing with those issues in existing instruments and for the development of specific new instruments, as appropriate.[9] In that connection, it was emphasized that the exploratory work should focus on legal obstacles and that any future work should "respect the principle of technology neutrality, be future-proof and focus on the disruptive impact of emerging technologies on commercial transactions".[10]

16. In 2020, at its resumed fifty-third session (Vienna, 14–18 September 2020), the Commission received a progress report from the secretariat which put forward a workplan to address the legal issues identified in its exploratory work (A/CN.9/1012). Among other things, the workplan singled out the use of AI and automated systems in the negotiation, formation and performance of contracts as a topic for preparatory work towards a new legislative text. Broad support was expressed in the Commission for work to continue in accordance with the workplan, while a range of points were raised to inform that work. Among other things, the Commission requested the secretariat to organize colloquiums to refine the scope of the topics identified in the workplan and to present proposals for concrete legislative work for consideration by the Commission at its next session in 2021.[11]

17. In 2021, the secretariat convened an expert group meeting (Vienna, 8–9 March 2021) to consult on a proposal for legislative work on AI and automated contracting. The Commission considered the proposal (A/CN.9/1065) at it its fifty-fourth session (Vienna, 28 June–16 July 2021), at which broad support was expressed to refer the issues identified therein to UNCITRAL Working Group IV. The Commission mandated the Working Group, which was then finalizing work on the use and cross-border recognition of identity management and trust services, to host a "focused conceptual discussion" with a view to refining the scope and nature of the work to be conducted.[12]

18. That discussion took place at the sixty-third session of the Working Group (New York, 4–8 April 2022), which focused on the distinction between automated and AI systems and the concept of "automated contracting" (A/CN.9/1093, paras. 49–59). The Working Group also exchanged preliminary views on the applicability of the substantive provisions and underlying principles of the MLEC, ECC and other UNCITRAL texts on electronic commerce to automated contracting, and on legal issues to be addressed in future work (ibid., paras. 49–76). The outcome of that discussion was considered by the Commission at its fifty-fifth session (New York, 27 June–15 July 2022), at which broad support was expressed for the Working Group to continue work on the topic, and for such work to proceed incrementally on the basis of a review of business practice and use cases.[13] The Commission therefore requested the Working Group to deal with the topic in two stages: (a) as a first stage, to compile provisions of UNCITRAL texts that apply to automated contracting, and to revise those provisions, as appropriate; and (b) as a second stage, to identify and develop possible new provisions that address a broader range of issues.[14]

[7] *Official Records of the General Assembly, Seventy-third Session, Supplement No. 17* (A/73/17), para. 253(b).
[8] Ibid., *Seventy-fourth Session, Supplement No. 17* (A/74/17), para. 209.
[9] Ibid., para. 211.
[10] Ibid., para. 210.
[11] Ibid., *Seventy-fifth Session, Supplement No. 17* (A/75/17), part two, para. 76.
[12] Ibid., *Seventy-sixth Session, Supplement No. 17* (A/76/17), paras. 25(e) and 236.
[13] Ibid., *Seventy-seventh Session, Supplement No. 17* (A/77/17), paras. 156–159.
[14] Ibid., para. 159.

19. At its sixty-fourth session (Vienna, 31 October–4 November 2022), the Working Group started a process of distilling "principles" from existing UNCITRAL texts and developing additional principles on legal issues not fully addressed in those texts, on the view that those principles could eventually serve as a basis for a set of legislative provisions on automated contracting (A/CN.9/1125, para. 16). By the close of the session, the Working Group had formulated a set of draft principles on the legal recognition of contracts formed or performed using an automated system, compliance of automated systems with applicable laws, and attribution of the output of automated systems (A/CN.9/1125, paras. 62–90), and requested the secretariat to continue developing the set of principles with a view to putting forward proposals for additional principles on other legal issues considered during the session.

20. Based on a suggestion put forward within the Working Group, the secretariat held an intersessional event (Vienna, 17 January 2023) in collaboration with the European Law Institute to explore these issues with actors involved in the design, operation and use of automated systems. At its sixty-fifth session (New York, 10–14 April 2023), the Working Group considered a first revision of the principles based on key takeaways from the intersessional event, which included new principles on state of mind and liability (A/CN.9/1132, paras. 52–85).[15] At its sixty-sixth session (Vienna, 16–20 October 2023), the Working Group considered a second revision of the principles (A/CN.9/1162, paras. 11–58), and requested the secretariat to revise and recast the principles as model legislative provisions (ibid., paras. 90–93).

4. Techniques for enactment

21. As noted above (para. 8), automated contracting is essentially a form of electronic contracting with reduced human involvement. A legal framework for automated contracting therefore relies on an enabling legal framework for electronic contracting. The provisions in the present [instrument] are intended to complement laws that establish such a framework, in particular laws on electronic transactions that are based on, or influenced by, the provisions of part one of the MLEC and the substantive provisions of the ECC. The present [instrument] does not seek to reproduce those provisions so as not to affect the standing of both texts. In that regard, the MLEC was enacted in over 80 States at the time of drafting and served as a global standard for laws on electronic transactions, while the ECC established a treaty regime with respect to international contracts that was implemented by States Parties in a variety of ways specific to each State.

22. For States that have enacted the MLEC (with or without the substantive provisions of the ECC), the provisions of the present [instrument] could be enacted by supplementing the law enacting the MLEC. For States that are parties to the ECC, which are already under an obligation with respect to the legal recognition of international contracts formed using an automated system, the provisions of the present [instrument] could be enacted as part of a more comprehensive law enabling electronic contracting that applies the substantive provisions of the ECC to domestic contracts (if not done so already).

B. Article-by-article remarks

1. Article 1. Definitions

(a) Definition of "automated system" (paragraphs 1(a) and 2)

23. Paragraph 1(a) of article 1 defines the concept of "automated system". It builds on the definition of "automated message system" in article 4(g) of the ECC and is intended to be consistent with that definition, which remains apt to describe the systems used for automated contracting (A/CN.9/1093, para. 53). The use of the term "computer system" in the definition clarifies that the [instrument] is concerned with systems that

[15] The intersessional event, including key takeaways, was reported to the Working Group in A/CN.9/WG.IV/WP.179.

involve the execution of computer programs (in particular those implementing algorithms for performing predefined tasks or objectives) and acknowledges that an automated system may comprise software components (i.e., computer programs) and hardware components (e.g., equipment) (A/CN.9/1132, para. 58(a)).

24. Consistent with other UNCITRAL texts,[16] the [instrument] refers to automated systems carrying out "actions". The term "action" is used in the definition – and in other provisions of the [instrument] – in a general, neutral sense to refer to any operation performed by the automated system on which a party may wish to rely in contracting. It is not necessary for the action to be associated with any physical act or juridical act,[17] or to bear any physical equivalent in paper-based or in-person contracting. An action will ordinarily be constituted by an output generated by the system, but may also be constituted by an input processed by the system (e.g., an action attributed to a person interacting with the system). Whether a particular output or input constitutes an action is not addressed in the [instrument] and is to be determined under other law.

25. The words "review or intervention" in the definition are drawn directly from the definition of "automated message system" in article 4(g) of the ECC. The requirement in the definition for such review or intervention to be "necessary" is intended to avoid the implication that an automated system ceases to fall within the definition on the sole ground that the system is subject to human oversight (A/CN.9/1132, paras. 58(b) and 60). The [instrument] does not itself establish any requirement for an automated system to be subject to human oversight, which might be imposed by regulations implementing standards on the ethical use of AI that are referred to in paragraph 2 of article 2 (see para. 33 below).

26. The definition of "automated system" is to be read with paragraph 2 of article 1, which states that an automated system "may be programmed to operate in a deterministic or non-deterministic manner". The term "deterministic" is intended to denote a system that always generates the same output given the same input, which may also be referred to as a "rule-based system" (A/CN.9/1093, para. 55). Conversely, a "non-deterministic" system may be said to operate in a "stochastic" manner (ibid.), generating an output that may not be predicted in a particular case but within a range of probabilities. Paragraph 2 thus clarifies that the term "automated system" encompasses not only AI systems – and more specifically "weak" AI systems that are recognized in theory and deployed in practice (A/CN.9/1132, para. 55) – but also more "unsophisticated" systems that would not ordinarily be described as exhibiting "intelligence". It also clarifies that an automated system may comprise components that operate deterministically and components that operate non-deterministically (A/CN.9/1132, para. 60).

27. Paragraph 2 strikes a balance between technology neutrality and acknowledging a key feature that distinguishes an AI system from other automated systems, namely the predictability of its operation (A/CN.9/1093, para. 55; A/CN.9/1125, para. 28; A/CN.9/1162, para. 16(b)). In other words, rather than simply performing predefined tasks, AI systems use methods that improve the performance of those tasks and allow for the performance of new tasks according to predefined objectives. Such systems are sometimes described as "autonomous" (A/CN.9.1125, para. 28), although the [instrument] purposefully does not use that term to avoid the implication that they have an independent will.

(b) Definition of "data message" (paragraph 1(b))

28. Paragraph 1(b) of article 1 reproduces the definition of "data message" that is established in other UNCITRAL texts. As noted above (para. 8), the [instrument] conceptualizes automated contracting as the use of automated systems to generate or otherwise process data messages (i.e., outputs) that constitute actions in connection

[16] See, e.g., articles 4(g) and 12 of the ECC.
[17] A/CN.9/WG.IV/WP.179, para. 17(b).

with the formation or performance of a contract. Consistent with the use of term in other UNCITRAL texts, data messages may constitute the terms of the contract or a communication in connection with the contract, whether alone or with other data messages that are logically associated or otherwise linked.

2. Article 2. Scope of application

(a) Matters within scope (paragraphs 2(1))

29. Paragraph 1 of article 2 clarifies the scope of the [instrument] and illustrates how automated systems are used to form and perform contracts.

30. The terms "formation" and "performance" are intended to cover the various stages of the contract life cycle. Consistent with the approach taken in the ECC, the concept of "formation" encompasses pre-contractual negotiations and the conclusion of a contract, while the concept of "performance" encompasses non-performance, modification of contract terms, and the exercise of rights arising out of the contract, including termination and other "self-help" remedies (A/CN.9/1132, paras. 61 and 64). The concept of "performance" would cover initiating a dispute resolution process provided for under the contract, but it is not intended to extend to the entire dispute resolution process defined elsewhere (ibid., paras. 62–64).

31. Ordinarily, the term "processing" is a catch-all term that refers to a range of operations carried out by the automated system, including generating or sending data messages (i.e., outputs) and receiving data messages (i.e., inputs). In illustrating how automated systems are used to form and perform contracts, paragraph 1 purposefully calls out "generating" data messages in acknowledgment that the output of a deterministic systems may not necessarily correlate with the inputs processed by the system (A/CN.9/1162, paragraph 17(a)).

32. Article 2 does not delimit the types of contracts or transactions to which the [instrument] applies. It was acknowledged when developing the [instrument] that automated contracting was prevalent in consumer transactions and in trading financial instruments (commonly referred to as "high-frequency trading") (A/CN.9/1093, paras. 65–66; A/CN.9/1125, para. 14). The substantive provisions of the [instrument] apply on their own terms to consumer transactions and to high-frequency trading, subject to any other laws (e.g., consumer protection laws and financial market regulations) that may limit, prohibit or otherwise regulate the use of automated systems for such transactions, whose application is preserved by paragraph 2 of article 2. Moreover, as noted above (para. 5), the [instrument] is intended to supplement existing laws on electronic transactions, in particular those based on other UNCITRAL electronic commerce texts, in which case its substantive provisions would ordinarily pick up any limits contained in those laws.[18]

(b) Matters outside scope (paragraphs 2(2))

33. Paragraph 2 of article 2 is modelled on article 2(4) of the 2022 UNCITRAL Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services and operates as a "give way" clause in the event of conflict between the provisions of the [instrument] and other laws. It is intended primarily to preserve the application of laws regulating the ethical use and governance of AI. Such laws may limit, prohibit or otherwise regulate the use of particular methods in AI systems or the use of AI systems for particular transactions, and may oblige the person using the AI system for a particular transaction to disclose information regarding the use or operation of the system. Paragraph 2 would also cover laws regulating the automated processing of personal data as well as laws regulating transactions with consumers or other weaker parties.

[18] For example, footnote ** to article 1 of the MLEC contemplates that a State enacting the MLEC may expressly preserve "any rule of law intended for the protection of consumers".

3. Article 3. Technology neutrality

34. Article 3 restates the principle of technology neutrality as it applies to automated systems used in contracting and reinforces the technology-neutral definition of "automated system". It does not preclude the application of other laws requiring a particular method to be used (or not to be used) in the operation of automated systems (see remarks on article 2(2) in para. 33 above). The term "method" is used in other UNCITRAL texts and encompasses the various technologies and techniques deployed by automated systems, including those associated with AI.[19]

4. Article 4. Legal recognition of automated contracting

35. Article 4 sets forth a set of non-discrimination provisions using a formulation that has become standard in UNCITRAL texts on electronic commerce. It is concerned with the validity and enforceability of contracts formed or performed using automated systems and with the legal effect of actions in connection with such contracts. It sends an important signal that the use of an automated system does not preclude the application of rules of contract law relating to the formation and performance of contracts, which is reinforced by article 9.

36. Article 4 is not concerned with the lawfulness of the content of a particular data message, nor does it preclude the application of other law that may deny legal effect, validity or enforceability on other grounds (e.g., a contractual requirement for an action to be carried out with human involvement), or other law that may limit, prohibit or otherwise regulate the use of automated systems (including a law covered by article 2(2)). Rather, it is aimed at overcoming obstacles to applying existing legal requirements to contracts formed and performed using an automated system. As such, article 4 complements article 11 of the MLEC (and article 8 of the ECC); while article 11 of the MLEC gives legal recognition to contracts and contractual actions in the form of data message, article 4 of the present [instrument] maintains that legal recognition where no human is involved in forming the contract or carrying out the action.

37. Article 4 refines and expands the rule in article 12 of the ECC. Like article 12 of the ECC, paragraph 1 of article 4 applies to contracts formed by the interaction of an automated system and a natural person and to contracts formed by the interaction of automated systems. Article 4 does not presuppose that the automated system is operated by a party, and therefore applies equally to contracts formed using an automated system operated by a third party. In that scenario, the attribution rule in article 6(1) will be particularly relevant in determining the parties to the contract.

38. Article 4 also applies to actions that are carried out by automated systems in connection with the formation or performance of a contract. The term "action", which is discussed above (para. 24), covers a "communication" within the meaning of the ECC (i.e. "any statement, declaration, demand, notice or request, including an offer and the acceptance of an offer") or other outcome of decision-making process for which an automated system might be used in a contractual setting. An action "in connection with" the performance of a contract covers not only the communications or other actions provided for under the contract, but also the exercise of rights under the contract and remedies prescribed in the contract or permitted by law outside the contract (A/CN.9/1132, para. 61). Accordingly, article 4 would give legal recognition to a "rejection" of a claim under a contract for insurance, or a "designation" of a place, time, object or amount under a contract for the sale of goods, that is generated and sent by an automated system. Article 4 purposefully does not use the term "decision" to avoid the implication that automated systems have an independent will capable of "making" decisions (as opposed to generating the outcome of a decision-making process deployed by the decision-maker).

[19] See, e.g., *UNCITRAL Model Law on Electronic Signatures with Guide to Enactment 2001* (United Nations publication, Sales No. E.02.V.8), para. 107; *UNCITRAL Model Law on Electronic Transferable Records* (United Nations publication, Sales No. E.17.V.5), para. 122.

39. For some legal systems, the use of an automated system to perform a contract may be regarded as a function of party autonomy, such that a rule giving legal recognition to that use may be regarded as unnecessary. In other legal systems, however, such a rule may be needed. For that reason, article 4 applies not only to actions in connection with the formation of contracts but also to actions in connection with the performance of contracts.

5. Article 5. Legal recognition of contracts in computer code or involving dynamic information

40. Article 5 addresses two issues that are not unique to automated contracting, but which have been raised in legal doctrine in some legal systems as issues of particular significance for contracts that are formed or performed by automated systems.

41. Paragraph 1 deals with contracts whose terms are expressed (in whole or in part) in computer code. Computer coding translates actions into machine-readable instructions that can be executed by automated systems. Contracts in the form of computer code are thus amenable to automated performance without further human intervention, and are sometimes described – in a manner somewhat apt to confuse in some legal systems – as "self-executing". This does not mean, however, that computer code executed by an automated system in performance of a contract will always express the terms of the contract. In many cases, the code will simply express the actions carried out in performance of a contract whose terms are expressed elsewhere, in which case paragraph 1 is not applicable.

42. Computer code is a type of data message as defined in paragraph 1(b) of article 1. In some legal systems, contracts in the form of computer code may already be covered by laws that give legal recognition to contracts in electronic form (i.e. formed by data messages), including laws enacting article 11 of the MLEC. Nevertheless, the analysis of "smart contracts" in legal doctrine has raised questions about the ability of law to recognize and makes sense of contracts in the form of computer code, insofar as their terms are not expressed in natural language nor accessible to natural persons (in the sense of being readable and interpretable by a human). Paragraph 1 is intended to clarify that legal recognition of contracts in electronic form extends to contracts in the form of computer code. However, it is not intended to displace rules of evidence or other law relating to the determination and interpretation of contract terms.

43. Paragraph 2 deals with contracts whose formation or performance involves the use of dynamic information (see A/CN.9/1125, paras. 22 and 84; A/CN.9/1162, paras. 27–45). Dynamic information refers to information from a data source that changes periodically or continuously (e.g., information on market price or on the location of an object). In the context of automated contracting, dynamic information is particularly relevant as it may form part of the terms of the contract (i.e., terms that change periodically or continuously), or trigger an automated action carried out in performance of a contract (A/CN.9/1162, para. 22). Subparagraph (a) of paragraph 2 deals with the former issue, which concerns the incorporation of terms, while subparagraph (b) deals with the latter issue, which concerns actions performed on the basis of dynamic information which need not form part of the terms of the contract.

44. The concepts and terminology reflected in paragraph 2 draw on article 5 bis of the MLEC (which deals with the incorporation of information into a data message by reference), article 13 of the ECC (which deals with contract terms in the form of data messages), and article 6 of the 2017 UNCITRAL Model Law on Electronic Transferable Records (MLETR) (which deals with the inclusion of additional information in an electronic record).[20] Subparagraph (a) does not preclude the application of other law that may deny the validity or enforceability of a contract comprising dynamic

[20] The explanatory note to the MLETR states that such additional information could consist of dynamic information, i.e. "information that may change periodically or continuously, based on an external source": *UNCITRAL Model Law on Electronic Transferable Records*, above note 18, para. 58.

information on other grounds (e.g., legal requirements regarding the incorporation and certainty of terms).

6. Article 6. Attribution of actions carried out by automated systems

45. Article 6 deals with the attribution of actions carried out by automated systems (i.e., the outputs of automated systems).

46. The term "attribution" can carry different meanings, even within the context of electronic transactions. For instance, article 13 of the MLEC contain rules on the attribution of data messages that are intended to apply "where there is a question as to whether a data message was really sent by the person who is indicated as being the originator".[21] Those rules are concerned with linking a data message to a person to the exclusion of another person (e.g., a person acting under the authority of the originator, or a person fraudulently passing off as the purported originator). Accordingly, article 13(2) contains a rule attributing a data message sent by another person acting under the authority of the originator, while article 13(3) entitles a party to the electronic transaction to rely on a data message as having been sent by the originator, even if the message is proven in fact to have been sent by another unauthorized person. While the rules in article 13 of the MLEC do not deal with liability for data messages, they have the effect of allocating risk between the parties to an electronic transaction, and thus deal to some extent with matters of substantive law.

47. Conversely, the concept of "attribution" in article 6 is concerned with linking the output of an automated system to a person to the exclusion of the system itself (A/CN.9/1125, para. 44). In other words, it is concerned with identifying the person "behind" the output. It is not concerned with allocating liability for that output (i.e. the legal consequences flowing from the output) or with authentication (i.e., verifying that a data message processed by an automated system was generated or sent by a particular person or object associated with the system). Article 6 is not intended to deal with matters of substantive law (A/CN.9/1132, para. 69).

48. Article 6 is thus of limited scope. Nevertheless, it reaffirms an important element in establishing a legal framework for the use of AI and automation in contracting (see A/CN.9/1132, para. 69), which is that automated systems are tools with no independent will or legal personality and that the output of automated systems should be attributed to persons and not to the system itself (A/CN.9/1125, para. 28; A/CN.9/1162, para. 28). Linking the output of an automated system to a natural or legal person is not a novel concept, nor is it unique to a contractual setting. In the context of intellectual property, for instance, linking outputs generated by an AI system to natural or legal persons is ordinarily required to establish the authorship or inventorship of a natural or legal person (although the analysis sometimes engages questions related to creativity, ingenuity and other considerations which are specific to the IP context).

49. Article 6 builds on the approach to attribution that is reflected in earlier UNCITRAL texts. These texts are based on a paradigm in which automated systems are "programmed" or "operated" by or on behalf of one or both parties to the contract.[22] Conversely, article 6 is based on a paradigm in which the parties also use systems that are operated by third parties, whose design and commissioning may involve other actors, and for which the parties have limited control over programming or operation (A/CN.9/1125, para. 30; A/CN.9/1162, paras. 33–34).

50. Paragraph 1 of article 6 establishes a primary rule according to which the output of an automated system is attributed in accordance with a procedure agreed to by the parties, whether that agreement is expressed in a framework contract between the parties, or in the rules of a platform operated by a third party to which both parties

[21] See *UNCITRAL Model Law on Electronic Commerce with Guide to Enactment 1996 with Additional Article 5 bis as Adopted in 1998*, above note 1, para. 83.

[22] MLEC, article 13(2)(b); *United Nations Convention on the Use of Electronic Communications in International Contracts*, above note 2, para. 213.

have assented for the use of an automated system operated via the platform. Drawing on the terminology of article 13(3) of the MLEC, the rule reaffirms the principle of party autonomy. The term "procedure" is intended to encompass "methods", as that term is understood in other UNCITRAL texts on electronic commerce (A/CN.9/1162, para. 38).

51. Paragraph 2 of article 6 establishes a fallback rule that applies in the absence of any agreed procedure. The concept of "using" an automated system for the "purpose" of carrying out a particular action presupposes some awareness or expectation on the part of the party using the system as to how it operates, as well as a degree of control over the operational parameters of the system in connection with its use in the formation and performance of contracts (A/CN.9/1125, paras. 42–46; A/CN.9/1162, para. 40). Paragraph 2 is not concerned with whether a person is characterized as an "operator" of the system, which may be a third-party platform operator offering the use of the automated system as a service, nor is it not concerned with whether the person is acting on their own behalf or on behalf of another. Article 6 is not intended to displace the law of agency (A/CN.9/1132, paras. 68–69).

52. Paragraph 3 of article 6 reinforces the distinction between attribution and liability and confirms that the rules on attribution are not concerned with allocating liability for the output of automated systems (see para. 47 above). However, it does not deny the connection between attribution and liability, as the application of the rules on attribution in article 5 will ordinarily be a preliminary step to applying rules on liability under other law (A/CN.9/1162, para. 28).

7. Article 7. Intention, knowledge and awareness of the parties in respect of actions of automated systems

53. The state of mind of the parties plays an important role in the rules of contract law. Besides the expression of will (or intention) on the part of the parties, those rules may require the presence of knowledge or awareness of a party with respect to actions carried out in the formation or performance of a contract. In the context of automated contracting, questions may arise as to how to determine what a party intends or knows with respect to actions that are carried out without human review or intervention by an automated system with no independent will or "mind" of its own.

54. Article 7 is intended to provide guidance on applying such rules by identifying factors that may be relevant to consider in an enquiry into the person's state of mind, namely the design, commissioning and operation of the automated system (A/CN.9/1132, paras. 73–74). By doing so, it sends an important signal that the use of an automated system does not preclude the application of those rules. It reflects the approach, distilled from legal doctrine on the use of automated machines in contracting, that the state of mind of a person in respect of actions carried out by an automated system can be manifested in the design of the system (e.g., how it is programmed) and the circumstances in which it is put into operation. Article 7 also refers to the "commissioning" of automated systems, which is intended to cover the configuring, training, testing and tuning of the system (A/CN.9/1162, para. 47). Article 7 is intended to apply whether state of mind is to be determined subjectively (e.g., what the person actually intends or knows) or objectively (e.g., what the person ostensibly intends or knows).

55. Like article 6, article 7 is of limited scope. It is not concerned with identifying the person whose state of mind is to be established. Moreover, it is not intended to displace rules of evidence or any other law relating to the determination of questions of law or fact, which is made clear by the words "unless otherwise required by law". Nor is it concerned with requirements for disclosing information on the design, commissioning or operation of the automated system (A/CN.9/1132, para. 76).

56. Article 7 is concerned with the state of mind of a person in respect of an action carried out by an automated system. The person may be the person to whom the action is attributed or another person (e.g., the recipient of a communication generated by the automated system). Article 7 does not go so far as to impute on the person

knowledge or awareness of information represented in the data messages processed by the automated system.

8. Article 8. Unexpected actions carried out by automated systems

57. Earlier in the development of the [instrument], it was suggested that guidance could be provided on situations in which things could go wrong in the use of automated systems (A/CN.9/1125, para. 33; A/CN.9/1132, para. 78). As work progressed, it was acknowledged that automated systems may be affected by errors in programming, errors in transmission and third-party interference, which can affect the data messages that are generated and processed by the system; however, it was also acknowledged that these situations arise equally in the context of electronic contracting and do not raise any novel legal issues in the context of automated contracting (A/CN.9/1162, para. 52).

58. Article 8 deals with an issue that is peculiar to automated contracting, particularly the use of automated systems deploying AI techniques, namely outputs that might be said, in lay terms, to be "unpredicted" or "unintended" (A/CN.9/1125, para. 37; A/CN.9/1132, para. 79). It does not deal with "input errors" made by a human interacting with an automated system, which is addressed in article 14 of the ECC, or with situations of system malfunction, but rather with situations in which the system operates as designed. The issue dealt with by article 8 has sparked particular interest in legal doctrine in the context of contract formation (to the extent that unexpected outputs might deny the existence of a contract in the first place), but it also arises in the context of contract performance.

59. In principle, the party using an automated system for the purpose of contracting bears the risk of the output of that system. Paragraph 1 of article 8 seeks to mitigate that principle for unexpected outputs by allowing a party to disavow the output in certain circumstances, and thus avoid the legal consequences of that output that may flow under other law. It builds on an approach, already foreshadowed during the preparation of the ECC, that a party should not be required to bear the risk of data messages that are generated on its behalf by an automated system in a manner that the party could not have reasonably anticipated.[23] By doing so, paragraph 1 appeals to notions of reasonable expectations and fair dealing in allocating risk.

60. By its very nature, paragraph 1 of article 8 is medium-specific; it only applies to automated contracts. As such, it departs from the approach generally applied in UNCITRAL texts on electronic commerce, which seek to ensure that the same substantive law applies to contracting regardless of medium, thereby avoiding dual regimes (see para. 12 above). Like article 14 of the ECC, article 8 deals with substantive law issues, but on a narrowly defined issue that is peculiar to automated contracting (A/CN.9/1132, para. 80), and may well achieve the same outcome as other laws, including those referenced in paragraph 2(a).

61. Paragraph 2 clarifies the limited scope of paragraph 1. Subparagraph (a) provides that paragraph 1 does not preclude the application of solutions to rectify affected transactions under other law, such as rules of law to avoid a contract in case of mistake or to excuse non-performance in case of force majeure, or under an agreed framework, such as rules governing transactions on high-frequency trading platforms (A/CN.9/1132, para. 79). Consistent with the principle of party autonomy, subparagraph (a) also preserves any allocation of risk agreed between the parties that is associated with transactions affected by error.

62. Subparagraph (b) of paragraph 2 is based on article 5 of the MLETR and articles 7 and 13 of the ECC and clarifies that paragraph 1 does not prescribe information disclosure requirements. While it was suggested earlier in its development to address pre-contractual disclosure of information (A/CN.9/1125, para. 32), the [instrument] defers to other law on matters relating to information disclosure between the parties, thereby avoiding dual regimes (see para. 12 above). Nevertheless,

[23] *United Nations Convention on the Use of Electronic Communications in International Contracts*, above note 2, para. 230; A/CN.9/484, para. 108.

subparagraph (b) signals that disclosure of information on the design or operation of the system (e.g., as may be required by transparency standards for AI implemented under other law) might be relevant in applying the rules of contract law in the context of automated contracting (ibid.).

63. Beyond the limited scope of article 8, the [instrument] assumes that rules on liability under other law are applicable to the outputs of automated systems. During the development of the [instrument], it was acknowledged that systems deploying AI techniques have the potential to make it more difficult to apply those laws on account of concerns about the explainability and traceability of those outputs (A/CN.9/1125, paras. 49–55, 57).

9. Article 9. Non-avoidance

64. Article 9 originated as a requirement for the design, operation and use of an automated system to comply with applicable law (see A/CN.9/1125, para. 66). Since the [instrument] is more concerned with the parties that use automated systems to form and perform contracts rather than the persons that operate the system (e.g., a third-party platform operator offering the use of the system as a service), it was felt during the development of [the instrument] that the provision should refocus to indicate that a contracting party cannot use an automated system to avoid compliance with applicable law (A/CN.9/1162, para. 57). [*Article 9 is new. If retained, explanatory remarks will build on the remarks in the notes in A/CN.9/1194.*]