United Nations A/CN.9/WG.IV/WP.173

General Assembly

Distr.: Limited
25 February 2022

Original: English

United Nations Commission on International Trade Law
Working Group IV (Electronic Commerce)
Sixty-third session
New York, 4–8 April 2022

The use of artificial intelligence and automation in contracting

Note by the Secretariat

Contents

V.22-01117 (E)

I. About this note

1. At its fifty-fourth session in 2021, the Commission considered a note by the secretariat (A/CN.9/1065) which set out a proposal for legislative work on electronic transactions and use of artificial intelligence (AI) and automation.[1] Broad support was expressed to refer the issues identified in the proposal to Working Group IV, and the Commission mandated the Working Group to "host a focused conceptual discussion on the use of artificial intelligence and automation in contracting, with a view to refining the scope and nature of the work to be conducted".[2] It was emphasized that the discussion "needed to be structured and should be informed by input from legal experts and businesses that use automation in contracting".[3] Item 4 of the provisional agenda for the sixty-third session of the Working Group (A/CN.9/WG.IV/WP.172) makes provision for that discussion.

2. This note is designed to inform and to provide a structure for the discussion within the Working Group. Chapter II outlines the concept of AI and automated contracting and explains how the topic emerged from exploratory work carried out by the secretariat. Chapter III then develops the general contours of the legal framework for AI and automated contracting that is presented in the proposal. The note is designed to be read with the proposal submitted to the Commission in 2021 (A/CN.9/1065), as well as with the draft taxonomy of AI and automation prepared by the secretariat, which records its exploratory work on the legal aspects of AI (A/CN.9/1012/Add.1 with revisions in A/CN.9/1064/Add.1).

3. The content of this note has been informed by further preparatory work carried out by the secretariat since the fifty-fourth session of the Commission. That work includes consultation with experts, in which the secretariat has sought feedback on the following questions:

(a) How is AI and automated contracting used in practice?

(b) How is it recognized under existing law?

(c) How complete and accurate is the analysis of the legal issues identified in the proposal?

(d) How appropriate are the provisions put forward in the proposal to address those legal issues.

II. Concepts and scope

A. From "legal aspects of AI" to "AI and automated contracting"

4. The proposal stems from exploratory work carried out by the secretariat, pursuant to a decision taken by the Commission, at its fifty-first session in 2018, on "legal issues related to the digital economy". The Commission's decision was taken in the context of a proposal by the Government of Czechia that the secretariat should closely monitor developments relating to the legal aspects of smart contracts and AI, which noted that "current laws have not yet recognized the specific features of AI [which] significantly influence dynamics of legal relationships, such as business contracts, liability disputes and investments".[4]

5. As explained in the proposal, the secretariat has analysed the legal aspects of AI by drawing a rough distinction between "AI in trade" (e.g. the supply of AI-enabled goods and services) and "AI to trade" (e.g. the use of AI systems to manage supply

[1] *Official Records of the General Assembly*, *Seventy-sixth session, Supplement No. 17* (A/76/17), paras. 234-236.
[2] Ibid., para. 25(e).
[3] Ibid., para. 235.
[4] Background that the proposal and decision is contained in the 2020 progress report by the secretary on its exploratory work: A/CN.9/1012, paras. 2 and 19.

chains, market goods and services, and to form and perform contracts). Based on that analysis, it has made the following observations:

(a) unlike "AI in trade", which raises complex policy questions well beyond the trade context, "AI to trade" prompts consideration of adapting existing laws to recognize the use of AI;

(b) AI systems used in the trade context resemble the kinds of automated systems that have been addressed in earlier work by UNCITRAL on electronic transactions; and

(c) Adapting existing laws to recognize the use of AI builds on past efforts at UNCITRAL to harmonize the law of electronic transactions.

6. The proposal accordingly suggests that the scope of future work focus on the broader concept of "automated systems" but be confined to the use of automated systems in commercial contracting (A/CN.9/1065, paras. 14-16). By doing so, it seeks in particular to avoid overlap with the work being carried out within the United Nations system and other international forums aimed at developing harmonized standards on the ethical use and governance of AI.

B. Defining key concepts

1. "Automated contracting" and "automated systems"

7. The proposal conceptualizes automated contracting as the use of automated systems to negotiate, form and perform contracts. It equates an "automated system" with the concept of an "automated message system", which is defined in article 4(g) of the 2005 United Nations Convention on the Use of Electronic Communications in International Contracts (ECC) to mean "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". If automated systems essentially process, with limited human intervention, data inputs from a variety of sources to generate data outputs (which may in turn trigger further automated, mechanical or human processes), automated contracting is concerned with applying those outputs in connection with the negotiation, formation, and performance of a contract. In particular, those outputs could include data messages that constitute an offer, the acceptance of an offer, the terms of a contract, or some action taken in execution of those terms.

2. "Smart contracts" as a form of automation

8. The proposal conceptualizes so-called "smart contracts" as instances of the use of automated systems to perform contracts. In its exploratory work, the secretariat has observed that, at the very most, a "smart contract" is a computer program used to perform a contract in an automated manner and, at the very least, it is a computer program used to perform a task in an automated manner without any connection to any contract whatsoever.[5] While "smart contracts" are commonly associated with distributed ledger technology (DLT), they predate the advent of DLT and can be deployed in other electronic environments.[6] When deployed in a DLT system, the execution of a "smart contract" will result in a new "transaction" (or data entry) being recorded on the ledger, which could form part of the provision of a product or service,

[5] A/CN.9/1012/Add.1, para. 24.

[6] A/CN.9/1012, para. 18. The secretariat has previously offered the following working definition of DLT (ibid., para. 14): "DLT refers to the technologies and methods (including blockchain) that support a record of data (i.e., a "ledger") that is retained on multiple networked computers (or "nodes"). Those technologies and methods include cryptographic techniques and consensus mechanisms that are designed to ensure that the same data is retained on each node (i.e., shared, replicated and synchronized) and that the data retained on each node remains complete and unaltered (i.e., "immutable")".

or represent some dealing in a digital asset.[7] Not all such transactions are initiated in connection with a contract. The secretariat has also observed that the term "smart contract" is defined differently in legislation and legal commentary, and therefore that its use can lead to confusion.[8] The proposal thus suggests avoiding the term "smart contract", however deployed, while accepting that use cases of programs being deployed in a DLT system in particular may be relevant to the consideration of the issues identified.

3. "AI" as a form of automation

9. Consistent with the understanding of "automated message system" in the ECC, the proposal conceptualizes AI systems as a type of automated system, and this note uses the terms "automation" and "automated system" to encompass the use of AI systems. The proposal refers to the explanatory note on the ECC, which posits that "future generations of automated information systems may be created with the ability to act autonomously and not just automatically", i.e. "through developments in artificial intelligence, a computer may be able to learn through experience, modify the instructions in its own programs and even devise new instructions".[9] The proposal does not offer a definition of AI system, but instead refers to recent international and regional initiatives that have sought to define the general contours of AI systems,[10] from which it distils two distinguishing features that give them the semblance of greater complexity and capability, "intelligence" and "autonomy": (i) the use of "machine learning" techniques to improve the performance of pre-defined tasks and allow for the performance of undefined tasks according to pre-defined objectives, and (ii) the processing of large quantities of data from multiple sources.

The Working Group may wish to discuss the concepts outlined in this section.

C. Automated contracting in practice

10. Automated contracting is not a new phenomenon. Legal issues related to use of electronic data interchange (EDI) to support automation in contracting were being put to the Commission for consideration over thirty years ago,[11] well before the preparation of the ECC. The use of machines in contract formation dates back much further. However, the growing use cases for automation in contracting, including through interaction with "smart contracts" deployed in DLT systems, as well as the increased sophistication of the systems being deployed, have brought automated contracting back into focus, with fresh calls for international efforts to clarify the applicable legal framework.

11. Automated contracting is today used in a variety of scenarios, including (i) high frequency trading, (ii) transactions carried out on online platforms, and (iii) transactions initiated by "smart" devices. Those scenarios – which are neither exclusive nor mutually exclusive – can involve interaction between a human and an automated system or the interaction between automated systems (sometimes referred to as "M2M" contracting). They also involve automation at different stages throughout the contract lifecycle, from setting the terms of an offer and taking action in acceptance of an offer, to executing the terms of the contract and triggering contractual rights and obligations.

[7] The secretariat has previously observed that a digital asset is essentially an electronic record within the meaning of 2017 UNCITRAL Model Law on Electronic Transferable Records (MLETR) whose value derives from being supported by a system (DLT or otherwise) that provides (a) control over the asset, and (b) a guarantee of singularity of the asset: A/CN.9/1012/Add.3, paras. 4-7.

[8] A/CN.9/1012/Add.1, para. 24.

[9] United Nations Convention on the Use of Electronic Communications in International Contracts, Sales No. E.07.V.2, para. 211.

[10] See A/CN.9/1012/Add.1, para. 3 and A/CN.9/1064/Add.1, para. 4.

[11] See e.g. A/CN.9/350, para. 94.

12. Two recurring themes in the use of automated contracting in practice are worth mentioning as they can be relevant in considering the issues identified in the proposal:

(a) The first is that automated contracting is commonly used in circumstances in which the contracting parties have already assented to the parameters of that use (e.g. the use of EDI under an interchange arrangement, and the use of a high frequency trading platform under terms of use set by the platform operator);

(b) The second is that automated systems are commonly developed and programmed by third-party vendors, rather than by the contracting parties themselves.

The Working Group may wish to discuss instances of automated contracting in practice and any other recurring themes that might be relevant to the legal analysis of automated contracting.

III. Towards a legal framework for automated contracting

A. Building on previous legislative work on electronic transactions

13. Automated contracting is essentially about applying new techniques to the processing of data in connection with the negotiation, formation and performance of electronic contracts with limited human intervention. Existing UNCITRAL texts supporting electronic transactions – notably the 1996 UNCITRAL Model Law on Electronic Commerce (MLEC), the ECC, and the MLETR – therefore provide a starting point for future legislative work on the topic, [12] while the principles underlying those texts provide guidance on the direction of future work.

The Working Group may wish to discuss the application of existing UNCITRAL texts and underlying principles to the use of AI and automation in contracting.

1. Existing provisions to consolidate and update

14. As explained in the proposal, a future legislative text on automated contracting could start by restating those provisions in existing UNCITRAL texts that support the use of data messages [13] – and, to a limited extent, automation – in contracting, including:

(a) A provision on the legal recognition of data messages used in the formation of electronic contracts (ECC, article 8(1); MLEC, articles 5, 11(1) and 12);

(b) A provision on the legal recognition of contracts formed using automated systems (ECC, article 12);

(c) A provision on admissibility in evidence of data messages (MLEC, article 9);

(d) A provision recognizing that data messages and electronic contracts can satisfy paper-based legal requirements as to form on the basis of functional equivalence (ECC, article 9; MLEC, articles 6, 7 and 9);

(e) A provision on when and where a data message is dispatched and received (ECC, article 10; MLEC, article 15).

[12] A/CN.9/1065, paras. 20, 21 and 24.

[13] Article 2 MLEC defines "data message" to mean "information generated, sent, received or stored by electronic, optical or similar means". Article 2 MLETR notes that the concept includes "all information logically associated with or otherwise linked together". Exploratory work by the secretariat on data transactions suggests that the understanding of data as a representation of information is consistent with more definitions formulated in other international forums, including the International Organization for Standardization (ISO) and the Council of the Organization for Economic Co-operation and Development (OECD).

15. Further preparatory work by the secretariat supports the continued relevance of those provisions to automated contracting. As noted in the proposal, those provisions could be fine-tuned to ensure that they reflect contemporary business practices, as well as further experiences in the domestic enactment of UNCITRAL texts and other developments in electronic transactions law.

2. Existing principles to reaffirm

16. The key principles underlying the existing UNCITRAL texts are the principle of non-discrimination (against the use of electronic means) and the principle of technology neutrality (and its related concept of system neutrality).[14]

(a) In the context of automated contracting, the principle of non-discrimination militates against establishing a "dual regime" whereby different legal requirements would apply to a contract depending on whether it is negotiated, formed or performed by "traditional" means (e.g. on paper and in person) or by the use of an automated system. Instead, future work would develop provisions that overcome obstacles to applying existing legal requirements to automated contracts. Existing UNCITRAL texts have done so by applying the "functional equivalence" approach. A functional equivalence approach could be relevant in developing new legislative provisions to address the additional legal issues identified in the proposal;

(b) In the context of automated contracting, the principle of technology neutrality militates against developing provisions that are specific to the models for automated contracting that are seen or foreseen in practice at a particular point in time. That principle is particularly pertinent in the present context given the pace at which the technology supporting automated contracting is developing.

17. Further preparatory work by the secretariat indicates strong support for upholding those principles in future work. However, it also indicates possible tension with those principles if future work were to proceed on the basis of differentiated treatment for AI systems (addressed in para. 20 below).

B. Developing new legislative provisions

18. As noted above (para. 14), existing UNCITRAL texts supporting electronic transactions provide a foundation for future work. Moving beyond those existing texts, the proposal identifies the legal issues that could frame future work and puts forward provisions that could serve as a starting point for addressing those issues. This section develops the proposal further by identifying priority issues that could frame future work and by elaborating on the provisions that could serve as a starting point for addressing those issues. In summary, those provisions are as follows:

Proposed provisions	*Reference in this section*
Legal recognition of contracts performed (not just formed) using automated systems	Paragraph 25
Attribution and matters relating to state of mind	Paragraph 32
Precontractual disclosure of information on the use of automated systems	Paragraph 35
Access to data identifying the terms of the contract	Paragraph 36
Liability for data processing errors	Paragraph 38
Remedies, enforceability of contract performance, and contract termination	Paragraph 39

[14] Other relevant principles underlying the existing UNCITRAL texts include the principle of freedom of contract and the principle of freedom of form in international contracts.

Proposed provisions	*Reference in this section*
Legal recognition of contracts (partly) in the form of computer code	Paragraph 40
Inclusion of dynamic information as part of the terms of a contract	Paragraph 40
Identification of components of an automated system	Paragraph 40

The Working Group may wish to structure its discussion around the issues addressed in those provisions. This section identifies some additional issues that were not identified in the proposal, for which no provision has been formulated.

19. In keeping with the approach taken in existing UNCITRAL texts, future work would focus not so much on *whether* existing law applies, but rather on *how* it applies. Further preparatory work confirms that some of the issues identified in the proposal, particularly those regarding the legal recognition of contracts formed using automated systems, may already be covered in a range of jurisdictions by applying existing legal principles. But even in those jurisdictions, the use of automated systems presents difficulties in applying existing legal requirements and in adapting existing legal principles, which would benefit from legislative guidance. Moreover, clarification of how existing law applies to automated contracting may pre-empt sector-specific and technology-specific laws in specific jurisdictions, which can inhibit cross-border trade.

20. While the proposal conceptualizes AI systems as a type of automated system (as explained in para. 9 above), it concedes that the distinguishing features of AI systems might warrant differentiated treatment in the form of modified or additional provisions (A/CN.9/1065, paras. 45-47). Further preparatory work confirms a divergence of views on that issue, at least with respect to AI systems that are programmed to operate using machine learning techniques, and thus not in a "deterministic" manner.

(a) On one view, while AI systems may be more complex and capable, they should be treated no differently to other automated systems for the purposes of contract law. Both are computer programs that remain under the control of human operators. Reference is made to the existing use of AI systems to support everyday commercial activity and the "AI effect", whereby complex systems (e.g. systems programmed to perform a variety of undefined tasks according to pre-defined objectives[15]) are no longer regarded as "intelligent" as soon as they are deployed;

(b) On another view, AI systems using machine learning techniques are different from automated systems in legally significant ways. On that view, the complexities and capabilities of AI systems need to be accounted for in determining how legal requirements are applied;

(c) On yet another view, AI systems using machine learning techniques represent a fundamental change in contracting. On that view, an entirely new legal framework may be needed for AI contracting that is distinct from a legal framework for both "traditional" and automated contracting.

21. Assuming that future work proceeds on the basis that AI systems are a type of automated system, it would seem prudent for the provisions of a future legislative text to be developed considering the range of techniques that are in use, while also making allowance for the pace at which AI technology is developing. Even if it is accepted that the distinguishing features of AI systems are legally significant, it is conceivable that the provisions of a future legislative text could be developed so as to accommodate those features without the need for differentiated treatment. If,

[15] This example is adapted from the definition of "AI systems" in the recommendation on AI adopted by the Council of the OECD in 2019, document C/MIN(2019)3/FINAL.

however, future work proceeds on the basis that those features warrant the differentiated treatment of AI systems, a clear and workable definition of "AI system" would need to be developed, and it would seem logical for a preliminary discussion on that definition to precede the development of any modified or additional provisions for AI systems. In that regard, the proposal queries whether the general contours of AI systems that have been defined in recent international and regional initiatives provide a sufficient basis for a future – and futureproof – legislative text. Further preparatory work suggests that refining the definition of "AI system" would be needed.

1. Legal recognition of automated contracting

22. The proposal suggests that a future legislative text could expand on other provisions in existing UNCITRAL texts to support automated contracting, including:

(a) A provision on how automated systems can be used to satisfy legal requirements for the formation of contract (A/CN.9/1065, para. 26(a));

(b) A provision on mistake (A/CN.9/1065, para. 26(c));

(c) A provision on the legal recognition of the performance of contracts using automated systems (A/CN.9/1065, para. 26(b)).

23. With regard to (a), further preparatory work reaffirms the concern echoed in the proposal that establishing conditions for contract validity (e.g. by reformulating article 12 ECC in positive terms) could lead to a dual regime contrary to the principle of non-discrimination. It suggests that a preferable approach might be to focus not on the requirements for contract formation, but rather on how automated systems can be used to satisfy those requirements under existing law. As those requirements are primarily concerned with the actions and state of mind of the parties, the focus would therefore shift to how the output of an automated system purported to constitute an action in the formation of the contract can be attributed to a party (i.e., "attribution"), and how a state of mind in connection with the formation of a contract (e.g., intention or knowledge) can be formed. The Working Group may therefore wish to focus its discussion on attribution and matter relating to state of mind (see para. 26 below).

24. With regard to (b), the same approach could also be applied to mistake and to any other factors vitiating the formation of a valid contract under existing law. Further preparatory work also reinforces the need to distinguish "mistake" as a vitiating factor from errors in data processed by an automated system, including erroneous inputs from external data sources, system malfunction, and third-party interference (referred to in this paper as "data processing errors"). While the issue of mistake has attracted attention in the wake of the decision of the Court of Appeal of Singapore in its 2020 judgment in the case of *Quoine Pte. Ltd. v. B2B2 Ltd*. ("*Quoine*"), which is discussed in the proposal, further preparatory work suggests that data processing errors may raise more pressing issues. Accordingly, the Working Group may wish to focus its discussion on the legal significance of data processing issues (see para. 38 below).

25. With regard to (c), further preparatory work indicates that there are different views. On one view, the use of automated systems to perform a contract is a matter entirely for the parties, such that its lawfulness is determined solely by reference to the terms of the contract itself, consistent with the principle of freedom of contract. On another view, a provision recognizing the use of automated systems to perform a contract would be useful, particularly given the focus of commentary on the use of "smart contracts" to perform contracts and the enactment of specific enabling laws in some jurisdictions.[16] Accordingly, the Working Group may wish to consider expanding the provision on the legal recognition of contracts formed using automated systems (mentioned in para. 14 (b) above) to cover the performance of contracts.

[16] For example, Federal Law No. 34-FZ of 18 March 2019 on amendments to parts 1, 2 and article 1124 of part 3 of the Civil Code of the Russian Federation.

The Working Group may wish to discuss the approach to legal recognition suggested above.

2. Attribution and matters relating to state of mind

26. Further to the observations above (para. 7), the output of an automated system could be held out as constituting actions in connection with the formation and performance of a contract under applicable law. The approach taken in previous work by UNCITRAL is consistent with the principle that automated systems are mere tools with no independent will or legal personality. Attributing the output of an automated system to a person therefore becomes critically important in establishing a legal framework for automated contracting. So too is determining the state of mind of a person in connection with that output (i.e., what the person "knew", "believed" or "intended") where the law requires a particular state of mind to be formed.

27. The proposal suggests that a future instrument could include provisions on attribution and matters relating to state of mind. Further preparatory work suggests the importance of those issues and reaffirms their relevance not only to contract formation but also to contract performance and other stages of the contract lifecycle. It generally supports the analysis of those issues in the proposal, including the need to separate "attribution" (i.e., who generated or sent the data message) from "liability" (who bears the legal consequences flowing from that data message).[17] It clarifies that determining state of mind is not limited to satisfying a requirement for an agreement between the parties, but may also be relevant to satisfying requirements of "reasonableness" and "good faith", as well as applying rules under existing law relating to contract interpretation and the implication of terms.

28. The proposal identifies two possible approaches to attribution: one focuses on the programming of the automated system; the other focuses on the operation of the automated system (A/CN.9/1065, para. 31). Further preparatory work suggests that focusing on the operation of the system better reflects how automated systems are deployed in practice, which may only be remotely connected to the programming of the system.

29. Further preparatory work carried out by the secretariat also reaffirms the point that a legal framework for automated contracting need not require every output of an automated system used in contracting to be attributed to a person (whether a party or third party). The principle of non-discrimination requires nothing less, given that existing legal frameworks do not require attribution for every event in connection with the negotiation, formation and performance of traditional contracting. Moreover, to reinforce the separation of "attribution" from "liability", future work could clarify that attribution of the output of an automated system should not be denied on grounds that either the person did not intend the output or have knowledge of its circumstances, or that the output was the result of a data processing error.

30. Specific to DLT systems, it has been noted that difficulties may arise in attributing "transactions" recorded in a ledger (and possibly "off-ledger" events triggered by such "transactions") as a result of the automated execution of a program deployed on a DLT system, particularly in association with "decentralized autonomous organizations".[18] However, those difficulties would appear to relate first and foremost to the identification of persons (to whom the "transaction" can be attributed) and the administration and operation of DLT systems. Further to the provisions listed above (para. 14), a future legislative text could make reference to, or incorporate provisions of, the eventual model law on the use and cross-border

[17] See A/CN.9/1065, para. 33.

[18] "Off-ledger" events occur outside a DLT system and interface with the ledger by way of a service or software application commonly referred to as an "oracle". In the context of DLT systems, the term "transaction" is sometimes used to refer to any action that results in a new data entry being submitted to the consensus mechanism for recording on the ledger, which may not have any connection to commercial activity, or match the concept of transaction under applicable law.

recognition of identity management and trust services that the Working Group has been preparing.[19]

31. As for matters relating to state of mind, the proposal presents two alternative approaches based on the arguments presented in *Quoine*: one based on the state of mind of the person who programmed the system (or rather the person who operated the system, in line with the reasoning in para. 28 above); the other based on the state of mind that the person would have had if they had known of relevant circumstances surrounding the transaction (A/CN.9/1065, para. 35). However, those approaches might better be described as complementary given that the law can require a person's state of mind to be determined subjectively (e.g. what the person actually knows or intends) or objectively (e.g. what the person ostensible knows or intends). Further preparatory work suggests the need for a future instrument to accommodate those different requirements. Referring to the person operating the system at the time the system was put into operation as programmed would seem to be appropriate for satisfying a requirement to determine a person's state of mind subjectively, while referring to the circumstances of the output of the system might be an appropriate starting point for satisfying a requirement to determine what a person's state of mind should have been.

32. The provisions of a future legislative text on attribution and matters relating to state of mind could thus be developed on the basis of the following:

(a) A provision stating that, where the law requires a person to take action in connection with a contract, that requirement is satisfied by the output of an automated system if the system is operated by or on behalf of the person;

(b) A provision stating that a person cannot deny the attribution of the output of an automated system on the sole ground that either the person did not intend the output or know its circumstances, or that the output was the result of a data processing error;

(c) A provision stating that, where the law requires the (actual) state of mind of a person to be associated with an action or state of affairs, that requirement is satisfied in relation to the output of an automated system if the state of mind is formed at the time that the person put the automated system into operation as programmed;

(d) A provision stating that, where the law requires the (ostensible) state of mind of a person to be determined by reference to an action or state of affairs, that requirement is satisfied in relation to the output of an automated system by reference to the circumstances of that output.

Guidance could be offered as to how those circumstances are to be ascertained, which could also assist in applying requirements of "reasonableness" and "good faith".

33. Given the complexity of matters relating to state of mind, as well as the variety of circumstances in which the state of mind of the parties might be relevant, future work could look incrementally at areas of law that require an enquiry into the state of mind of the parties.

3. Precontractual disclosure of information

34. The proposal identifies issues with respect to precontractual disclosure of information on the use of the system and access to data identifying the terms of the contract (A/CN.9/1065, para. 29). Further preparatory work generally supports the analysis of those issues in the proposal. It also advocates for treating the issues separately, and reaffirms the relative importance of access to data (however made accessible) in supporting a legal framework for automated contracts. Access to data is addressed below (para. 36).

35. As noted in the proposal, any provision on precontractual information would need to balance the interests of transparency with the rights of the parties to guard the

[19] See item 3 of the provisional agenda (A/CN.9/WG.IV/WP.172).

secrecy of information relating to the operation of the system. Among other things, the balance might be tipped in favour of disclosure for AI systems if a future legislative text were to apply a different legal regime to AI systems (as foreshadowed in para. 20 above). In developing any such provision, future work should accommodate scenarios in which the person operating the system might only have limited access to information on the use of a system that has been programmed by a third-party vendor, as well as scenarios in which the information can already be gleaned from the circumstances without disclosure by the operator. The provision could clarify that it does not displace other obligations arising outside the legislative text relating to the transparency and explainability of AI systems (e.g. regulations stemming from standards on the ethical use and governance of AI developed in other forums).

4. Traceability of actions in connection with formation and performance

36. As noted in the proposal, a provision on access to data identifying the terms of the contract could be developed on the basis of article 9(2) ECC, and therefore oblige the party operating the automated system to make the terms of the contract available to counterparties in a form that is "accessible" (i.e. readable and interpretable) so as to be "usable" (by humans and machines) for subsequent reference. The provision could also extend to a requirement to retain the terms for subsequent retrieval by counterparties. The proposal explains that, during negotiations on the ECC, the particular risks associated with the availability of terms when contracting in an online environment were recognized,[20] and that it was noted that access to the terms of the contract could enhance legal certainty, transparency, and predictability in international electronic transactions. The issue is particularly relevant to contracts concluded via online platforms, although in that context the platform operator may be in a better position to satisfy the requirement, even if it is not a party to the contract.

37. The provision could be expanded to cover data related to action taken by the automated system in execution of the terms of the contract. The expanded provision would give effect to the principle of traceability of AI systems and could lend support to the application of provisions on liability and remedies (discussed in paras. 38 and 39 below). It could also clarify that it does not displace other obligations arising outside the legislative text relating to the traceability of AI systems.

5. Liability and remedies

38. The proposal identifies issues related to liability for loss arising from the functioning (or malfunctioning) of the automated system (A/CN.9/1065, paras. 39-41), as well as issues related to remedies in the event of a failure to perform the contract (A/CN.9/1065, para. 43). Further preparatory work generally supports the analysis of those issues in the proposal. While it raises questions about the feasibility of addressing liability, whether contractual or non-contractual, it also reaffirms that data processing errors present difficulties in applying liability rules under existing law. Accordingly, the provisions of a future legislative text on liability could focus on the legal significance of data processing errors, and in that regard build on the suggestion made in previous legislative work by UNCITRAL to develop a provision excusing a party operating an automated system from the legal consequences flowing from an output generated by a data processing error that could not have reasonably been anticipated by the person in programming the system, or where the error was beyond the party's control. As posited in the proposal (A/CN.9/1065, para. 40), the reliability of the system and compliance with harmonized standards on ethical use and governance of AI may be relevant to triggering the provision.

39. Further preparatory work also reinforces the need for clarity regarding the use of the term "remedies", which can be distinguished from (a) the operation of an integrated automated dispute resolution system, (b) the automated execution of

[20] Explanatory note on the ECC (footnote 9 above), para. 220.

contractual terms that are triggered by a prescribed default event, or (c) the exercise of other rights in the event of default (e.g. termination). While it is not suggested to include the use of automated dispute resolution systems in the discussion,[21] further preparatory work suggests that automated execution and exercise of rights should also be considered. Accordingly, a future legislative text could address not only how particular remedies (e.g. specific performance and restitution) can be applied in the case of contracts performed using automated systems, but also how existing laws related to matters such as the enforceability of contract performance and termination can be applied or adapted in the context of automated performance. As noted above (para. 32 (d)), future work could offer guidance on relevant factors to take into account when applying requirements of "reasonableness" and "good faith", as well as ascertaining the circumstances surrounding the performance.

6. Other enabling provisions

40. The proposal identifies possible additional provisions for a future legislative text to enable the use of automated contracting, including:

(a) A provision recognizing contracts (partly) in the form of computer code (A/CN.9/1065, para. 27(a)), which may in turn be supported by rules on access to the terms of the contract (see para. 34 above);

(b) A provision on the inclusion of dynamic information as part of the terms of the contract (A/CN.9/1065, para. 27(c); and

(c) A provision on the identification of components of an automated system (e.g. sensors), which could lend support in particular to the application of provisions on liability and remedies.

41. Further preparatory work supports the relevance of the issues addressed in those additional provisions, and emphasizes the importance of the work of the Working Group on identity management and trust services to the identification of object. It also emphasizes that the use of dynamic information raises different issues in the context of automated contracts (e.g. addressing legal requirements regarding the incorporation and certainty of terms) than it does in the context of article 6 MLETR (e.g. addressing legal requirements regarding the content of transferable documents and instruments).

42. Another issue not specifically identified in the proposal, but one that was raised in earlier exploratory work by the secretariat,[22] is the interpretation of contract terms that are memorialized in computer code, particularly if interpretation rules under existing law presuppose contracts written by humans in natural language. Future work could offer guidance on how those rules could be adapted or applied. Another related issue raised is the implication of terms in automated contracts, which would appear to bring in matters relating to state of mind, particularly if existing law requires a determination of what is "reasonable" or what "good faith" requires. As noted above (para. 39), future work could offer guidance on relevant factors to take into account when applying those requirements. Incidentally, while earlier exploratory work by the secretariat identified possible issues relating to the translation of such "soft" concepts into computer code for the purposes of the automated performance of contracts,[23] those issues have not been raised in further preparatory work.

---

[21] As noted in the provisional agenda, topics related to dispute resolution in the digital economy are being explored in a colloquium during the seventy-fifth session of Working Group II, which is scheduled to take place the week before the sixty-third session of Working Group IV. Further information on the colloquium can be found on the Working Group II web page: https://uncitral.un.org/working_groups/2/arbitration.

[22] A/CN.9/1012/Add.1, para. 31.

[23] Ibid., para. 32.