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Developing new provisions to address legal issues related to automated contracting

Note by the Secretariat

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I. About this note

1. As noted in the provisional agenda ([A/CN.9/WG.IV/WP.174](#)), the Working Group is expected to focus on the first stage of its mandate at its sixty-fourth session (i.e. compiling and revising provisions of applicable UNCITRAL texts). There may nevertheless be occasion for the Working Group to consider aspects of the second stage of its mandate (i.e. identifying and developing possible new provisions that address issues not covered by existing provisions). This note recalls some of the legal issues related to automated contracting that were identified within the Working Group at its sixty-third session (New York, 4–8 April 2022), and offers some remarks that build on the note that the secretariat submitted for that session ([A/CN.9/WG.IV/WP.173](#)).

II. Legal issues not (fully) addressed by existing provisions

2. At its sixty-third session, the Working Group heard that automated contracting poses “significant legal challenges” that are not addressed within existing UNCITRAL texts.¹ Various legal issues were identified, including the attribution of electronic communications, matters relating to state of mind, pre-contractual disclosure of information, traceability with respect to the operation of automated systems, liability for the output of automated systems, and issues relating to automated performance (including “self-enforcement”, automated dispute resolution, and renegotiation).² It was also acknowledged that the use of systems deploying artificial intelligence – for which a preference emerged to use the term “autonomous” systems – raises specific legal challenges, including access to evidence and causality on account of the large quantities of data processed from multiple sources. The Working Group may wish to elaborate on those specific challenges when considering the issue of traceability (see paras. 19–20 below).

A. “Autonomous” systems

3. An exchange of views took place during the sixty-third session of the Working Group on the necessity and feasibility of distinguishing automated systems that are “autonomous”.³ Broad support was expressed for the view that the defining feature of “autonomous” systems is their unpredictability, although doubts were expressed about using the terms “deterministic” and “non-deterministic” to describe the software that runs those systems. It was noted that the use of the term “autonomous” did not imply a loss of human control over the design or operation of the system.

4. A summary of the deliberations within the Working Group was considered by the Commission at its fifty-fifth session (New York, 27 June–15 July 2022), where it was acknowledged that it would be open for the Working Group to consider definitional issues in proceeding with its new mandate ([A/77/17](#), para. 158). The Working Group may therefore wish to continue its deliberations on the necessity and feasibility of distinguishing “autonomous” systems for the purposes of its future work.

B. Attribution

5. As noted in [A/CN.9/WG.IV/WP.176](#) (para. 37), attribution is about linking the output of an automated system to a person so that it can be said that the output is an action of the person. Attribution should not be confused with liability, which is about identifying the person who bears the legal consequences flowing from the output of

¹ [A/CN.9/1093](#), para. 62.

² *Ibid.*

³ *Ibid.*, paras. 53–56.

an automated system and the circumstances in which those consequences are to be borne (see paras. 21–23 below).

6. At the sixty-third session of the Working Group, it was said that article 13(2)(b) of the UNCITRAL Model Law on Electronic Commerce (MLEC) provides a relevant reference point for addressing attribution. It was added that the concept of “originator”, as used in that provision, might need to be revised.⁴

7. The secretariat has previously indicated that provisions on attribution and on matters relating to state of mind are critically important for addressing the “remoteness” between the parties and the output of automated systems used for contracting. Preparatory work by the secretariat suggests that issues of attribution and matters relating to state of mind are relevant not only to contract formation, but also to contract performance and other stages of the contract life cycle.⁵

8. Article 13(2)(b) of the MLEC is based on the view that data messages sent by an automated system are attributable to the person on whose behalf the system is “programmed”. Conversely, the explanatory note to the 2005 United Nations Convention on the Use of Electronic Communications in International Contracts (ECC) expresses the view that data messages generated by automated systems should be regarded as originating from the legal entity on whose behalf the system is “operated”. Further preparatory work by the secretariat 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. The Working Group may wish to confirm that approach for the second stage of its mandate.

9. To reinforce the separation between attribution and liability, the Working Group may wish to consider whether the approach applies regardless of whether the person intended the output or had knowledge of its circumstances, or whether the output was the result of a data processing error affecting the operation of the system, such as an erroneous input from an external data source, system malfunction, or third-party interference. Those factors might well be relevant in matters relating to liability (see paras. 21–22 below).

10. In the context of distributed ledger systems, it has been noted that difficulties may arise in attributing “transactions” recorded in the ledger (and possibly “off-ledger” events triggered by such “transactions”) that are executed by so-called “smart contracts” deployed in the system.⁶ The Working Group may wish to consider whether those difficulties are more concerned with the identification of persons, rather than the attribution of transactions to those persons.

C. Matters relating to state of mind

11. In the context of automated contracting, state of mind refers to matters such as what a person “knows”, “believes” or “intends” in connection with the output of an automated system. A determination of state of mind is relevant to applying a variety of existing legal rules relating to the formation and performance of contracts. Those rules may require state of mind to be determined not only subjectively (i.e. what the person actually knows, believes or intends), but also objectively (i.e. what the person ostensibly knows, believes or intends, based on the circumstances). Matters relating to state of mind therefore extend to requirements of “reasonableness” and “good faith”.

12. The Working Group may wish to consider whether guidance can be provided on determining matters relating to state of mind in connection with automated contracting. In that regard, it may wish to consider the two approaches put forward in the case of *Quoine Pte. Ltd. v. B2C2 Ltd.* before the courts of Singapore for the

⁴ Ibid., para. 73.

⁵ See discussion in [A/CN.9/WG.IV/WP.173](#), paras. 26–30.

⁶ Ibid., para. 30.

purposes of applying the law of mistake.⁷ The first approach (accepted by the court) was to refer to the state of mind of the person who programmed the automated system (i.e. before the contract was formed). The second approach (rejected by the court) was to refer to the state of mind that the party operating the automated system would have had if that party knew of relevant circumstances surrounding the formation of the contract.⁸

13. Given the variety of circumstances in which the state of mind of the parties is relevant for legal purposes, future work could look incrementally at specific areas of contract law that require an enquiry into the state of mind of the parties (e.g. the law of mistake). At its sixty-third session, the Working Group heard that transparency in the operation of automated systems could assist in determining matters relating to state of mind.⁹ The Working Group may wish to elaborate on that point.

D. Pre-contractual disclosure of information

14. At the sixty-third session of the Working Group, it was explained that pre-contractual disclosure of information was an issue of transparency. Broad support was expressed for the view that transparency in the use of electronic means should guide the future work of the Working Group.

15. The Working Group may wish to take note of recent work on transparency in other international forums, which is aimed at developing harmonized standards on the ethical use and governance of artificial intelligence. Within the United Nations system, for example, the General Council of UNESCO adopted a “Recommendation on the Ethics of Artificial Intelligence” on 23 November 2021¹⁰ with the stated aim of “bring[ing] a globally accepted normative instrument that focuses not only on the articulation of values and principles, but also on their practical realization, via concrete policy recommendations”.

16. With respect to transparency, the recommendation states that “people should be fully informed when a decision is informed by or is made on the basis of AI algorithms” and that “AI actors should inform users when a product or service is provided directly or with the assistance of AI systems in a proper and timely manner”. It adds that transparency is “necessary for relevant national and international liability regimes to work effectively”. In terms of content, the recommendation acknowledges that “the level of transparency... should always be appropriate to the context and impact, as there may be a need to balance between transparency... and other principles such as privacy, safety and security”. It goes on to elaborate:

Transparency aims at providing appropriate information to the respective addressees to enable their understanding and foster trust. Specific to the AI system, transparency can enable people to understand how each stage of an AI system is put in place, appropriate to the context and sensitivity of the AI system. It may also include insight into factors that affect a specific prediction or decision, and whether or not appropriate assurances (such as safety or fairness measures) are in place. In cases of serious threats of adverse human rights impacts, transparency may also require the sharing of code or datasets.

17. While the recommendation is not primarily concerned with the use of artificial intelligence (AI) in business-to-business transactions (the recommendation pays specific attention to the broader ethical implications of AI systems in relation to the central domains of UNESCO, namely education, science, culture, and communication and information), it may nevertheless be relevant to the mandate of the Working Group so far as it recognizes the importance of proportionality and context in determining

⁷ *Quoine Pte. Ltd. v. B2C2 Ltd.*, Civil Appeal No. 81 of 2019, Judgment, 24 February 2020, Singapore Law Reports, vol. 2020, No. 2, p. 20, [2020] SGCA(I) 02.

⁸ See discussion in [A/CN.9/WG.IV/WP.173](#), paras. 31–33.

⁹ [A/CN.9/1093](#), para. 75.

¹⁰ SHS/BIO/PI/2021/1.

what transparency requires. As the recommendation highlights, the disclosure of information needs to be balanced against the rights of a party to guard the secrecy of information relating to the operation of AI systems.

18. In addressing the issue further, the Working Group may wish to consider how to apply the principle of transparency in cases where automated systems are used by both parties (i.e. “fully” automated transactions), and how to accommodate cases in which the parties have only limited access to information on the operation of the system (e.g. where the system is programmed or operated by a third party, such as a third-party platform operator).

E. Traceability

19. While related to transparency, traceability is a distinct issue that is concerned with explaining a particular output of an automated system. As noted above (para. 13), it has been noted within the Working Group that traceability may assist in determining matters related to state of mind. As noted in the UNESCO recommendation, traceability may also be important in administering applicable liability regimes. The Working Group has also heard about operations logs being maintained for autonomous systems, as well as the impossibility of tracing the operation of some systems.¹¹

20. A related issue concerns the availability of contract terms. During negotiations on the ECC, particular risks associated with the availability of terms when contracting in an online environment were recognized, and it was noted that access to the terms of the contract could enhance legal certainty, transparency, and predictability in international electronic transactions.¹² The issue is particularly relevant to contracts concluded via online platforms. As noted in [A/CN.9/WG.IV/WP.176](#) (para. 32), retention provisions of existing UNCITRAL texts may provide a basis for the Working Group to address the issue in the second stage of its mandate. As with transparency (see para. 18 above), the Working Group may wish to consider how to accommodate cases in which the parties have only limited access to information on the operation of the system.

F. Liability

21. Liability covers a range of issues, including (i) the circumstances triggering liability (e.g. the occurrence of events, the engagement in conduct, and a state of mind in connection with those events or conduct); (ii) burden of proof and other evidentiary issues in establishing those circumstances; and (iii) the legal consequences flowing from those circumstances (e.g. the obligation to pay damages and the basis on which damages are assessed). Advances in the development and update of digital technologies mean that automated systems are being deployed to perform transactions with significant monetary value. Errors in automation – whether human error (e.g. error in programming the system) or data processing error (e.g. erroneous input from an external data source, system malfunction, or third-party interference) – therefore have the potential to expose parties to significant loss. In the case of online platforms, this may take the form of loss of control over digital assets, loss of income or loss of data.

22. No existing UNCITRAL text on electronic contracting deals in detail with liability. In its earlier deliberations on the MLEC and ECC, the Working Group endorsed the view that, as a general principle, as between the parties, the party to whom the output of an automated system is attributed should ultimately bear the risk of that output. As noted in [A/CN.9/WG.IV/WP.176](#) (para. 37), paragraphs 3 to 6 of article 13 of the MLEC go some way to elaborating and refining that general principle,

¹¹ [A/CN.9/1093](#), paras. 74 and 76.

¹² *United Nations Convention on the Use of Electronic Communications in International Contracts* (United Nations publication, Sales No. E.07.V.2), para. 220.

including by reference to what the other party knows or should know. In subsequent deliberations leading to the preparation of the ECC, it was recognized that there might be circumstances justifying a mitigation of the general principle, such as when an automated system generates erroneous messages in a manner that could not have reasonably been anticipated by the person. It was suggested at the time that relevant factors to be taken into account included the extent to which the party had control over the software or other technical aspects used in programming the system. It was also suggested that consideration be given to whether, and to what extent, the system provided an opportunity for the parties to rectify errors made during the contracting process.¹³

23. At the sixty-third session of the Working Group, it was said that it would be desirable for the Working Group to establish a common legal core for liability.¹⁴ With respect to liability as between the parties to the contract concerned, the Working Group may wish to take article 13 of the MLEC and the past deliberations outlined above as a starting point for the second stage of its mandate. Notions of reliability, as well as compliance with harmonized standards on ethical use and governance of AI (developed in other forums), may also be relevant. It was noted in the Working Group that data processing errors could engage the liability of third-party service providers under side contracts (e.g. a third-party platform operator or a third-party programmer). The Working Group may wish to consider the merits of developing solutions in that broader context.

G. Contract performance

24. As noted above (para. 2), the Working Group has heard that automated contracting raises several issues relating to automated performance. One issue is the legal recognition of the performance of contracts using automated systems (see para. 23 of [A/CN.9/WG.IV/WP.176](#)). On the one hand, the use of automation 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 principles of party autonomy and freedom of contract. On the other hand, an express legal recognition of automated performance may be beneficial for parties, particularly given the focus of commentary on the use of “smart contracts”¹⁵ to execute the terms of a contract (or even to constitute the contract itself), as well as the enactment of specific enabling laws in some jurisdictions.¹⁶

25. In the Working Group, reference has been made to “self-enforcement”. The concept of “enforcement” has different meanings in different contexts (from executing a contractual right and enforcing a security right created by contract, to enforcing a judgment or arbitral award settling the contractual rights and obligations of the parties) and the Working Group may wish to confirm a common understanding of the concept before addressing related issues further in the second stage of its mandate. One issue, which is commonly raised in commentary on the use of “smart contracts” whose execution cannot be altered or stopped once deployed, is the adequacy of court-ordered remedies (e.g. specific performance and restitution) in addressing automated performance. The Working Group may wish to consider whether guidance can be provided on adapting or applying existing remedies.

H. Other issues

26. [A/CN.9/WG.IV/WP.176](#) identifies a number of additional issues that might be considered by the Working Group in the second stage of its mandate. This includes

¹³ Ibid., para. 230, and [A/CN.9/484](#), para. 108.

¹⁴ [A/CN.9/1093](#), para. 76.

¹⁵ On the use of the term “smart contract”, see para. 6 of [A/CN.9/WG.IV/WP.176](#) and accompanying footnotes.

¹⁶ See discussion in [A/CN.9/WG.IV/WP.173](#), para. 25.

recognizing the inclusion of dynamic information (para. 19) and the admission of electronic communications in evidence (para. 21).

27. During the fifty-fifth session of the Commission, it was acknowledged that additional legal issues may emerge as the project progresses. One such issue concerns the use of online platforms, particularly those operated by third parties, that support a range of services for automating various stages of the contract life cycle. The role of online platforms was noted during the sixty-third session of the Working Group,¹⁷ and recalls earlier deliberations at UNCITRAL on the role of “intermediaries” in electronic contracting.¹⁸ As noted above, the use of online platforms is particularly relevant to applying the principles of transparency and traceability. A related issue is the legal significance of the parties giving prior consent to the use of automation in contracting, such as the use of electronic data interchange (EDI) under an interchange arrangement, the use of a “smart” device to initiate transactions under a framework contract, or the use of a high frequency trading platform under terms of use agreed with a third-party platform operator. The use of automated contracting in those cases may be regarded as exercise of party autonomy.

28. Another issue concerns the interpretation of contract terms that are memorialized in computer code. Even if existing provisions of UNCITRAL texts recognize contracts in the form of computer code (see para. 27 of [A/CN.9/WG.IV/WP.176](#)), questions may arise if the interpretation rules under existing law presuppose contracts memorialized in natural language.¹⁹ Future work by the Working Group could offer guidance on how those rules could be adapted or applied.

¹⁷ [A/CN.9/1093](#), para. 59.

¹⁸ *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), paras. 38–39.

¹⁹ See [A/CN.9/WG.IV/WP.173](#), para. 42.