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# Advancing work on automated contracting

# Note by the Secretariat

# Contents

			Page
I.	Abc	ut this note	2
II.	Intersessional event		2
	A.	Background.	2
	В.	Typology of use cases	3
	C.	Key takeaways	6
III.	Revised principles		10
	A.	Status	10
	В.	Text and remarks	11





# I. About this note

1. This note reports to the Working Group on intersessional work carried out by the secretariat on the topic of the use of artificial intelligence (AI) and automation in contracting, including the intersessional event held on 17 January 2023 (section II), and the development of the set of principles elaborated within the Working Group at its sixty-fourth session (section III).

The Working Group may wish to consider the revised principles contained in section III, and provide guidance to the secretariat on developing additional principles that (i) address situations in which things go wrong, including errors in programming, erroneous inputs and third-party interferences, and (ii) give expression to the principles of transparency, explainability and traceability (e.g. the use of "trustworthy" AI systems) in a contractual setting. The Working Group may wish to task the secretariat with preparing a revised set of principles for consideration by the Working Group at its sixty-sixth session.

# II. Intersessional event

# A. Background

2. At its sixty-fourth session (Vienna, 31 October–4 November 2022), the Working Group heard several suggestions as to how the advance its work on the topic of the use of AI and automation in contracting, which the Working Group was considering for the first time under a new mandate conferred by the Commission (A/77/17, para. 159). One suggestion was to categorize the different types of automated systems used for contract automation and the different types of actors and sectors of the economy that use them (A/CN.9/1125, para. 11). Another suggestion was to review court cases involving the use of automated systems to shed light on gaps in existing law and possible solutions to fill those gaps (A/CN.9/1125, para. 12).

3. The Working Group heard a suggestion that an intersessional meeting could be held under the auspices of the secretariat to explore issues further with actors involved in the design, operation and use of automated systems (A/CN.9/1125, para. 11). It also heard a suggestion that its work could benefit from the work of other organizations that were addressing private law aspects of AI (A/CN.9/1125, para. 18). In particular, it was informed of a project being undertaken by the European Law Institute (ELI) to develop guiding principles and model rules on "algorithmic contracts" (i.e. the use of algorithmic decision-making and AI across the contract life cycle).<sup>1</sup>

4. With a view to exploring the various suggestions put forward within the Working Group, the secretariat, in collaboration with ELI, hosted an online event on 17 January 2023 that featured presentations by experts from legal practice, the business community and the technology sector. The programme for the event focused primarily on contract formation, but also addressed how "smart contracts" are used to automate contract performance. Experts were joined by the ELI project team in presenting use cases of AI and automation in a variety of commercial transactions, and in discussing related legal issues with reference to court cases involving the use of automation in contract formation. In preparation for the event, the secretariat compiled information on the types of automated systems considered by UNCITRAL in its earlier work on contract formation. Details of the event, as well as the information compiled by the secretariat, were shared with delegates to the sixty-fourth session.

<sup>&</sup>lt;sup>1</sup> See www.europeanlawinstitute.eu/projects-publications/current-projects/current-projects/algorithmic-contracts/.

5. In this section, the secretariat presents a "typology" of use cases based on the information that it compiled and the presentations and discussions during the event. This is followed by a summary of some key takeaways from the event.

# B. Typology of use cases

## 1. Contracts formed through EDI and websites

6. As noted by the secretariat in an earlier note to the Working Group, automated contracting is not a new phenomenon:<sup>2</sup>

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, well before the preparation of the 2005 United Nations Convention on the Use of Electronic Communications in International Contracts (ECC). The use of machines in contract formation dates back much further.<sup>3</sup>

7. The use of electronic data interchange (EDI) in a contractual setting is acknowledged in article 13(2) of the 1996 UNCITRAL Model Law on Electronic Commerce (MLEC). For its part, the ECC dedicates two provisions (arts. 12 and 14) to the use of "automated message systems" in the formation of contracts.

8. The explanatory note on the ECC reveals that the drafters had at least two types of use cases in mind: (i) supply contracts formed by electronic communications sent between computers through EDI; and (ii) sales contracts formed by a natural person placing an order through a website (interacting with the automated system operating "behind" the website).<sup>4</sup> While the use of EDI in contract formation has received very little consideration by the courts,<sup>5</sup> formation of contracts via websites has been considered and upheld by the courts in many jurisdictions (even leaving aside cases concerned with *how* a natural person manifests its will online, including in "click-wrap" or "browse-wrap" scenarios). However, these cases often overlook the critical element in automation, which is the lack of human intervention on the side of the website operator.<sup>6</sup>

9. Further information compiled by the secretariat on court cases has identified additional (but not necessarily novel) use cases of contracts formed through EDI or other Internet-based technologies, namely (i) contracts formed by "smart" devices placing orders via connected online platforms, and (ii) contracts formed by Internet bots interacting with websites (e.g. "screenscraping bots" and "shopping bots"). Each of these use cases – and possible future scenarios – were explored during the intersessional event.

(a) The formation of contracts using connected devices was considered by the courts in Germany in a case concerning the "Dash Button", a handheld device that could be used (by pressing an integrated tactile button) to order products linked to the device. In that case, which engaged special consumer protection provisions, the Higher Regional Court of Munich found that a contract for the supply of the product was concluded each time the device was used, which was distinct from the framework contract in place for the use of the device and services provided via the connected

<sup>&</sup>lt;sup>2</sup> A/CN.9/WG.IV/WP.173, para. 10.

<sup>&</sup>lt;sup>3</sup> Ibid. During this period, the formation of contract using automated systems – sometimes referred to as "electronic agents" or "software agents" (terminology that the drafters of the ECC purposefully eschewed to avoid importing general principles of agency law) – has also attracted interest in legal doctrine.

<sup>&</sup>lt;sup>4</sup> Explanatory note on the ECC, United Nations Convention on the Use of Electronic Communications in International Contracts (United Nations publication, Sales No. E.07.V.2), para. 104.

<sup>&</sup>lt;sup>5</sup> This phenomenon has been put down to the prevalence of overarching interchange arrangements that govern the interactions between the contracting parties.

<sup>&</sup>lt;sup>6</sup> The secretariat covered some of those cases in a note prepared during the preparation of the ECC: A/CN.9/WG.IV/WP.104/Add.4, paras. 1–13.

online platform.<sup>7</sup> During the intersessional event, attention was also drawn to the discussion of contracts formed by interactions with "smart" speakers in the interpretative guidelines published by the Ministry of Economy, Trade and Industry of Japan on electronic commerce and information property trading.<sup>8</sup> While both use cases involve transactions initiated by a natural person, the point was made during the intersessional event that they provide a conceptual basis for dealing with transactions initiated by AI-enabled devices without human intervention;

The formation of contracts formed by Internet bots interacting with (b)websites has been considered by courts in cases dealing with "screenscraping", a practice by which an Internet bot is used to extract (or "scrape") data from a website. Some website operators seek to curb screenscraping by prohibiting the practice in their website terms of use on the assumption that, by accessing the website, the party operating the bot manifests its acceptance of those terms of use. Thus, a contract is concluded on those terms and extracting data constitutes a breach of that contract. In the case of Register.com, Inc. v. Verio, Inc.,<sup>9</sup> the Court of Appeals for the Second Circuit in the United States held that a party could manifest its assent to the terms of use of a website through the "use of an automated software robot" to access the website. In another case, the Court of Justice of the European Union (EU) noted the possibility for website operator laying down "contractual limitations" on the use of data, although it also acknowledged that this was "without prejudice to the applicable national law" of EU member States. As it happens, the courts of several EU member States in related proceedings have largely rejected the view that merely accessing a website (i.e. in a "browse-wrap" scenario) is sufficient to manifest acceptance of the terms of use for the purposes of contract formation, but they do not appear to have rejected the view that, in principle, an Internet bot can be used to manifest acceptance.

10. During the intersessional event, the ELI project team presented scenarios for algorithmic contracts that are being developed to inform its work. These scenarios recall the use cases involving transactions initiated by Internet bots and connected devices, but factor in the additional capabilities of automated systems based on machine learning. One scenario involves a "smart" device (or "digital delegate") that is programmed to search for offers online, personalize search results, make recommendations, and conclude transactions without human intervention. Another scenario, projected to be more relevant in a business-to-business context, involves the use of connected devices in a "smart" warehouse, along the lines presented to the Working Group at its sixty-fourth session (A/CN.9/1125, para. 15). The ELI project team explained that the first stage of the ELI project focuses on consumer contracts, specifically the suitability and adequacy of EU consumer law in addressing algorithmic decision-making, while the second stage, involving the formulation of guiding principles and model rules, will focus on contracts more generally, including in a business-to-business context.

## 2. Contracts formed using automated negotiation tools

11. Another use case explored during the intersessional event involves a natural person, acting on behalf of one party, interacting with an automated negotiation tool (e.g. a "chatbot" accessible via a website) that is operated by a software vendor on behalf of another party. If the question raised by earlier use cases involving EDI and websites is whether a valid contract can be formed, the question raised by use cases involving automated negotiation tools is identifying the person to whom the output of the systems is to be attributed.

12. A presentation was delivered by the founder of a start-up software vendor company whose AI-enabled negotiation tool is used by companies in a range of

<sup>&</sup>lt;sup>7</sup> Case No. 29 U 1091/18, Judgment, 10 January 2019.

<sup>&</sup>lt;sup>8</sup> Interpretative Guidelines on Electronic Commerce and Information Property Trading (April 2022), available at www.meti.go.jp/english/press/2022/0401\_002.html.

<sup>&</sup>lt;sup>9</sup> Docket No. 00-9596, Judgment, 23 January 2004, *Federal Reporter, Third Series*, vol. 356, p.393.

industries to settle certain payment and delivery terms and to conclude supply contracts on those terms. It was explained that the script for the negotiation tool is developed with the client (i.e., the party on whose behalf the tool is operated) and is used to conclude contracts with multiple suppliers. The tool does not always result in the same payment terms for the same data input by suppliers when prompted by the script and is capable of "learning" based on changes in market price over time. It was also explained that the software vendor is developing more "autonomous" tools that are capable of settling more sophisticated terms as well as devise new negotiation strategies.

13. This type of use case draws parallels with the type of system considered by the High Court of England and Wales in the case of *Software Solutions Partners Ltd v. Her Majesty's Commissioners for Customs and Excise* (the "*SSP*" case).<sup>10</sup> That case concerned software developed by a software vendor (SSP) which enabled insurance brokers to carry out insurance transactions with insurers. While primarily concerned with the nature of the services provided by the software vendor for the purposes of tax law, the court analysed in some detail the operation of the system software to form contracts and the attribution of the system output. The court rejected a claim that the software vendor was acting as agent for the insurers, finding instead that the insurers were entering into insurance contracts directly with the brokers based on the automated processing of data input by the brokers. In its decision, the court characterized the insurance transaction in the following terms:

[T]he correct legal analysis is that the relevant insurers, expressly or impliedly, invited brokers who had access to the appropriate SSP software to use the computer programme for the purpose of contract formation, and that the insurers undertook that, if the brokers followed the pre-programmed procedures, they would be bound by the automatically generated result, even if they (the insurers) were temporarily unaware of that result. Insurers further undertook that if for any reason the computer programme failed to execute the contract in accordance with the parameters that had been established, or ought to have been established, in the computer programme, insurers would, within specified limits, be bound by the result produced by the programme. [...]

[I]n the present case, insurers hold out the SSP software as the automatic medium for contract formation. Once the broker [...] has input the necessary data into the electronic process, no further human intervention is necessary for the formation of a binding contract between broker and insurer.

14. In doing so, the court equated the software system with the automated ticket machine considered by the Court of Appeal of England and Wales in *Thornton v. Shoe Land Parking Ltd* (the "*Thornton*" case).<sup>11</sup> In that case, the leading judgment found that a car parking contract had been formed by a person inserted money into an automated ticket machine, thereby accepting the offer made by the machine being held out as ready to receive the money.

15. During the intersessional event, attention was drawn to the "Lucky Betting *Ticket*" case in Japan, which also involved a transaction with an automated machine.<sup>12</sup> In that case, the District Court of Osaka found that the installation of a machine for placing bets on horse racing was not an offer by the company installing the machine but rather an invitation to make offers, as the person placing the bet still needed to input details of the bet. In other words, the terms of the bet were not known at the time the machine was installed. The person placing the bet input details of the bet by inserting a pre-filled machine-readable paper slip into the machine with the appropriate money, which the court found to constitute the offer. The offer was in turn accepted when the machine displayed a message that it was "in communication with the computer" together with the details of the bet and the amount of money paid. It

<sup>&</sup>lt;sup>10</sup> Case No. CO/2220/2005, Judgment, 2 May 2007, [2007] EWHC 971 (Admin).

<sup>&</sup>lt;sup>11</sup> Judgment, 18 December 1970, All England Law Reports, vol. 1971, No. 1, p. 686, [1970] EWHC Civ 2.

<sup>&</sup>lt;sup>12</sup> Case No. 2002 (Wa) 13238, Judgment, 30 July 2003, *Kin'yū Shōji Hanrei*, vol. 1181, p. 36.

was explained that legal doctrine in Japan has drawn analogies to the *Lucky Betting Ticket* case when analysing contracts formed using automated systems.

# 3. Contracts formed on algorithmic trading platforms

16. Yet another use case explored during the intersessional event involves the interaction of computer programs buying and selling financial assets or instruments on algorithmic trading platforms. This type of use case was considered by the Court of Appeal of Singapore in the case of *B2C2 Ltd. v. Quoine Pte. Ltd.* (the "*Quoine*" case), which was referenced during the sixty-fourth session of the Working Group (A/CN.9/1125, para. 12).<sup>13</sup> While high-frequency trading has been identified within the Working Group as a common instance of automated contracting, the contract law aspects of high-frequency trading has received very little consideration by the courts, much like cases of contracting through EDI (see para. 8 above).<sup>14</sup>

17. Several aspects of the *Quoine* case were presented during the intersessional event. First, it was highlighted that the court was composed of an international panel of judges – comprising three members of the Supreme Court of Singapore, the former Deputy President of the Supreme Court of the United Kingdom and the former Chief Justice of the High Court of Australia. While the court applied the law of Singapore, the composition of the court was indicative of the approach that might be taken to similar transactions in other common law jurisdictions.

18. Second, it was recalled that the main issue in the case was whether and how the law of unilateral mistake applied to contracts formed without any human involvement. It was recalled that, while the majority judgment and dissenting opinion differed in the principles to apply, none of the judges expressed any doubt that valid and enforceable trading contracts had been concluded. Specifically, the majority judgment acknowledged:

[T]he contracting parties did not in fact know beforehand that they were going to enter into the trading contracts or their terms, and were content to abide by what the relevant algorithms did at least as long as this was within the ambit of their programmed parameters.

19. Third, a distinction was drawn between the alleged mistake (a mistaken belief of one contracting party that the exchange rate under the trading contracts did not deviate significantly from the market rate) and a series of errors made by the platform operator in the design and operation of the system running the trading platform, which resulted in the system operating in an unintended or unanticipated manner. It was emphasized that it was the contracting party – and not the automated system – that made the mistake.

# C. Key takeaways

## 1. Some basic assumptions reaffirmed

20. The presentations and discussions at the intersessional event support a range of basic assumptions that have been expressed within the Working Group:

(a) Automated systems are used at all stages in the contract life cycle (A/CN.9/1125, para. 14). Besides contract formation and performance, automated systems are used to establish the terms of offer (e.g., pricing, boilerplate provisions),

 <sup>&</sup>lt;sup>13</sup> Civil Appeal No. 81 of 2019, Judgment, 24 February 2020, Singapore Law Reports, vol. 2020, No. 2, p. 20, [2020] SGCA(I) 02.

<sup>&</sup>lt;sup>14</sup> This phenomenon has been put down to the fact that high-frequency trading commonly occurs in regulated markets. As the secretariat has previously observed (A/CN.9/WG.IV/WP.176, para. 44), rules governing high frequency trading have been introduced in some jurisdictions to maintain market stability and fair trading. These rules may apply ex ante to ensure that things do not go wrong, or that if they do go wrong, there is a mechanism to reverse the trade ex post. The Quoine case concerned trading in an unregulated market.

to inform decisions to conclude a contract (including performing due diligence), to administer contracts, to assert contractual rights, and to resolve contractual disputes;

(b) In the current state of practice, automated systems are used primarily for low-risk, low-variable transactions. Some automated systems that are in use or in development employ AI techniques, such as machine learning and knowledge-based problem solving. Experts from the business community and technology sector advised that AI-assisted systems are being developed for use in a contractual setting to carry out tasks associated with more complex decision-making processes (e.g., negotiation strategies, see para. 12 above);

(c) A distinction can be drawn between automated systems that operate in a "deterministic" manner (i.e. the system generates the same output given the same input) and those that operate in a "non-deterministic" or stochastic manner (A/CN.9/1125, para. 28; A/CN.9/1093, para. 55) (as elaborated in paras. 31 and 32 below);

(d) Regardless of the techniques used, automated systems are tools with no independent will or distinct legal personality (A/CN.9/1125, paras. 69 and 86; A/CN.9/1093, para. 56). The output of an automated system is therefore attributable to a person (A/CN.9/1125, para. 28). This does not presuppose liability for the output or the enforceability of the contract (e.g., in situations in which things go wrong, as elaborated in paras. 25 to 29);

(e) Consistent with existing UNCITRAL texts, the current work of the Working Group should focus on creating an enabling legal environment for the use of automation to form and perform contracts (A/CN.9/1125, para. 37). Existing contract law rules can be applied to the formation and performance of contracts using automated systems;

(f) There is room for further clarity on how to characterize the output of automated systems, how to determine the state of mind of those parties with respect to that output where the law so requires, and how to deal with errors in programming and third-party interference (i.e., when things go wrong) (A/CN.9/1125, para. 33). Moreover, existing principles of contract law may not sufficiently address novel issues associated with the unpredictability of automated systems operating in a non-deterministic manner and may warrant new rules. There is also a question as to whether some rules are so presumptive of human intervention that they cannot be applied to contracts that are formed or performed using automated systems;

(g) In a contractual setting, "smart contracts" are 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). When originally coined, "smart contracts" were described as the modern version of automated vending machines. <sup>15</sup> As with more rudimentary machines, interacting with a smart contract may coincide with contract formation and performance, which can blur the analysis of these two stages of the contract life cycle. The programme for the intersessional event focused primarily on contract formation, which reflects the focus of deliberations at the sixty-fourth session. In considering the development of additional principles, the Working Group may wish to focus on both the formation and performance stages.

#### 2. Pinpointing issues

#### (a) Attribution and state of mind

21. Experts explored the use case involving "smart" devices to highlight some of the complexities in attributing outputs generated by an AI system. It was explained

<sup>&</sup>lt;sup>15</sup> For the treatment of vending machines in a contractual setting, see, e.g., Russian Federation, Civil Code, article 498(2); United States, New York Court of Appeals, *Lachs v. Fidelity & Casualty Co. of New York*, Judgment, 4 March 1954, *New York Reports*, vol. 306, p. 357. An earlier contractual analysis is provided by Antonio Cicu in "Gli automi nel diritto privato", *Il Filangieri: Rivista Giuridica, Dottrinale e Pratica*, vol. 26 (1901), p.561.

that, in some contexts, the device might be regarded as an "agent" of the party that supplies the device for use by a consumer, while in other contexts, it might be regarded as an "agent" of the consumer. It was also explained that the use of a "smart" device might involve a range of actors, including persons supplying the computer program that runs on the device, persons supplying products ordered using the device, and persons operating the system that is used to process orders. Discussions during the event emphasized the need to analyse how the system operates and what other contractual arrangements are in place between the parties (e.g., framework contract for the use of services provided via the connected platform) to address questions of attribution.<sup>16</sup>

22. Experts indicated that, notwithstanding the complexities of online ecosystems, questions of attribution and state of mind for AI systems could be addressed by drawing analogies with the more rudimentary machines that have been analysed by the courts and in legal doctrine. The court cases discussed during the event recognize that machines can be deployed either as an expression of an offer or as expression of an acceptance of an offer. They can therefore be used by the parties as a manifestation of will, even if one party has no knowledge of the specific circumstances of the interaction of the other party with the machine.

23. It was observed during the event that in the *Thornton* case, the leading judgment characterized the installation of the machine and the issuance of tickets from the machine as an offer,<sup>17</sup> while in the *Lucky Betting Ticket* case, the court characterized the installation of the machine as an invitation to make offers and the automated processing of paper slips inserted into the machine as an acceptance of offers. While the difference in characterization could be put down to a difference in legal systems, it may equally be the result of differences in the operation of the machine in question. Either way, both cases demonstrate that the programming of the machine and the context in which it is operated are important factors in the legal analysis. A recent example of the importance of these factors is the case in Australia of *Commissioner of Patents v. Thaler*, in which the Federal Court indicated that attributing an invention devised by an AI system to a human inventor involved consideration of various factors, including ownership of copyright in the computer code, ownership of the computer running the code, and responsibility for the operation and maintenance of the system.<sup>18</sup>

24. It was also observed during the event that the *Quoine* case demonstrated that a legal requirement to determine a party's actual state of mind in connection with the formation of a contract can be met even if the party uses an automated system. For the purposes of applying the law of unilateral mistake, the court referred to the state of mind of the person who programmed the software, even though that person had no knowledge of the specific circumstances of the interaction of the other party with that program. It is conceivable that a similar approach could be applied to satisfy a requirement that the party using an automated system have knowledge of the offer in order to accept it.

## (b) Errors in programming and third-party interference

25. Experts reaffirmed the importance of understanding how errors in programming and third-party interference can impact contracts formed and performed using automated systems. The secretariat has previously referred to these events, together

<sup>&</sup>lt;sup>16</sup> These contractual arrangements also recall the "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 form and perform contracts): see, e.g., A/CN.9/WG.IV/WP.173, para. 5. As identified by the secretariat in its earlier exploratory work on the topic (see A/CN.9/1012/Add.1), as a stand-alone product (and not just as a tool for forming and performing contracts), "smart" devices engage a range of other legal regimes, such as sale of goods law, tort law and product liability law.

<sup>&</sup>lt;sup>17</sup> The other two judges of the court expressly eschewed any finding as to the precise moment at which the contract was concluded.

<sup>&</sup>lt;sup>18</sup> Commissioner of Patents v. Thaler, File No. VID 496 of 2021, Judgment, 13 April 2022, [2022] FCAFC 62, para. 121.

with erroneous inputs from an external data source, as "data processing errors". While the different types of events have so far not been defined, they are commonly understood as events that cause a computer program to operate in an unintended or unanticipated manner. The court cases discussed during the event demonstrate that data processing errors can sometimes give rise to mistakes at law, capable of vitiating an otherwise validly formed contract, but can also impact the formation of contracts in other ways.

26. In the *Lucky Betting Ticket* case, a paper jam prevented the machine from operating as intended so that it did not reach the point in its programming at which the offer was accepted. In other words, physical interference frustrated the formation of a contract.

27. In the Quoine case, the majority judgment accepted that a party using a computer program to form a contract could be affected by mistake, even if the computer program operated as programmed. It also accepted that the non-mistaken party also using a computer program to form the contract could meet a requirement to have knowledge of the mistake by reference to the state of mind of the person who programmed the software, even if the mistake was not formed until several months after the software was programmed. Conversely, the dissenting opinion found that it was impossible for the non-mistaken party to meet the knowledge requirement. It relied instead on more "flexible" equitable principles to find that the contract was voidable due to a "fundamental computer system breakdown" that would have been readily apparent to any reasonable trader with knowledge for the circumstances of the trade. In other words, the system operated in a way that was "not conceived as possible" and would never have been accepted by the platform operator. This approach echoes a view put forward during the preparation of the ECC that a system operator should not bear the risk of the output of the system if that output is generated in a manner that could not have reasonably been anticipated by the operator.<sup>19</sup>

28. As noted above (para. 19), the "mistake" or "system breakdown" affecting the trading contracts in the *Quoine* case was the result of a series of data processing errors, which included a failure to access external data sources that caused the exchange rate to deviate from the market rate, and a lack of safeguards built into the programming to prevent the trades. In the discussion during the intersessional event, a question was raised as to the extent to which such errors should affect the contract, and whether alternative relief was available. As has already been observed within the Working Group, errors in programming may give rise to liability on the part of third-party software vendors towards the party that used the system to form or perform the contract (A/CN.9/1093, para. 58). Liability could be contractual (e.g., failure to comply with the specifications in a contract for the supply of the software) or non-contractual (e.g., negligent failure in developing the software, or product liability in the case of a "smart" device).

29. The different types of "error" that can affect the operation of automated systems, and the legal consequences thereof, were not explored in detail during the event. The Working Group may wish to consider these issues, which recall a suggestion made during the sixty-fourth session for work to "focus on the circumstances that might trigger liability" and to "provide guidance on situations in which things could go wrong, including errors in programming and third-party interference" (A/CN.9/1125, para. 33).

## (c) Identifying contract terms

30. Several experts discussed the use of dynamic information (i.e. information that may change periodically or continuously based on an external data source, such as a market price). Dynamic information may be used in contract formation (e.g., to determine the terms of contract offered by an automated negotiation tool) and contract performance (e.g., triggering an action carried outunder the contract). At its sixty-fourth session, the Working Group heard that a provision enabling the use of dynamic

<sup>&</sup>lt;sup>19</sup> Explanatory note on the ECC, footnote 4 above, para. 230; A/CN.9/484, para. 108.

information could be based on article 6 of the 2017 UNCITRAL Model Law on Electronic Transferable Records (MLETR), but that such a provision would need to be adjusted to apply in a contractual setting (A/CN.9/1125, para. 22). In that setting, the use of dynamic information engages existing principles of contract law on the incorporation and certainty of contract terms, which were considered in the preparation of article 5 *bis* of the MLEC. Some experts also raised the issue of the availability of contract terms, which was considered in the preparation of article 13 of the ECC.

#### (d) Deterministic versus non-deterministic systems

31. Experts drew attention to statements by the court in the *Quoine* case that the computer programs used by both parties operated in a "deterministic" manner. While the court did not indicate whether its analysis would have differed if the program operated in non-deterministic manner, legal commentary on the case suggests that the statements signal a possible difference in approach. In an address given shortly after the judgment, the Chief Justice of the Supreme Court of Singapore offered the following response:

[S]ome commentators have noted that the majority decision in *Quoine* appears to be confined to automated contracts formed by the operation of deterministic algorithms, leaving open the position where stochastic and other non-deterministic algorithms based on some form of artificial intelligence or machine learning are at play. While there are strengths in such an incremental ad hoc approach, there are also legitimate concerns over consistency, the breadth of these decisions, and their adequacy in dealing with rapid technological advancements.

32. While experts did not deny that a non-deterministic system could be used to conclude a contract, it was suggested that additional rules may need to be developed to counterbalance the unpredictability of such systems. Some experts indicated the possibility of developing rules that give expression to the principles of transparency, explainability and traceability in a contractual setting. Some experts also suggested looking to equitable principles and general principles of agency for inspiration in defining the circumstances in which a party might repudiate a contract formed using an automated system (i.e., formulating new rules by analogy).

# **III.** Revised principles

# A. Status

33. At its sixty-fourth session, the Working Group started a process of distilling principles from the provisions of existing UNCITRAL texts and developing additional principles on legal issues not fully addressed in those texts. At the end of the session, the Working Group had elaborated a draft set of principles on legal recognition, legal compliance and attribution of automated systems. The Working Group requested the secretariat to develop the set of principles with a view to putting forward proposals for additional principles on other legal issues considered during the session. The secretariat has commenced this process by consolidating and revising the principles based on the key takeaways from the intersessional event. A revised set of principles is contained in the next section.

34. In large part, the revised principles restate the applicability of existing UNCITRAL texts with language adapted to apply specifically to the context of automation. Based on the information compiled by the secretariat, such a "restatement" would provide valuable guidance as to the applicability of those texts and the enabling legal environment that they create, particularly amid the growing use and complexity of automated contracting demonstrated at the intersessional event.

35. The revised principles do not yet address stand-alone requirements giving expression to the principles of transparency, explainability and traceability; while

these issues were raised during the intersessional event, the content of possible principles was not elaborated further beyond the suggestions previously put forward within the Working Group. Those suggestions addressed matters such as (i) the pre-contractual disclosure of the use of an automated system and the criteria for its operation (A/CN.9/1125, para. 49), and (ii) logging the operation of the automated system (A/CN.9/1093, para. 74). These matters are also being addressed – albeit not purely in a contractual setting – through work in other international forums aimed at developing harmonized standards on the ethical use of AI, which the secretariat continues to monitor.

36. Another suggestion put forward within the Working Group was incorporating a requirement to use a reliable method (A/CN.9/1125, para. 70). As a concept encompassing principles of transparency, explainability and traceability, reliability (or "trustworthiness") could be incorporated into the principles through shifting the burden of proof or introducing presumptions of liability (ibid., para. 57). For example, in a claim brought against a person operating an automated system that employs AI techniques for non-formation or non-performance of a contract, it is conceivable that the burden might be placed on the person to establish the formation or performance of the contract if a reliable (or "trustworthy") system is not used.

37. Moreover, the revised principles do not yet address liability. They do, however, propose a new principle on legal consequences flowing from the output of an automated system (principle 6), which might provide a foundation for developing additional rules addressing the legal consequences of situations in which things go wrong.

The Working Group may wish to provide guidance to the secretariat on the development of additional principles on the matters highlighted in paragraphs 35 to 37 above, including the suggestions in paragraphs 50 and 51 below as a possible starting point.

# **B.** Text and remarks

# 1. Definition of "automated system"

# Principle 1

An "automated system" is a computer program that carries out an action without review or intervention by a natural person.

38. Principle 1 restates the basic concept of "automated system" as elaborated within the Working Group (A/CN.9/1125, para. 62). It is based on the definition of "automated message system" in article 4(g) of the ECC, which is regarded as apt to describe the systems in use (A/CN.9/1093, para. 53). The language of the principle has been simplified to remove reference to other "electronic or other automated means", and to streamline terminology with article 12 of the ECC (which refers to "actions carried out" by automated systems). Drafted in technology-neutral terms, the principle accommodates systems employing all kinds of methods, including "machine learning" (A/CN.9/1125, para. 63), which is reinforced by principle 3(b).

## 2. Use of automated systems in contracts

#### Principle 2

(a) Automated systems are used throughout the contract life cycle, including in the formation and performance of contracts.

(b) Automated systems can be used to form contracts by processing data messages that constitute communications in connection with the formation of contracts, such as an offer or acceptance of an offer. Automated systems can be used to perform contracts by processing data messages that constitute an action in connection with the performance of a contract.

(c) The terms of a contract that is formed or performed using automated systems can be in the form of data messages, including computer code and data messages that are logically associated, whether generated contemporaneously or not.

#### Remarks

39. Principle 2 develops some of the other basic concepts elaborated within the Working Group (A/CN.9/1125, para. 62). Paragraph (c) expands on the concept of "data message", as outlined in A/CN.9/WG.IV/WP.176 (paras. 13 and 18).

## 3. Legal recognition

#### Principle 3

(a) A contract is not to be denied validity or enforceability on the sole ground that an automated system was used in its formation.

(b) An action in connection with the formation or performance of a contract is not to be denied validity or enforceability on the sole ground that it was carried out by an automated system.

(c) The legal effect of an automated system is not to be excluded or restricted on the sole ground of the method used.

#### Remarks

40. Paragraphs (a) and (b) develop the principle of non-discrimination as elaborated within the Working Group (A/CN.9/1125, para. 80). They establish a "foundational" provision that legally enables the use of automation in contract formation and performance. The critical element of automation – the absence of human intervention – is incorporated into the definition of "automated system" in principle 1.

41. Paragraph (b) picks up the terminology of the definition of "automated system", and thus refers to the "actions" carried out by the automated system. The term "action" is not used in other provisions of existing UNCITRAL texts. It is intended to cover 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"). It is also intended to cover the outcome of other decision-making processes for which an automated system might be used in a contractual setting, which responds to a query raised within the Working Group (A/CN.9/1125, para. 77).

42. Actions "in connection with" the performance of a contract cover not only the type of exchanges between the parties that are provided for under the contract (cf. MLEC, art. 12), but also the exercise of rights under the contract and remedies provided for outside the contract. This reflects a suggestion made within the Working Group (A/CN.9/1125, para. 35). Consistent with the non-discrimination provisions in existing UNCITRAL texts, paragraph (b) is not intended to interfere with legal requirements that otherwise apply (e.g., a contractual requirement that the action be carried out in a particular manner, or an extracontractual requirement to refrain from carrying out the action).

43. Paragraph (c) develops the principle of technology neutrality as elaborated within the Working Group (A/CN.9/1125, para. 79). It reinforces the technology-neutral definition of "automated system" in principle 1. The term "method" is widely used in existing UNCITRAL texts, and encompasses the various technologies and techniques used for the automated system.

## 4. Attribution

## Principle 4

(a) Automated systems are tools with no independent will or legal personality. A data message generated or sent by an automated system is attributed to the person on whose behalf the automated system is operated.

(b) An automated system may be operated by a person on behalf of one or more parties to the contract.

(c) As between the parties to a contract, a data message generated or sent by an automated system is attributed in accordance with any procedure agreed to by the parties for that purpose.

(d) This principle does not deal with the legal consequences that may flow from a data message that is attributed to a person.

#### Remarks

44. This principle develops the principle of attribution elaborated within the Working Group (A/CN.9/1125, paras. 71–77). It deals with "attribution" in the sense of 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 (A/CN.9/1125, para. 44). It is not about liability (i.e. identifying the person who bears the legal consequences flowing from that output) (ibid.) or authentication.

45. Paragraph (a) restates the basic assumption expressed on several occasions within the Working Group that automated systems are tools (A/CN.9/1125, paras. 69 and 86; A/CN.9/1093, para. 56), which in turn provides context for the basic rule for attribution that is expressed in the explanatory note on the ECC<sup>20</sup> and has received support within the Working Group. Broad support has been expressed within the Working Group for a suggestion that the rule of attribution refer to "parties" (not "persons"), so that it effectively allocates attribution between the parties to the contract (A/CN.9/1125, para. 74). Given the use cases explored during the intersessional event, which involve systems developed or operated by third parties, the basic rule might have broader application beyond the parties to the contract, including for the purposes of identifying the parties to the contract in the first place.

46. Paragraph (b) responds to a concern expressed within the Working Group that the principle accommodate the use of online platforms, for which the platform operator (i) provides an automated system that is used by multiple parties to form and perform contracts, but (ii) retains control of the system without being party to those contracts (A/CN.9/1125, para. 73).

47. Paragraph (c) picks up on a suggestion made during the Working Group that the principle should reflect the relationship between attribution and party autonomy (A/CN.9/1125, para. 76). It uses language drawn from article 13 of the MLEC. The secretariat has previously stated 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).<sup>21</sup> In the context of contracts formed via online platforms, the platform rules

<sup>&</sup>lt;sup>20</sup> Ibid., para. 213.

<sup>&</sup>lt;sup>21</sup> A/CN.9/WG.IV/WP.173, para. 12(a).

may well address the attribution of data messages among platform users (ibid., para. 74).

48. Paragraph (d) restates a basic understanding articulated within the Working Group (A/CN.9/1125, para. 44). A similar principle was reflected in earlier drafts of the provision on attribution in article 13 of the MLEC, but it was ultimately felt unnecessary to express the principle in the text.<sup>22</sup> As noted above (para. 36), the revised principles do not yet address matters related to liability, although principle 6 does propose a rule that affects the legal consequences flowing from the output of an automated system.

## 5. State of mind

## Principle 5

Where the law requires the determination of the state of mind of a person in connection with data messages generated, sent or received by an automated system that are attributed to the person, regard may be had to the design and operation of the system.

## Remarks

49. This principle is new and is put forward for consideration by the Working Group. It is based on the cases explored during the intersessional event, which demonstrate how questions about the knowledge, belief and intention of the parties can arise in the context of contract formation. It is framed in more general terms than the provisions suggested earlier by the secretariat,<sup>23</sup> and essentially reflects the concept that the state of mind of a person with respect to actions carried out by an automated system flows from the design of the system (i.e. how it is programmed) and the context in which it is operated (see also A/CN.9/1125, para. 86).

## 6. Legal consequences

## Principle 6

As between the parties to a contract, a party cannot rely on a data message that is attributed to another party if that data message is generated or sent in a manner that was not anticipated or could not reasonably have been anticipated by the other party, and the relying party knew or should reasonably have known that the data message was generated or sent in such a manner.

#### Remarks

50. This principle is also new and is put forward for consideration by the Working Group. It is intended to reflect the type of equitable principle put forward by the dissenting opinion in the *Quoine* case, and the view put forward during the preparation of the ECC (see para. 27 above). It also draws on article 13(5) of the MLEC, which is part of a regime for allocating risk of reliance on data messages sent between the parties. By affecting the legal consequences flowing from the output of an automated system, the principle may impact the allocation of liability between the parties for data processing errors. As noted above (para. 29), the Working Group may wish to elaborate the principle to provide further guidance on the legal consequences flowing from situations in which things could go wrong, including errors in programming and third-party interference (A/CN.9/1125, para. 33).

 <sup>&</sup>lt;sup>22</sup> Guide to Enactment of the MLEC, 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. 92.

<sup>&</sup>lt;sup>23</sup> A/CN.9/WG.IV/WP.173, para. 32.

# 7. Legal compliance

# Principle 7

The person on whose behalf the automated system is operated ensures that the design, operation and use of the automated system complies with applicable laws. These laws may include laws on data privacy and protection, as well as laws on disclosure of information regarding the contract, its terms or the automated system.

# Remarks

51. This principle develops the principle elaborated within the Working Group (A/CN.9/1125, para. 66) by signalling possible legal requirements regarding pre-contractual disclosure or making available contract terms. It does not establish stand-alone requirements to that effect, which may be subject of future proposals within the Working Group, including to give expression to the principles of transparency, explainability and traceability (A/CN.9/1125, para. 49).