Electronic Agents and the Formation of Contracts

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Abstract

In this paper, an analysis is made of the increasingly active role of electronic agents, especially intelligent agents, in the negotiation and formation of contracts. Among the different doctrinal solutions that might be applicable is to consider conferring some degree of legal personality on agents or, at the other extreme, to treat them as mere communication tools. Another alternative discussed is whether intelligent agents should be considered as agents under the law of agency. Following an analysis of the two main theories of consent – the subjective and the objective theories – it is argued that the objective theory is applicable to the use of electronic agents in contracting. There is then a short examination of some enacted legislation that deal with contract formation through the involvement of electronic agents. Finally, some practical considerations for the widespread use of electronic agents in electronic commerce are highlighted, and some solutions proposed.

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As soon as it read the e-mail from the search agent, stating that its search was positive, Jeenie forwarded a copy of the e-mail together with the documents attached with it, to Sue’s folder on Omega Ltd., highlighting them as ‘high priority’ so that Sue would read them before her meeting with a large potential client scheduled for that afternoon. The search agent had searched the archives of all one hundred and thirty-five subsidiaries of Alpha Ltd., of which Sue was the CEO. The search detailed all the cases where Omega Ltd. had in the past competed with Alpha Ltd. in tenders, detailing the cases where it outbid Alpha Ltd. as well as those where Alpha Ltd. outbid it. A pattern could be extrapolated from the data, pointing towards some common tactics in Omega’s bidding strategy. This could surely be of use to Sue that afternoon in her efforts to win over the new client from its competitor Omega Ltd. ...

Jeenie then checked the rest of Sue’s e-mails and from a message from another agent that monitored books just published by Sue’s favourite authors, it found that Stephen King had just published a new book. It quickly travelled to one of the book agents in the electronic marketplace and requested a list of book sellers who were offering that book for sale, together with a price list. When the list came, Jeenie noticed that BookBargain were offering that book in paperback format for a special price that was well below the price being offered by NetShop for an electronic version. However, as it knew that Sue had recently indicted a strong preference for electronic books, Jeenie ordered the book from NetShop, charged it to Sue’s Visa card, and instructed the NetShop agent to transmit the book directly to Sue’s electronic books folder. The NetShop agent first checked and confirmed Jeenie’s authority to use Sue’s Visa card, then transmitted electronically a copy of the book, sending together with it an e-mail to Sue to inform her of her latest acquisition.

Science or science fiction? Jeenie and the other agents mentioned here are of course software agents and not human agents. Such electronic agents display

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2 According to Russell & Norvig, ‘An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors. A human agent has eyes, ears, and other organs for sensors, and hands, legs, mouth, and other body parts for effectors. A robotic agent substitutes cameras and infrared range finders for the sensors and various motors for the
characteristics that are very close to human characteristics such as intelligence, autonomy and pro-activeness. The idea of having intelligent systems to assist human beings with routine tasks, to sift through the enormous amount of information available to a user and select only that which is relevant, is not new and a lot of work and results have already been achieved in the field of artificial intelligence (‘AI’). Indeed, the notion of intelligent agents has been around since the mid-1950s with the Massachusetts Institute of Technology (MIT), Carnegie Mellon University (CMU), Stanford University and IBM being at the forefront in this field of AI. Among the earliest reasoning programs are Logic Theorist developed by Allen Newell and Herbert Simon from Carnegie Tech, (now CMU) in 1956 and the General Problem Solver or GPS. Today electronic agents are used as mediators in electronic commerce and there are available in the market a number of electronic and intelligent agent systems to assist buyers (buyer agents or shopping agents) and sellers (selling agents).

1.1 Characteristics of intelligent agents

It is not very easy to clearly define an electronic agent, let alone an intelligent agent. The problem, as Wooldridge & Jennings put it, is that although the term agent is widely used by many people working in closely related areas, it defies attempts to
produce a single universally accepted definition. Besides this, there are a number of synonyms for electronic agents. We hear, for example, of robots (e.g. a factory robot performing a repetitive task), softbots (software robots), knowbots (knowledge-based robots), taskbots (task-based robots), autonomous agents, personal agents and personal assistants.

A fundamental characteristic of intelligent agents that distinguishes them from other software agents is their autonomy. As explained by Russell & Norvig,

‘An agent’s behaviour can be based on both its own experience and the built-in knowledge used in constructing the agent for the particular environment in which it operates. A system is autonomous to the extent that its behaviour is determined by its own experiences.’

Therefore, an autonomous agent is one that operates without the direct intervention of human beings or other agents, and has some kind of control over their actions and internal state.

One of the most comprehensive notions of intelligent agents in the literature is the ‘weak’ and ‘strong’ notion of agency put forward by Wooldridge & Jennings. This notion corresponds to a set of fundamental and auxiliary agent attributes that characterise software agents. An intelligent agent should possess all the fundamental attributes (‘weak notion’) but need not possess the auxiliary ones (‘strong notion’). The fundamental attributes of an agent according to Wooldridge and Jennings are the following:

‘autonomy: agents operate without the direct intervention of humans or others, and have some kind of control over their action and internal state;

social ability: agents interact with other agents (and possibly humans) via some kind of agent-communication language;
*reactivity*: agents perceive their environment, (which may be the physical world, a user via a graphical user interface, a collection of other agents, the internet, or perhaps all of these combined), and responds in a timely fashion to changes that occur in it;

*pro-activeness*: agents do not simply act in response to their environment, they are able to exhibit goal-directed behaviour by *taking the initiative*.  

As explained by Wooldridge & Jennings, for some researchers (particularly those working in AI) the term ‘agent’ has stronger and more specific meaning than that explained above. According to the ‘strong notion’ of agents, besides the abovementioned four fundamental characteristics, an agent ‘is either conceptualised or implemented using concepts that are more usually applied to humans’. Some characterise an agent using *mentalist* notions (e.g. knowledge, belief, intention, and obligation) while others considered emotional agents. To give agents human-like attributes, some researchers represent the agents visually, perhaps by using a cartoon-like graphical icon or an animated face. Wooldridge & Jennings explain that a number of other attributes are sometimes discussed in the context of agency such as:

*mobility*: the ability of an agent to move around an electronic network;

*veracity*: the assumption that an agent will not knowingly communicate false information;

*benevolence*: the assumption that agents do not have conflicting goals;

*rationality*: the assumption that an agent will act in order to achieve its goals, and will not act in such a way as to prevent its goals being achieved, at least insofar as its beliefs permit.

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16 Wooldridge & Jennings, *supra* n. 10.  
The paper will focus on intelligent, i.e. autonomous agents that can base their behaviour on both the built-in knowledge used in their construction and on their own experience.

1.2 Role of agents as mediators in e-commerce
Electronic agents may be used as mediators in electronic commerce. In order to establish the role of electronic agents in e-commerce, a model known as the Consumer Buying Behaviour (CBB) Model was devised by Maes, Guttman, and Moukas\textsuperscript{18}, members of the Software Agents Group at MIT Media Laboratory. This model identifies six fundamental stages in the buying process and helps to elucidate where agent technologies apply to the shopping experience. These stages are: (1) need identification, (2) product brokering, (3) merchant brokering, (4) negotiation, (5) purchase and delivery, and (6) product service and evaluation. Once the buyer becomes aware of some unmet need (need identification), a number of product alternatives are retrieved and presented to him based on buyer-provided criteria (product brokering). A number of alternative merchant suppliers are then provided based on buyer-provided criteria (merchant brokering). Once the product and the merchant have been selected, the terms of the transaction are negotiated (negotiation), following which the product is purchased and delivered. The last stage of the model involves product service, customer service and an evaluation of the satisfaction of the overall buying experience and decision.

Maes et al. found that the personalised, continuously-running and autonomous characteristics of agents make them well-suited for mediating those consumer

behaviours involving information filtering and retrieval, personalised evaluations, complex coordination, and time-based interactions, and that these roles correspond best to the first four stages of the CBB model, i.e. from need identification up to negotiation. One might add that these first four stages are also those stages preceding and leading to the conclusion of a contract, and are of relevance for the purposes of this discussion. It is to be noted that it is not necessary that one and the same agent will perform all these separate stages, since different agents could be employed for each stage.

It would also appear that the current-state-of-the-art electronic agents in the market today assist the individual in one or more of these stages in the buying process, but there is usually required the intervention of a human being at some stage in this process, e.g. to make the definitive selection of the product or merchant. Although it is difficult to state how software agents will operate or what they will look like in the future, it is already clear that software agents will play a more major role in e-commerce. Kerr19 notes that,

‘Agents will no doubt be employed to assist human interaction through the various stages of a transaction from product and merchant brokering through to negotiation, sale, distribution and payment. It is not unreasonable to predict that, in time, agent technology will become sufficiently sophisticated to perform many if not all of these sorts of tasks without human oversight or intervention.’

One can envisage a future where an intelligent agent would be able to itself initiate and generate agreements without the individual being even aware that contract negotiation has been initiated, let alone concluded. Agreements will therefore no longer be generated through machines but by them,20 without any intervention or supervision of an individual. This will pose challenging questions to current legal theory in a number of areas. Questions may arise as to whether such contracts are contractual and binding on the parties, who is liable where a mistake is committed or damage is caused by an agent, who has property rights in respect of agents and in the result of the work of agents.

20 See Kerr, supra n. 19, p. 19.
2. Electronic agents and the formation of contracts

Today, computers are not merely a means of communication that enable and facilitate electronic commerce, but are capable of initiating that communication. The role of a computer is developing from that of a passive tool into an active participant in the electronic trading process. We can envisage a world where electronic agents become sufficiently animated as to generate agreements, as in the scenario presented in the introduction to this paper, and not merely be the means through which agreements may be generated.

In such a situation, the question that naturally arises is whether a contract that has been generated and conducted by an intelligent agent without any direct human intervention, is legally binding and on whom. Would such an agreement be enforceable on the person who used that agent and gave it substantial autonomy to take initiative and make decisions?

‘If machines are capable of replicating, or at least mimicking, processes that are regarded as evidence of free will when performed by human beings, what are, and ought to be, the legal consequences of this situation?’

Both civil and common law systems consider capacity and consent as essential elements for the validity of a contract. To be valid and legally enforceable, a contract

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22 Kerr, supra n. 19, p. 19.
23 See Allen & Widdison, supra n. 21, p. 25.
24 There is a difference of approach between common and civil law systems, but the end effect is probably the same. In civil law systems such as France, capacity and consent are deemed to be two of the essential elements of contract, together with the other elements that a contract should have a definite object and a lawful ‘causa’. For example, article 1108 of the French Civil Code defines four essential conditions for the validity of contracts: ‘le consentement de la partie qui s’oblige; sa capacité de contracter; un object certain qui forme la matière de l’engagement; une cause licite dans l’obligation.’ However, it is very interesting to note that Mazeaud, writing on the French civil code, holds that the rules of capacity are aimed to protect consent, and that there are therefore three conditions for the formation of a contract: consent, object and cause - see Mazeaud, Mazeaud & Chabas, Leçons de Droit Civil - Tome II - 1er vol. Obligations: Théorie Générale, 7th ed., (Editions Montchrestien: Paris 1985), p. 98. Common law systems do not seem to include capacity with the three basic essentials to the creation of a contract (which are said to be agreement, contractual intention and consideration), but the topic of incapacity of one or more of the parties to the contract is treated as a factor that may defeat the
must have been entered into by parties who are considered by the law to be capable of contracting. Such contracting parties are bound because they have agreed to be bound, i.e. because they have so consented. The focus of this article will therefore be on these two elements of capacity and consent.

Only persons who are legally capable of contracting, may enter into a binding contract. This in practice means that only natural persons or legal persons\(^{25}\) have the legal capacity to contract. Within these categories, the capacity to contract is the rule, incapacity is the exception,\(^{26}\) e.g. minors, and persons who have been interdicted or incapacitated are not deemed to have the requisite capacity to enter into a legally binding contract.

It is important, as Mazeaud\(^{27}\) explains, to avoid confusing the notion of capacity from that of absence of personality. Incapacity is linked to a person, and therefore presumes personality. A group or an individual to which the legislator has not conferred or from which the legislator has withdrawn personality, does not have a juridical life, and is therefore not a person in the eyes of the law. According to Mazeaud, the absence of personality is not incapacity.

With this in mind, it becomes clear that the use of an intelligent agent in the contract formation process gives rise to considerable doctrinal difficulties. An intelligent agent has no juridical standing in the eyes of the law. How can one speak of an agent contractually binding a human being? A number of possible solutions are put forward and examined below.

Among the solutions discussed below is whether legal personality should be conferred on intelligent agents or whether they should be treated as mere communication tools. Then there is a study of whether intelligent agents should be considered as agents under the law of agency. This is followed by an analysis of the two main theories of consent – the subjective and the objective approaches – and its applicability to the use of electronic agents in contracting. This section\(^{28}\) ends with a

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\(^{25}\) sometimes also referred to as juridical persons, moral persons or artificial persons to distinguish them from human beings (referred to as natural or physical persons).


\(^{27}\) Mazeaud et al., supra n. 24 at p. 225.

\(^{28}\) i.e. section 2.
short examination of some enacted legislation that deal with contract formation through the involvement of electronic agents. The next section\textsuperscript{29} looks into some practical considerations for the widespread use of electronic agents in electronic commerce and refers to some proposed solutions.

2.1 Legal personality for intelligent agents?
A possible solution to these difficulties that has been mentioned by a number of authors\textsuperscript{30} is to confer legal personhood onto intelligent agents and to develop a theory of liability on that basis. At least three different kinds of reasons have been offered as a justification for attributing legal personality on an entity: (1) moral entitlement, (2) social capacity and (3) legal convenience.

According to some authors, an entity which is in some way sentient or conscious is morally entitled to be treated as a legal person.\textsuperscript{31} However, the applicability of this criterion to intelligent agents is debatable since it is not at all certain that intelligent agents can achieve self-consciousness. Even if such agents are described as intelligent or as acting autonomously, we are nowhere near the point where these devices can be said to be making conscious, moral decisions of their own.\textsuperscript{32} In any case, ‘We are concerned with the protection of those who trade through the computer, rather than the protection of the computer itself. The computer has no interest in these transactions.’\textsuperscript{33}

The argument for conferring legal personality on the basis of social reality is based on the fact that many artificial legal persons are already regarded as persons in some extra-legal sense. An illustration of this is an association of individuals which pursues

\textsuperscript{29} Section 3 of this paper.
\textsuperscript{31} It has been argued, for example, that whales should have the right to life because they are intelligent and are conscious of their own sufffering – see Amato & Chopra, ‘Whales: Their Emerging Right to Life’ American Journal of International Law 21 (1985), quoted in Allen & Widdison, \textit{supra} n. 21 at III.A.
\textsuperscript{32} Kerr, \textit{supra} n. 19, p. 25.
\textsuperscript{33} See Allen & Widdison, \textit{supra} n. 21, III.A.
a particular object that is distinct from the human beings which constitute it in such a manner that society starts distinguishing the whole from the individual parts, so to speak. In the nineteenth century, theorists developed this idea by linking it to the biological concept of an organism and arguing that collective bodies could develop into a social organism with a distinct social will.\textsuperscript{34} Allen & Widdison explain that social capacity for autonomous action by a computer arises once those who interact with it regard it, rather than its human controllers, as the source of relevant communication. Although we might be prepared to say that today there are computers which play chess on their own - and indeed that Deep Blue\textsuperscript{35} has even beaten the current world (human) champion - it is still a substantial jump to state that computers have the capacity for social action and should be granted legal personality.

The other reason for conferring legal personality - legal expedience - has been applied to confer personality to limited liability companies. Some of the advantages that accrue from the conferment of legal personality on a company are that it can sue or be sued in its own name and independently of its members, that it owns its own property, and that it has perpetual succession until dissolution, thereby surviving the death or change of its directors and shareholders, and that it can own property independently of its members.\textsuperscript{36} Some legal systems may confer elements of legal personality on what otherwise would be a thing (a res) with no juridical standing, e.g. in \textit{in rem} jurisdictions anyone who has a specific interest in a particular ship’s business may sue directly the ship as defendant and arrest it so that any eventual favourable judgment could then be enforced directly against the ship.

The notion of conferring legal personality on autonomous electronic devices such as intelligent agents raises other interesting legal issues. A consequence of conferring legal personality would be that such devices would have both rights and responsibilities. Carbonnier explains that under the classical theory of law patrimony is viewed as an emanation of personality (\textit{une émanation de la personnalité}). According to this theory, every person, physical or moral, has a patrimony, and it is

\begin{flushright}
\begin{itemize}
  \item \textsuperscript{34} See Allen & Widdison, \textit{supra} n. 21, III.B.
  \item \textsuperscript{35} On May 11, 1997, Deep Blue - an IBM supercomputer - beat World Chess Champion Garry Kasparov in a chess finale match that lasted barely more than an hour. This was the first time a current world champion had lost a match to a computer opponent under tournament conditions. For more about this match, see http://www.research.ibm.com/deepblue/home/may11/story_1.html (last visited 15.08.2001).
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only persons who are capable of having a patrimony. Patrimony is composed both of assets (‘actif’) and liabilities (‘passif’). It comprises all the assets and rights belonging to one and the same owner which are susceptible of a pecuniary evaluation (as opposed to extra-patrimonial or personal rights - droits de la personnalité), as well as all the liabilities of that person. Ascribing legal personhood to an intelligent agent would mean that such an agent would be able to have patrimonial rights and also be subject to liability for negligent acts or omissions, just as a natural person would.

A problem that would immediately arise if one were to decide to confer legal personality on an electronic agent, is that it is difficult today, with the current state of the art as regards such autonomous electronic devices, to identify the intelligent agent: ‘Is it the hardware? Is it the software? What if the hardware and software are dispersed over several sites and maintained by different individuals?’ As is the case with companies, a possible identification procedure would involve having some sort of registry where anyone who wishes to use intelligent agents for use in electronic commerce should register such agent as well as identify himself as the party standing behind the agent. Both Allen & Widdison and Karnow propose such a system. However, the difficulty of introducing such a system is its expense, and that it is difficult to economically justify it. Whereas, as described above, there are distinct economic benefits to conferring personality on companies or on ships, no such advantages appear to flow from conferring legal personality onto intelligent agents. Moreover, it would also seem superfluous since traders could more easily have agreed to sign an interchange agreement which would serve the same purpose of guaranteeing the enforceability of the agreement.

As intelligent agents are given greater autonomy, there could come a point where it would be legally appropriate to give autonomous agents the status of legal persons, particularly if it becomes more easy to attribute some form of identity to the intelligent agent (e.g. through the agent being embodied in a robot or by being given an

38 Carbonnier, supra n. 37, p. 292.
39 See Allen & Widdison, supra n. 21, III.C.
40 Karnow, supra n. 30, pp. 193-194.
41 whose legal existence is usually also dependent on its registration.
42 which is also usually registered in its flag country’s ship registry.
43 See Allen & Widdison, supra n. 21, III.C.
44 See Allen & Widdison, supra n. 21, V.B.
intelligent and independent animated body in cyberspace). However, we are still some years away from that ...

2.2 Intelligent agents as mere communication tools?
According to this view, a legal fiction is adopted that anything issuing from the electronic agent really issues directly from its human controller. The electronic agent is here being put at a par with a machine such as the telephone or fax machine. In such a case, one would no longer be able to say that the electronic agent has automatically concluded a contract on behalf of the person in whose interest it has acted. On the contrary, it is the human controller who has concluded the contract through such a means of communication charged with transmitting his will.

This view puts the risk of unexpected obligations on the persons who program, control or otherwise use an electronic agent in the electronic marketplace. Its advantage is that it gives such person a strong incentive to ensure that the agent is properly operating and policed. However, as Allen and Widdison admit, this approach is also unnecessarily harsh. ‘Is it fair, or even commercially reasonable, to hold the human trader bound by unexpected communications just because it was theoretically possible that the computer would produce them?’ For example, where the other party is, or should be, aware that a communication produced by an autonomous electronic device does not represent the human trader’s true intention, that party is in the best position to reduce the costs of unexpected obligations. Under this legal fiction, the human controller would have to bear the disastrous consequences that could ensue from an electronic bug, from an error of calculation or a programming fault. This approach will be revisited below when reference is

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45 Digital animation is already with us with colourful ‘characters’ such as Ananova (a virtual newsreader) and Tmmy (her successor) - see ‘Dawn of the cyberbabes’, The Financial Times, August 17, 2000.
47 ‘Le risque est indéniable: si les juges adoptent cette théorie, l’acteur juridique devra irrémédiablement supporter les conséquences désastreuses qui pourraient survenir d’un bug informatique, d’une erreur de calcul ou d’un défaut de programmation. Il sera tenu de l’ensemble des
made to the notion of attribution, which means that the operations of an intelligent agent are attributed to the human who uses that agent.

2.3 Intelligent agents as agents under the law of agency?

It may be rather tempting to consider applying the notion of agency to contracts formed through the use of electronic agents. After all, one might argue, does not an autonomous electronic agent that has the capability to execute agreements without any human intervention or awareness, serve the same function as a similarly instructed human agent of a party? This view has been put forward by Fischer\textsuperscript{49} but has been subjected to a number of criticisms.

Under common law, the agent must accept his mandate.\textsuperscript{50} Fischer himself acknowledges that according to the Restatement of Agency, ‘to create a principal-agent relationship under agency law, the consent of both parties is necessary.’\textsuperscript{51} Fischer admits that this concept, applied to computers, is absurd and therefore proposes the adoption of a legal fiction of consent to try to satisfy this criterion of agency law.\textsuperscript{52}

Moreover, in the law of agency, there is a presumption that both principal and agent are two separate persons. In fact, Cheshire, Fifoot and Furmston\textsuperscript{53} describe agency as ‘a comprehensive word which is used to describe the relationship that arises where one man is appointed to act as the representative of another’ (my emphasis) whereas

\footnotesize{\textsuperscript{48} See infra section 2.5.  
\textsuperscript{50} see Thoumyre, supra n. 46, p. 11.  
\textsuperscript{51} Restatement (Second) of Agency § 1(1) (1958) & see Fischer, supra n. 49, at 569.  
Chitty\textsuperscript{54} hold that ‘at common law the word ‘agency’ represents a body of general rules under which one person, the agent, has the power to change the legal relations of another, the principal.’ (my emphasis) Civil law systems such as France also speak of agency as being the substitution, ordered or allowed by the law, of one person with another.\textsuperscript{55} The position is also similar with regards to commercial agents under European Union contract law. According to Council Directive 86/653/EEC\textsuperscript{56}, a commercial agent is a self-employed intermediary who has continuing authority to negotiate the sale or the purchase of goods on behalf of another person the principal, or to negotiate and conclude such transactions on behalf of and in the name of that principal.\textsuperscript{57}

Kerr holds that it would not be far-fetched to deem an electronic device as an agent for the purposes of electronic commerce because of the well established principle in the law of agency that one need not have the capacity to contract for oneself in order to be competent to contract as an agent. In fact, as regards common law, Chitty states that the agent ‘need not, therefore, be a person himself having full contractual capacity so long as he can understand what he is doing.’\textsuperscript{58} Similarly, the general theory under civil law is that, as the agent is not acting on his own behalf, it is not necessary that he has personal capacity to contract and that an incapacitated person may be an agent.\textsuperscript{59}

However, as explained above,\textsuperscript{60} one should not confuse the notion of lack of capacity with that of lack of legal personality. The absence of personality is not incapacity and should never be considered as such. Although both common law and civil law systems seem to allow an incapable person to act as an agent, such an agent is a person nonetheless. In fact, an incapable person has a patrimony, though he or she would be limited in his/her capacity to dispose of his/her property,\textsuperscript{61} whereas an

\textsuperscript{55} Mazeaud et. al, \textit{supra} n. 24, para 155 at p. 137.
\textsuperscript{58} \textit{Chitty on Contracts}, \textit{supra} n. 54, para. 31-35.
\textsuperscript{60} see \textit{supra} section 2.
\textsuperscript{61} and in fact a guardian or tutor is usually appointed to represent him/her.
agent cannot have a patrimony. Kerr recognises that agency law by itself would be insufficient to cure certain doctrinal difficulties (e.g. that only legal persons have contractual capacity and can contract) since agency law applies only to legal persons. He therefore suggests that, ‘in order to invoke the principles of agency, it is therefore necessary to include electronic devices within the set of rules that form the external aspect of agency.’

Kerr justifies his focus on only the external aspect of agency by claiming that disputes in electronic commerce will involve only the relations between the principal and third party. Quoting Bowstead & Reynolds, he claims that there will therefore not be need for the ‘agent’ (i.e. the autonomous electronic device) to have agreed to or to have knowledge of the conferring of authority at all as long as it can be established that the principal (i.e. the person initiating the electronic device) did confer ‘authority’ in one way or another.

This is a rather tempting approach, particular in view of the fact that there are a number of principles in the law of agency which could be very relevant to electronic agent-based contracting in the following manner:

(1) the notion of apparent authority: the person initiating the electronic agent may either voluntarily confer a power by the unilateral manifestation of a willingness to have her legal position changed through the operations of the electronic device or such authority is presumed to have been conferred where a representation is made which makes it appear as though the electronic agent is operating under the principal’s authority.

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62 see supra section 2.
63 supra n. 19 at p. 55.
64 Bowstead & Reynolds hold that ‘The basic justification for the agent’s power as so far explained seems to be the idea of a unilateral manifestation by the principal of willingness to have his legal position changed by the agent. ... There is certainly no conceptual reason which requires a contract between principal and agent to achieve this creation of power, and it is indeed clear that no contract is necessary, for a person without juristic capacity may be an agent. Further, if only the relations between principal and third party are in issue, it may not be necessary for the agent to have agreed to, or perhaps even to have knowledge of, the conferring of authority at all, if it can be established that the principal had conferred it; though such a situation would be an unusual one.’ quoted in Kerr, supra n. 19, p. 56.
65 ‘Il convient enfin de signaler l’intervention de la notion d’apparence dans la matière de la représentation: les tiers peuvent invoquer à leur profit les conséquences de la représentation, lorsque le représentant apparaît comme ayant pouvoir, bien que ce pouvoir lui fasse en réalité défaut.’ See Marty et Raynaud, supra, n. 59, para. 156 at p. 284; see also Mazeaud et al, supra n. 24, para. 151 at p. 134.
(2) the doctrine of ratification: where an electronic agent has entered into an unauthorised transaction with some third party, it is possible that the person who initiated the electronic agent might later affirm its operations by ratifying them. However, ratification is only possible where the existence of the principal was known to the third party at the time when the act was done. Hence, if the third party contracting with the electronic agent is not aware of the existence of the principal, then any unauthorised transaction by the agent may not be ratified by the principal.

(3) the theory of the undisclosed principal: where the agent is authorised to transact on the undisclosed principal’s behalf, then the contract is deemed to be between the agent and the third party, but in common law countries, the principal is allowed to intervene and to be sued (when discovered). However, where the agent acted in excess of its authority and the principal was undisclosed to the third party, then there is a problem since the principal cannot ratify the acts of the agent.

This approach, therefore, gives rise to a number of problems:

(1) excess of authority: As technology becomes more refined and agents become capable of initiating transactions and operating without any human intervention, what happens if the electronic agent has operated in excess of its implied authority when it functioned in a particular manner so as to execute the instructions of the person who initiated its use? Kerr mentions the example of an agent who is ‘authorised’ to buy certain shares, holding that such an agent has the implied authority to operate within the scope of that which is necessary in the usual course of business to complete the transaction. What happens if the agent arranged a line of credit through an illegitimate lender? As Kerr observes, ‘part of the problem is that the operations of these devices will not always be dictated by those who program them. The electronic devices of tomorrow will ‘learn for themselves’ what is necessary in the usual course of business to complete the transaction.’

(2) delegation: What happens if an electronic agent operates in a collaborative manner with other electronic agents and delegates some parts of its task to such

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66 This is the situation in both civil and common law countries: see Mazeaud et al, supra n. 24, para. 153 at p. 136 and Cheshire, Fifoot & Furnston, supra n. 53, p. 499.
68 See Kerr, supra n. 19, p. 59.
other electronic agents without the knowledge of the person who initiated the original electronic agent? Sub-agency problems could arise if those other devices engage in transactions that are not sufficiently related to the task as conceived by the person who initiated the original device.69

(3) **ratification:** The doctrine of ratification does not apply where the third party is unaware of the existence of a person who initiated the electronic agent. Under the principles of agency law, the agent would be liable for his acts where he did not disclose that he is transacting on another’s behalf and has exceeded that authority. Since electronic agents are not considered as legal persons under the law, they may not be considered liable for their acts. Against whom may the third party turn?

A number of principles in the law of agency do appear to have relevance for intelligent agent contracting. However, Kerr’s proposal, though attractive, still leaves a number of unanswered questions as regards what might be termed the internal aspect of agency, i.e. the internal relationship between the principal and agent, as highlighted above.

### 2.4 Towards an objective view of consent?

There is a conceptual difference of approach to the formation of a contract in civil law and common law jurisdictions. For example, whereas French jurists usually start treating this subject with an analysis of *volonté* and *consentement*, and then examine together mistake, fraud and duress under a unitary theory of ‘defects in consent’ before proceeding to discuss *cause*, English law does not know of a general theory of ‘defects in consent’ or of *cause*.70

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69 See Kerr, *supra* n. 19, p. 59.

2.4.1 **Subjective approach**

The emphasis on liberalism in 19th century France led to a strong view in support of the autonomy of the will and therefore of the supremacy of the inner will (volonté interne or volonté réelle), although a new trend was advocated in the early 20th century for the predominance of the declared will (volonté déclarée). What happens where the declared will does not exactly represent the inner will? To find out whether a person wanted to bind himself in a particular manner, it is not enough to just rely on the declared will; one must see what the inner will was, as Marty and Raynaud explain:71

‘... il faut rechercher ce que cette personne a voulu dans son for interne. Par delà la volonté déclarée, il faut rechercher la volonté interne que seule importe. Il en résulte que dans l’interprétation du contrat, on devra scruter la volonté réelle des partis sans s’arrêter aux termes mêmes qu’elles ont employés pour s’exprimer.’ 72

To examine if there was a valid contract, the court in countries which follow a subjective theory of consent will examine if the parties subjectively intended to be bound by the contract. However, there are some other contemporary French writers, such as Mazeaud73 who differ from Marty and Raynaud’s view and deviate from the traditional line by referring to instances where the declaration of will overrides the inner will, such as, for example, where a contractual clause is clear and unequivocal.

It may be interesting, in this context, to note the difference between German law - another civil law system - and French law on this point. Although paragraph 13374 of the German BGB leans towards the subjectivist approach, its interpretation depends on whose position is being taken into account, i.e. whether it is the person who made the declaration or the addressee. In the former case, the subjectivist approach is

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72 As regards present French law, according to Owsia, *supra* n. 70, p. 222, contemporary French authors are divided with some, like Mazeaud (*supra* n. 24 p. 105), deviating from the traditional line by referring to instances where the declaration of will overrides the inner will while others like Marty and Raynaud still stress the predominance of the inner will (*supra* n. 71 p. 79).
73 *supra* n. 24, p. 105.
74 ‘... in interpreting a declaration of will one must seek out what was really intended and not adhere to the literal meaning of the words used’, quoted in Owsia, *supra* n. 70, p. 222.
followed; however, in the latter case, the situation is different and an objective approach is taken since the courts will look at what the addressee would normally have understood by the declaration.

2.4.2 **Objective approach**

According to common law, a contracting party is bound because he has agreed to be bound.

‘Agreement, however, is not a mental state but an act, and, as an act, is a matter of inference from conduct. The parties are to be judged, not by what is in their minds, but by what they have said or written or done. ... The common law ... lays peculiar emphasis upon external appearance.’75

As far back as 1478 Chief Justice Brian had said that ‘the intent of man cannot be tried, for the Devil himself knows not the intent of man’76 and in the nineteenth century Lord Eldon said that his task was not ‘to see that both parties really meant the same thing, but only that both gave their assent to that proposition which, be it what it may, de facto arises out of the terms of their correspondence’.77

English and American78 law adopt an objective test of agreement. According to Cheshire, Fifoot and Furmston, in common law it is therefore misleading to speak of *consensus ad idem* since this is an alien approach to the problem of agreement which is ‘concerned not with the presence of an inward and mental assent but with its outward and visible signs.’79 To determine whether an agreement exists, an English court will examine whether a party has made a firm offer and whether the other party has accepted that offer through some external manifestation of assent.

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75 Cheshire, Fifoot and Furmston, *supra* n. 53, p. 29.
76 *Anon* (1477) YB 17 Edw 4, fo 1, p. 2, quoted in Cheshire, Fifoot and Furmston, *supra* n. 53, p. 29.
78 In the U.S., the objective theory of assent became predominant in the end of the nineteenth century and has today become accepted by the courts - see *Farnsworth on Contracts*, cited by Lerouge, *supra* n. 52, p. 415. Of course, since 1999, the use of electronic agents is regulated by the UETA and the UCITA, *infra* sections 2.5.3 and 2.5.4.
English law is thus concerned with the outward appearance of the agreement, that is with the objective correspondence between the offer and acceptance, rather than with the accord of the minds of the parties. The innermost states of mind of the parties may be quite different from the outward appearance of their agreement. The traditional approach of English law has been to use the test of the ‘reasonable man’ by placing him in the position of the promisee:80

‘If, whatever a man’s real intention may be, he so conducts himself that a reasonable man would believe that he was assenting to the terms proposed by the other party, and that other party upon that belief enters into the contract with him, the man thus conducting himself will be equally bound as if he had intended to agree to the other party’s terms.’81

Atiyah has argued that this approach can be understood as a manifestation of the reliance theory of contract.82 Similarly, Chitty83 has argued that, under the objective test, an apparent intention to be bound may suffice to bind the alleged offeror (A) if his words or conduct are such as to induce a reasonable person (B) to believe that he intends to be bound, even though in fact he has no such intention. Therefore, if A offers to sell a book to B for £10 and B accepts the offer, A cannot escape liability merely by showing that his actual intention was to offer the book to B for £20, or that he intended the offer to relate to a book different from that specified in the offer.

2.4.3 Application of the consent theories to use of electronic agents

To recapitulate, the subjective theory - the traditional concept in France - holds that the will (volonté) is the psychological adhesion of each contracting party to the

80 see Owsia, supra n. 70, p. 230.
82 Atiyah holds that ‘the law of contract itself, together with associated parts of the law sometimes characterized as distinct set of rules, provides many examples of provisions plainly designed for the protection of acts of reasonable reliance, rather than for the imposition of promissory liability. The law of misrepresentation, of warranty, of estoppel and promissory estoppel, no matter how they are conceptualized, provide many illustrations of what can only be rationally regarded as reliance-based liability.’ See ‘Contracts, Promises and the Law of Obligations’ in Essays on Contract, (Oxford University Press: Oxford 1990), at p. 21.
83 see Chitty on Contracts, supra n. 25, para. 2-002.
contract, and that the external manifestation has no value except in its conformity to
the inner will. If one tries to apply the subjective approach to a contract where at
least one of the parties was using an intelligent agent, one would immediately run into
difficulties. Where an intelligent agent was used by one of the parties to the electronic
contract, at what inner psychological state of mind can one look? How can an
intelligent agent be said to have ‘an inner state of mind’? How can free will be
attributed to an intelligent agent?

If one applies the objective test, then a court would not be interested in any
psychological or inner state of mind but in the outward significance of the contractual
statements that were made. It would apply the test of how a reasonable man in the
shoes of the other contracting party would have interpreted the contractual statements
made by the electronic agent, to see if they amounted either to a firm offer or an
acceptance (depending on whether the offer was made by the agent or by the other
party). It would thus seem that the actual internal workings of the intelligent agent
and questions as to whether this could have formed an intent to enter into an
agreement are irrelevant. What is relevant is whether a reasonable man would believe
that assent to the terms proposed was being manifested by the other party. However,
this view is criticised by Kerr:

‘this might be correct in so far as the transaction is understood as an agreement that
is merely mediated by one or more electronic devices. ... But the above analysis is
incorrect in circumstances where an offer can be said to be initiated by the
electronic device autonomously, i.e. in a manner unknown or unpredicted by the
party employing the electronic device. Here it cannot be said that the party
employing the electronic device has conducted himself such that a reasonable
person would believe that he was assenting to the terms proposed by the other
party.’

However, it is submitted that for the purposes of the objective theory, what is
relevant is that a person should be deemed to be expressing his assent by his/her
conduct when using an electronic agent for the purposes of contract formation. The

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84 Carbonnier, *op. cit.* Thémis 4, p. 72 where Carbonnier observes that Ripert and Boulanger insist on
the intellectual phase of preparation and on the profound interiority of the will.
85 Kerr, *supra* n 19, p. 23.
manifestation of assent that is relevant for our purposes here is that of the *person* and not of the *electronic agent*. Kerr believes that ‘there will come a time when an electronic device will appear to conduct itself such that a reasonable person would believe that the device was assenting to the terms proposed by the other party.’ In this situation, of course, it is submitted the objective theory of consent would still be applicable by holding that by initiating the electronic agent, the user is deemed to have accepted that contracts concluded by the agent will be binding on such user. The assent of the electronic agent will be inferred to be the assent of the (human) user of the agent. 86

Kerr also criticises the application of the objective theory to contracts formed through the interaction of electronic agents by arguing that ‘the objective theory of contract will not allow autonomous devices to escape doctrinal difficulties: sophisticated technologies notwithstanding, electronic devices are not legal persons; they lack the intellectual capacity to intend legal relations and cannot meaningfully be said to enter into agreement voluntarily.’ It is submitted that the consent that is relevant (where a contract is formed in which at least one party is using an electronic agent) is that of the person using the electronic agent, and not of the electronic agent itself since the latter is not a legal person and has no legal standing in the eyes of the law. Therefore, it is submitted that the objective theory of contracting does provide a solution for giving legal validity to contracts carried out by electronic agents. 88 It is a particularly attractive solution for common law countries (since they follow an objective approach) but could also be the way forward as regards such electronic contracting for countries which follow a more subjective approach. 89

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86 Whether this should be the case, is another question. Maybe that would be the time to start actively considering conferring some form of legal personality on agents …
87 See *supra* n. 19, p. 23.
88 Allen & Widdison hold that neither English law nor American law (as it stood in 1996 prior to the enactment of the UCITA) would confer legal status on all computer-generated agreements. They suggest that the most likely route that courts would take would involve relaxing the requirement that the intention of the parties must be referable to the offer and acceptance of the specific agreement. They hold that: ‘human intention need not underlie the making of an offer or an acceptance, at least as far as computer-generated agreements are concerned. In other words, the courts would hold that the human trader’s generalised and indirect intention to be bound by computer-generated agreements is sufficient to render the agreements legally binding.’, see Allen & Widdison, *supra* n. 21 at part IV.A. As Lerouge observes, this view is taking more of a subjective approach to the reaching of an agreement than an objective one – see Lerouge, *supra* n. 52.
89 In fact, there are a number of authors in such ‘subjectivist’ countries who already have deviated from the purely subjective approach – see *supra* section 2.4.1.
In the next section we shall examine the approach that has been taken by those legal systems which already provide for the use of electronic agents in electronic commerce.

2.5 Legislation on contract formation and electronic agents

In this section, reference will be made to a number of enacted legislation which, in some way, have dealt with the formation of contract by automated means, including by electronic agents. Some of these laws, such as the UNCITRAL Model Law on Electronic Commerce and the U.S. Uniform Electronic Transactions Act 1999 have taken the approach of attributing the acts of electronic agents to the person who initiated the electronic agent. The Uniform Computer Information Transactions Act 1999 of the U.S. also attributes the operations of electronic agents to the person who initiated the electronic agent but, as we shall see, there are also overtones of agency law in a number of sections. On the other hand, the European Union’s recent Electronic Commerce Directive, is more generically worded in that, though making no specific reference to electronic agents, it encourages Member States to allow contracts to be concluded by electronic means. A different approach was taken by the Canadian Uniform Electronic Commerce Act 1999 which seems to apply the objective theory of contracting to contracts formed through the involvement of electronic agents.

2.5.1 The UNCITRAL model law on electronic commerce

It is interesting that the use of intelligent agents is implied by Article 2 of the UNCITRAL Model Law which provides that the originator of a data message includes both ‘a person by whom or on whose behalf’ a message is purported to have been

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90 UN General Assembly Resolution 51/162 of 16 December 1996, UN publication V.97-22269-May 1997-5,100, hereinafter referred to as the ‘UNCITRAL Model Law’.
sent.\textsuperscript{91} The Article-by-Article Remarks provide that ‘data messages that are generated automatically by computers without direct human intervention are intended to be covered by subparagraph (c).’

Moreover, Article 13(2)(b) attributes the operations of electronic devices to the person who originates the data message ‘if it was sent by an information system programmed by, or on behalf of, the originator to operate automatically.’

A number of other jurisdictions have either proposed or enacted legislation that deal with the use of autonomous electronic agents in electronic commerce. Some are closely modelled on the UNCITRAL Model law such as Article 13\textsuperscript{92} on ‘Attribution’ of Singapore’s Electronic Transactions Act of 1998\textsuperscript{93}.

\textbf{2.5.2 The Electronic Commerce Directive\textsuperscript{94}}

Although the text of the recently adopted Electronic Commerce Directive itself makes no direct reference to electronic agents, the ‘Executive Summary’ of the Proposal text of such Directive provided that ‘Member States will ... not prevent the use of electronic systems as intelligent electronic agents ...’\textsuperscript{95} Section 3 on ‘Contracts concluded by electronic means’ has a provision on the ‘Treatment of contracts’ which states that:

‘Member States shall ensure that their legal systems allows contracts to be concluded by electronic means. Member States shall in particular ensure that the

\textsuperscript{91} Article 2(c) provides that:

‘Originator’ of a data message means a person by whom, or on whose behalf, the data message purports to have been sent or generated prior to storage, if any, but it does not include a person acting as an intermediary with respect to that data message’.

\textsuperscript{92} Article 13 of the Singapore Electronic Transactions Act is patterned on Article 13 of the UNCITRAL Model law.


legal requirements applicable to the contractual process neither create obstacles for the use of electronic contracts nor result in such contracts being deprived of legal effectiveness and validity on account of their having been made by electronic means.’

2.5.3  **U.S. Uniform Electronic Transactions Act**\(^{96}\)
At its annual conference meeting in July 23-30, 1999, the National Conference of Commissioners on Uniform State Laws (NCCUSL) approved and recommended the Uniform Electronic Transactions Act (1999) for enactment in all the states of the United States. This law is intended to remove barriers to electronic commerce by validating and effectuating electronic records, signatures and contracts. As the drafters stated in the ‘Prefatory Note’ to the Act, ‘the Act makes clear that the actions of machines (‘electronic agents’) programmed and used by people will bind the user of the machine, regardless of whether human review of a particular transaction has occurred.’

The UETA applies to transactions related to business, commercial (including consumer) and governmental matters where electronic records and electronic signatures are used in the transaction.\(^{97}\) An electronic agent is defined in Section 2(6):

\[\text{‘Electronic agent’ means a computer program or an electronic or other automated means used independently to initiate an action or respond to electronic records or performances in whole or in part, without review or action by an individual.’}\]

The UETA therefore expressly recognises that an electronic agent can operate ‘without review or action by an individual’ and the definition of electronic agent seems wide enough to encompass both electronic agents that act automatically and those that act autonomously (intelligent agents):

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\(^{97}\) See Section 3 UETA, and Comment 1 to this Section.
'While this Act proceeds on the paradigm that an electronic agent is capable of performing only within the technical strictures of its preset programming, it is conceivable that, within the useful life of this Act, electronic agents may be created with the ability to act autonomously, and not just automatically. That is, through developments in artificial intelligence, a computer may be able to ‘learn through experience, modify the instructions in their own program, and even devise new instructions’ (Allen and Widdison98) If such developments occur, courts may construe the definition of electronic agent accordingly, in order to recognise such new capabilities.99

The approach taken by the drafters is to consider an ‘electronic agent’ as a machine, as a tool of the person who employs it. They do, however, recognise that although, as a general rule, the employer of a tool is responsible for the results obtained by the use of that tool since the tool has no independent volition of its own, ‘an electronic agent, by definition, is capable within the parameters of its programming, of initiating, responding or interacting with the other parties or their electronic agents once it has been activated by a party, without further attention of that party.’ Although the drafters recognise that electronic agents may operate autonomously, the operations of electronic agents are still treated as nothing more than the extension of human action.

The attribution provision found in Section 9 of the final draft of the UETA is very stark and, unlike previous versions of it,100 makes no direct reference to electronic agents, although the drafters comment that ‘a person’s actions include actions taken by human agents of the person, as well as actions taken by an electronic agent, i.e. the tool, of the person.’101 The Act contemplates both contracts formed (1) by the interaction of electronic agents and those formed (2) by the interaction of an electronic agent and an individual. Section 14 provides rules applicable in automated transactions:

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98 supra n. 21 at p. 25.
99 See drafters’ comment No. 5 to Section 2 of the UETA, supra n. 96.
100 A previous version of Section 9(a) was called Section 108(a) and provided that ‘An electronic record or electronic signature is attributable to a person if in fact the electronic record resulted from the act of the person, or its electronic agent. ...’ The final draft of this provision - Section 9(a) provides that ‘An electronic record or electronic signature is attributable to a person if it was the act of the person. ...’
101 See Comment 1 to Section 9, UETA, supra n. 96.
ELECTRONIC AGENTS AND THE FORMATION OF CONTRACTS

‘(1) A contract may be formed by the interaction of electronic agents of the parties, even if no individual was aware of or reviewed the electronic agents’ actions or the resulting terms and agreements.

(2) A contract may be formed by the interaction of an electronic agent and an individual, acting on the individual’s own behalf or for another person, including by an interaction in which the individual performs actions that the individual is free to refuse to perform and which the individual knows or has reason to know will cause the electronic agent to complete the transaction or performance.’

This section confirms that contracts can be formed by electronic agents and negates any claim that lack of human intent, at the time of contract formation, prevents the formation of a legally binding contract. Section 14(2) provides a mechanism for validating a click-through transaction.

Unfortunately, both the UNCITRAL Model law and the UETA would attribute liability to the person who initiated the electronic agent even if it malfunctioned or performed operations unintended by the person on whose behalf it was operating.102 In fact, the section in UETA dealing with the effect of errors (Section 10)103 contemplates only the effect of human error in automated transactions but makes no mention of errors made by the electronic agent itself (e.g. due to malfunction of the electronic agent, or to a situation where, although the agent cannot be properly said to

102 See Kerr, supra n. 19, p. 35.
103 Section 10 provides that ‘If a change or error in an electronic record occurs in a transmission between parties to a transaction, the following rules apply:
(1) If the parties have agreed to use a security procedure to detect changes or errors and one party has conformed to the procedure, but the other party has not, and the nonconforming party would have detected the change or error had that party also conformed, the conforming party may avoid the effect of the changed or erroneous electronic record.
(2) In an automated transaction involving an individual, the individual may avoid the effect of an electronic record that resulted from an error made by the individual in dealing with the electronic agent of another person if the electronic agent did not provide an opportunity for the prevention or correction of the error and, at the time the individual learns of the error, the individual:
(A) promptly notifies the other person of the error and that the individual did not intend to be bound by the electronic record received by the other person;
(B) takes reasonable steps, including steps that conform to the other person’s reasonable instructions, to return to the other person or, if instructed by the other person, to destroy the consideration received, if any, as a result of the erroneous electronic record; and
(C) has not used or received any benefit or value from the consideration, if any, received from the other person.
(3) If neither paragraph (1) nor paragraph (2) applies, the change or error has the effect provided by other law, including the law of mistake, and the parties’ contract, if any.
(4) Paragraphs (2) and (3) may not be varied by agreement.’
be malfunctioning, it functions in a manner which the individual would never have authorised had he known of it).

2.5.4  *U.S. Uniform Computer Information Transactions Act*\(^{104}\)

The UCITA, like the UETA, was also promulgated in response to the tremendous growth of electronic commerce. Originally it was thought that the law would be incorporated into the Uniform Commercial Code as Article 2B, but it was then decided that a separate act be enacted.

The former version of the UETA - UCC article 2B - treated the operations of electronic agents as extensions of human actions. However, a number of modifications to this idea were introduced to subsequent versions of the UCITA and the final version defines an electronic agent as:

‘a computer program, or electronic or other automated means, used by a person to initiate an action, or to respond to electronic messages or performances, on the person’s behalf without review or action by an individual at the time of the action or response to the message or performance.’

Although the words ‘on the person’s behalf’ seem to imply that a sort of agency relationship might be construed between the electronic agent and the individual, the Official Comments state that ‘The legal relationship between the person and the automated agent is not equivalent to common law agency, but takes into account that the ‘agent’ is not a human. However, parties that use electronic agents are ordinarily bound by the results of their operations.’\(^{105}\) Another conspicuous reference to the law of agency was made by the drafters in their comments to the final version of Section

\(^{104}\) The Uniform Computer Information Transactions Act (hereinafter referred to as ‘UCITA’) was approved by the NCCUSL in its annual conference meeting in 23-30 July, 1999, and recommended for enactment in all U.S. states, available at http://www.ucitaonline.com/ucita.html (last visited 15.08.2001).

107 which deals with the situation where a party selects an electronic agent\textsuperscript{106} for making an authentication, performance or agreement, including manifestation of assent. The drafters state clearly that the term ‘selects’ does not imply a choice from among alternative agents but rather a conscious decision to use a particular agent.

‘The concept stated here embodies principles like those in agency law, but it does not depend on agency law. The electronic agent must be operating within its intended purpose. For human agents, this is often described in terms of acting within the scope of authority. Here the focus is on whether the agent was used for the relevant purpose.’

Section 107 provides:

‘(d) A person that uses an electronic agent that it has selected for making an authentication, performance, or agreement, including manifestation of assent, is bound by the operations of the electronic agent, even if no individual was aware of or reviewed the agent’s operations or the results of the operations.’

Section 202(a) recognises that an agreement can be formed by operations of electronic agents:

‘A contract may be formed in any manner sufficient to show agreement, including offer and acceptance or conduct of both parties or operations of electronic agents which recognise the existence of a contract.’

The agent’s operations bind the person who deployed the agent for that purpose. The UCITA attributes the acts of an electronic agent to the person using it:

‘An electronic authentication, display, message, record, or performance is attributed to a person if it was the act of the person or its electronic agent, or if the person is bound by it under agency or other law. ...\textsuperscript{107}’

\textsuperscript{106} This is stated to cover the case where the party consciously elects to employ the agent on its own behalf, whether that agent was created by it, licensed from another, or otherwise adopted for this purpose. See Official Comments, UCITA, \textit{supra} n. 105.

\textsuperscript{107} Section 213(a), UCITA, \textit{supra} n. 104.
UCITA has a provision on the manifestation of assent. Section 112 deals with assent by conduct and assent by electronic agents. Among the former is the case where person ‘intentionally engages in conduct or makes statements with reason to know that the other party or its electronic agent may infer from the conduct or statement that the person assents to the record or term’. This follows the objective theory of contracting followed in common law countries. In fact, the drafters observe that:

‘As under common law, proof of assent does not require proof of a person’s subjective intent or purpose, but focuses on objective indicia, including whether there was an act or a failure to act voluntarily engaged in with reason to know that the inference of assent would be drawn. Actions objectively indicating assent are assent. This follows the modern contract law doctrine of objective assent. It is especially important in electronic commerce.’

The Act also provides for assent by electronic agents. According to Section 112(b), assent occurs if the electronic agent, after having an opportunity to review a record or term, authenticates it or engages in operations that in the circumstances indicate acceptance of the record or term. It is not clear why the drafters have felt the need to create a distinction between assent by conduct and assent by electronic agents. As Lerouge opines, it would have been simpler to consider that a person can express his assent by conduct when using an electronic agent. Moreover, how is the notion of ‘opportunity to review’ to be understood when applied to electronic agents? To complicate matters, this provision provides that an electronic agent is deemed to have an opportunity to review a record or term ‘only if it is made available in a manner that would enable a reasonably configured electronic agent to react to the record or term.’ The notion of a reasonably configured electronic agent is very ambiguous and what is meant by a manner in which the agent could not react is also very unclear, even to software practitioners.

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108 Section 112(a)(2), UCITA, supra n. 104.
109 See Official Comments to Section 112, UCITA, supra n. 105.
110 supra n. 52, at p. 423.
111 Section 112(e), UCITA, supra n. 104.
The UCITA envisages the formation of contracts (1) by the interaction of electronic agents, and (2) by the interaction of an electronic agent and an individual acting on the individual’s own behalf or for another person. It is interesting to note that, in the provision dealing with contracts formed by the interaction of electronic agents only, there is contemplation of relief being granted by a court ‘if the operations resulted from fraud, electronic mistake, or the like’. However, there is no analogous provision for electronic mistake with regards to contracts formed by the interaction of an electronic agent and an individual. In any case, there is no definition of ‘electronic mistake’, although from the Official Comments it would appear that this is similar to the common law concept of mistake. However, in cases involving a consumer, a special application of ‘electronic error’ is applied to automated contracts in Section 214.

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113 Section 206(a) provides that: ‘A contract may be formed by the interaction of electronic agents. If the interaction results in the electronic agents’ engaging in operations that under the circumstances indicate acceptance of an offer, a contract is formed, but a court may grant appropriate relief if the operation resulted from fraud, electronic mistake, or the like.’

114 Section 206(b) provides: ‘A contract may be formed by the interaction of an electronic agent and an individual acting on the individual’s own behalf or for another person. A contract is formed if the individual takes an action or makes a statement that the individual can refuse to take or say and that the individual has reason to know will:

(1) cause the electronic agent to perform, provide benefits, or allow the use or access that is the subject of the contract, or send instructions to do so; or

(2) indicate acceptance, regardless of other expressions or actions by the individual to which the individual has reason to know the electronic agent cannot react.’

115 See Official Comments to Section 206, UCITA, supra n. 105.

116 Section 214 provides: ‘(a) In this section, ‘electronic error’ means an error in an electronic message created by a consumer using an information processing system if a reasonable method to detect and correct or avoid the error was not provided.

(b) In an automated transaction, a consumer is not bound by an electronic message that the consumer did not intend and which was caused by an electronic error, if the consumer:

(1) promptly on learning of the error:

(A) notifies the other party of the error; and

(B) causes delivery to the other party or, pursuant to reasonable instructions received from the other party, delivers to another person or destroys all copies of the information; and

(2) has not used, or received any benefit or value from, the information or caused the information or benefit to be made available to a third party.

(c) If subsection (b) does not apply, the effect of an electronic error is determined by law.’
2.5.5 Canada’s Uniform Electronic Commerce Act

Another country which has legislation which deals specifically with electronic agents and contract formation is Canada where the Uniform Electronic Commerce Act 1999 was adopted by the Uniform Law Conference of Canada. This enactment contains a definition of electronic agent as ‘a computer program or any electronic means used to initiate an action or to respond to electronic documents or actions in whole or in part without review by a natural person at the time of the response or action.’ 117

This is a simple but clear definition, 118 with no undertones linking the notion of electronic agents with the doctrine of agency. 119 The law also recognises that:

‘A contract may be formed by the interaction of an electronic agent and a natural person or by the interaction of electronic agents.’ 120

It is unfortunate that this provision does not state clearly that the natural person could either be acting on his own behalf or on behalf of a legal person, although probably a court would construe this in its interpretation of this section.

The provision on formation of contracts is also interesting. Section 20 provides that:

‘(1) Unless the parties agree otherwise, an offer or the acceptance of an offer, or any other matter that is material to the formation or operation of a contract, may be expressed

118 It is interesting to note that the definition of an ‘electronic agent’ in the U.S. Electronic Signatures in Global and National Commerce Act of January 2000 has the same wording as the definition in the UETA but then finishes with the clause ‘… at the time of the action or response’ found in the Canadian Uniform Electronic Commerce Act. Section 106(3) of the Electronic Signatures in Global and National Commerce Act (http://www.interlex.it/testi/usa_s761.htm (last visited 15.08.2001) provides that ‘The term ‘electronic agent’ means a computer program or an electronic or other automated means used independently to initiate an action or respond to electronic records or performances in whole or in part without review or action by an individual at the time of the action or response.’ It would thus appear that North American legislators are moving towards a common wording.
119 as one could perhaps read in the definition of electronic agent in the UCITA which has the phrase ‘on the person’s behalf’, see comments on this in section 2.5.4 supra.
120 Section 21, Uniform Electronic Commerce Act 1999, Canada, supra n. 117.
ELECTRONIC AGENTS AND THE FORMATION OF CONTRACTS

(a) by means of an electronic document; or

(b) by an action in electronic form, including touching or clicking on an appropriately designated icon or place on a computer screen or otherwise communicating electronically in a manner that is intended to express the offer, acceptance or other matter.’

Sub-paragraph (b) thus contemplates the notion of expressing an offer, an acceptance or a material matter to the contract, by an action, i.e. by conduct. This could be expressed by the interaction of an electronic agent which, according to the definition in the Canadian UECA, is a software program or other electronic means used to initiate an action or to respond to electronic documents or actions.

Another provision worth mentioning is that on material error. Although the Act has a specific section on a material error\(^\text{121}\) which is made by a natural person when transacting with an electronic agent, there is no mention of errors made by an electronic agent. It is presumed that the courts will here apply the doctrine of mistake under Canadian contract law.

3. Some practical considerations

As submitted above,\(^\text{122}\) a contract may be concluded through the interaction of an electronic agent by application of the objective theory of contracting. However, it is of little use to theorise on the validity of such contracts, if the business community, consumers and society at large do not feel comfortable with and are wary of using electronic agents in electronic commerce.

\(^\text{121}\) Section 22 states:

'An electronic document made by a natural person with the electronic agent of another person has no legal effect and is not enforceable if the natural person made a material error in the document and

(a) the electronic agent did not provide the natural person with an opportunity to prevent or correct the error;

(b) the natural person notifies the other person of the error as soon as practicable after the natural person learns of the error and indicates that he or she made an error in the electronic document;

(c) the natural person takes reasonable steps, including steps that conform to the other person’s instructions to return the consideration received, if any, as a result of the error or, if instructed to do so, to destroy the consideration; and
Situations can arise where one of the contracting parties will try to get out of an electronic contract by arguing either that its agent failed, or was defective, or acted improperly. Who is to bear the risk of such consequences? Parties would probably try to use doctrines such as mistake or unconscionability (in common law countries) or error or bad faith (in civil law countries).

### 3.1 Issues

One way of looking at this matter is by trying to identify how risk is to be apportioned where one of the parties is alleging that the electronic agent malfunctioned. Is it to be borne by the programmer, by the person who trained the agent or by the user? Where the agent software malfunctioned or was defective, the user may have a remedy against the programmer of the electronic agent software in terms of the license agreement through which the electronic agent was acquired. Of course, the programmer might have limited his liability or excluded certain warranties. One should also enquire to what extent contract doctrines such as mistake or error may be raised.

In England, a unilateral mistake as to the terms of the contract, if known to the other party, may avoid the contract. Similarly in the U.S., if the offeree knows or has reason to know that a change in the offer has occurred, he has no power to bind the offeror by an acceptance of the offer as delivered. Lerouge proposes that an analogy may be drawn with a mistake caused by an error in the transmission of a telegram where the terms of the offer have been changed because not properly handled by the natural person has not used or received any material benefit or value from the consideration, if any, received from the other person.’

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122 See supra section 2.4.
124 such as those of merchantability or fitness for a particular purpose.
125 *Chitty on Contracts, supra* n. 24, para. 5-022, p. 308.
127 Lerouge, *supra* n. 52, p. 427.
telegraph clerk. Thus, if the change is one that no reasonable man would make, such that a reasonable man would suspect error, then the offeree is not permitted to ‘snap up’ such an offer. This is probably what a civil law judge will conclude, basing himself on the general principle of contract law in civil law systems, that contracts should be carried out in good faith.

If the change is such that the offeree has no reason to know that it has been made, and the offer as delivered is one that he reasonably believes to be the one that the offeror intends to make, then although judicial opinion is divided, Corbin holds that it would seem that the offer as delivered would be binding on both parties. The sender is thus deemed to have assumed the risk of the mistake. A similar argument is put forward by Cavanillas that ‘e-suppliers should pay the ‘cost of confidence’ in e-commerce (the cost of probability of unwanted contracts being concluded by mistake and the cost of the technical tools and procedures employed to reduce the probability of mistakes)’.

3.2 Proposed solutions

From the above it appears clearly that issues of security, proper functioning and reliability of intelligent agents are very important for the users of electronic agents. A number of suggestions have been put forward to address these concerns.

One solution suggested by Stuurman and Wijnands is the development of a security classification and the certification of agents by reference to a particular class of security standards. Requirements could then be imposed in respect of the security level which the agent must fulfil if it is to be authorised or accepted for certain activities. Such a system may require monitoring to determine whether the agent complies with the specified level of security. This may lead, in turn, to the development of a system of independent verification marks for agent security features.

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128 supra n. 126 at §105, p.470.
130 Stuurman & Wijnands, ‘Intelligent Agents: a curse or a blessing? A survey of the legal aspects of the application of intelligent software systems’, based on an article in Dutch of the same authors, in print.
This is similar to the labelling system suggested by Lerouge,\textsuperscript{131} although the latter proposes that this should be a voluntary system to offer more flexibility.

Karnow has proposed the introduction of a certification system for electronic agents, in virtue of which agents could only be used after they have been certified. The certification authority (the Turing Registry) would evaluate the risks attached to the use of the agent, on the basis of which it would issue a certificate for the agent. Such agent would be able to interact only with systems that also bear a certificate issued by the Registry.\textsuperscript{132}

4. Conclusion

As mediators and, in the future, as initiators of electronic transactions, intelligent agents may truly facilitate electronic commerce by fostering a global and digital economy. However, for this to happen, the business community and consumers must first become comfortable with the phenomenon of intelligent systems. Very often, the user not only does not see what is going on, but is not aware of what is happening. This could lead to a feeling of unease and wariness. As mentioned above, there are a number of ways in which a confidence boost may be provided such as by developing a certification system for agents, or by establishing a labeling system for them. This is likely to be the main issue on which the extent of use of intelligent agent systems in the future will depend.

\textsuperscript{131} supra n. 52, p. 430.