



Digital Commons@
Loyola Marymount University
LMU Loyola Law School

Loyola of Los Angeles Law Review

Volume 26
Number 3 *Is the UCC Dead, or Alive and Well?*

Article 7

4-1-1993

X Marks the Spot: New Technologies Compel New Concepts for Commercial Law

Patricia Brumfield Fry

Follow this and additional works at: <https://digitalcommons.lmu.edu/llr>



Part of the [Law Commons](#)

Recommended Citation

Patricia B. Fry, *X Marks the Spot: New Technologies Compel New Concepts for Commercial Law*, 26 Loy. L.A. L. Rev. 607 (1993).

Available at: <https://digitalcommons.lmu.edu/llr/vol26/iss3/7>

This Symposium is brought to you for free and open access by the Law Reviews at Digital Commons @ Loyola Marymount University and Loyola Law School. It has been accepted for inclusion in Loyola of Los Angeles Law Review by an authorized administrator of Digital Commons@Loyola Marymount University and Loyola Law School. For more information, please contact digitalcommons@lmu.edu.

X MARKS THE SPOT: NEW TECHNOLOGIES COMPEL NEW CONCEPTS FOR COMMERCIAL LAW

*Patricia Brumfield Fry**

I. INTRODUCTION: COMPUTERIZATION OF TRANSACTION PROCESSING REQUIRES EVALUATION OF PAPER REQUIREMENTS IN COMMERCIAL LAW

Predictions of a paperless society have been around for years—so many years that many of us no longer pay much attention. In spite of all the prophesying, people still write checks, send letters and reduce agreements to paper. Office supply stores and catalogs are filled with pads of standard form purchase orders, invoices, notes and leases, which are ready for the small business to purchase.

While paper has not disappeared—and shows few signs of doing so—some of the prophets' predictions of a paperless society have come and will continue to come to pass. We may not eliminate paper in the foreseeable future, but a constantly increasing stream of transactions are consummated without the use of a single piece of paper. Still more are consummated in reliance on information transmitted electronically, and pieces of paper are generated after the fact only to be placed in over-stuffed filing cabinets and forgotten.

Currently, approximately five percent of sales transactions are conducted through the use of standardized computer-to-computer communications. In the paper-based sales transaction familiar to most of us, a

* Professor of Law, University of North Dakota School of Law; Member, National Conference of Commissioners on Uniform State Laws for North Dakota; Member, NCCUSL Article 2 Drafting Committee; Member, Uniform Commercial Code Committee; Chair, Subcommittee on Electronic Commercial Practices of the Uniform Commercial Code Committee (Business Law Section, ABA).

This Article has been developed from and is based upon the efforts of the Working Group on Electronic Writings and Notices, Subcommittee on Electronic Commercial Practices, Uniform Commercial Code Committee, Business Law Section, American Bar Association (Working Group). However, the opinions expressed herein reflect the author's impression of the proceedings of the Working Group and may not reflect those of other members of the group.

The author would like to thank Professor Amelia H. Boss, Temple University School of Law, Chair of the Uniform Commercial Code Committee (Business Law Section, ABA), for reviewing an early draft of this manuscript. Her comments and suggestions were invaluable. Any remaining errors or misstatements are the responsibility of the author alone.

clerk inserts information into blanks on standardized paper forms, copies of which are sent to trading partners and relevant intracompany departments, such as shipping and accounting. Not too long ago the paper form would have been mailed to the addressee; today it may be faxed. In other situations, the information may be telephoned and the papers filled out and mailed (or faxed) only after a verbal agreement has been reached. In any of these scenarios, the paper may be stored in a filing cabinet, or the information may be scanned into a computer and stored on disc.

In a firm using computer-to-computer methods, standard forms are completed on the computer screen by clerical workers and then transmitted via modem to the intended recipient. The recipient's computer will receive the data contained in these standardized formats, process it, perhaps signal acceptance of transactions and instruct the appropriate departments to process the order, prepare to receive the goods and so forth.

The entire sales cycle, from bid solicitation, purchase order and acceptance, through shipment and delivery of goods and payment for them, can be effected without the need to produce a single piece of paper. A record of the transaction, from inception through closure, may be stored electronically in a reliable, enduring manner, and the necessary information may be relayed to the appropriate departments through the company's computer network. Using a computer network, the cycle may be completed at a significant savings in processing costs, with a reduction in processing errors by eliminating any need to transcribe information onto new forms, and permitting information to be stored in less physical space for a period at least as long as the life of a piece of paper. Fewer employees are required to process the information for each discrete transaction. The efficiencies that may be achieved in this manner are critical to implementing improved methods of production, such as just-in-time and quick-response production modes.

The most obvious difference between paper-based systems and electronic systems of communicating and storing information is the existence of paper. Electronically based technologies¹ permit agreements to be put

1. The terms "electronically based technologies" and "electronic media" are used here as a shorthand for various methods of communicating and storing information without paper. The most obvious device in use today is the computer which, when linked to a modem, permits data transmission from one computer to another. The facsimile machine permits an image of a piece of paper—or information created in a computer—to be transmitted over telephone lines to a receiving facsimile machine. If that machine is linked to the receiver's computer, the information may appear on a computer screen; if it is not linked to a computer, the information will be printed onto a piece of paper.

Today, information may be entered on a computer by a transcriber or copied through a scanner. The data may be stored in the computer's memory, on a magnetic disc, compact disc or tape. It may be communicated to others by delivering a hard copy printout or by sending

into words, which may be communicated and stored without generating a single piece of paper. Frequently when computers are used in this manner, they are used merely as substitutes for or alternatives to paper. It seems to take some time for users to become sufficiently comfortable with computerized operations before they will rethink their procedures and eliminate those that computerization has made superfluous. One simple illustration should suffice: Typists manually address envelopes; this task is unnecessary when a word processing program is used. Most typists will continue to address envelopes manually when they start using word processors and for some time thereafter.

The benefits of a memorial of a transaction may now exist without paper; no longer does the absence of paper mean reliance on human memory. Many of the functions formerly served exclusively by paper may be served by relying on information stored on computer discs, tapes and memories. Adapting to these simple facts, both operationally and in terms of understanding the processes involved, takes time and experience.

Parties to electronically based sales transactions believe they have the right to expect one another to perform, deliver and pay for the goods in a timely manner. But for commercial law assumptions of the existence of paper, there is little reason to believe that once the fact of a transaction is established a court would refuse to enforce it. For several years, commentators have suggested various approaches to resolve the difficulties raised by paper requirements, but each of these suggestions has turned ultimately on the reform of commercial law to accommodate electronically based transactions.

At an ever increasing pace, commerce has begun adopting methods of processing, communicating and storing information without paper—on electronic media.² As a result, some of the fundamental structures of commercial law must now be reexamined.

The process of adapting American commercial law to new technological realities commenced with the 1977 amendments to UCC Article

the data via modem or facsimile. The communication may use the mails, telephone lines or satellite networks. Businesses with a telephone, modem and personal computer may conduct trade with one another without any additional sophisticated equipment.

Tomorrow, new and additional modes of communicating and storing information will emerge and be adopted by business. Whether these new modes will rely on the electronic technologies underlying today's methods is unknowable. What is predictable is that technological development will continue and, as additional efficiencies become affordable, commerce will adopt them.

2. See Electronic Messaging Services Task Force, *The Commercial Use of Electronic Data Interchange—A Report and Model Trading Partner Agreement*, 45 BUS. LAW. 1645 (1990).

8, which recognized emerging uses of "uncertificated securities" by including provisions governing the rights and liabilities of the issuers and holders of interests or obligations not represented by pieces of paper.³ Some years later, Article 4A was added to the UCC explicitly to furnish a legal structure for funds transfers, a payment system through which billions of dollars passed without generating paper or a predictable structure of legal rules.⁴ Currently, drafting committees are preparing revisions of Articles 2, 5 and 8. The Business Law Section of the American Bar Association has established task forces to study the need for revising both Article 1, which contains the basic definitions and general provisions applicable throughout the UCC, and Article 7, which governs documents of title.

The emergence of electronic or computerized technologies in the business office is not solely responsible for these increasing revision efforts, but changes in commerce that implement nonpaper-based procedures have significantly contributed to the recognition of the need to modernize commercial law. This Article will review one method that has been employed in an effort to reform existing commercial law and will introduce a defined concept developed for incorporation into the UCC.

II. WHAT IS WRITTEN IS NOT CAST IN STONE: INTRODUCING A NEW CONCEPT TO COMMERCIAL LAW

When the Code initially was offered to the states for enactment, computers were large, unwieldy, expensive pieces of equipment that had not yet found general commercial acceptance for routine operations. Some preliminary experiments were underway,⁵ but the drafters, like the rest of the legal profession, could not know how electronic technologies might impact commercial law until there was experience with some commercial applications. It is unremarkable, then, that existing provisions of

3. See U.C.C. §§ 8-102(1)(b), -313(1)(b), (f), (h), -313(3) (1990).

4. See *id.* art. 4A prefatory note. In addition, amendments were made to Articles 3 and 4, governing negotiable instruments and bank collections, to accommodate methods of automated processing of checks and other instruments that had been adopted by the banking industry since the Code was enacted. See *id.* art. 3 prefatory note.

5. For example, in July 1956, the American Bankers Association Technical Subcommittee on Mechanization of Check Handling made its first recommendations, opting for imprinting machine-readable figures on checks (which became the MICR line) to enable the use of automated scanner readers for the processing of checks. Use of this automated system and the encoding of checks with magnetic ink (the MICR line) became widespread in the 1960s. See DONALD I. BAKER & ROLAND E. BRANDEL, *THE LAW OF ELECTRONIC FUND TRANSFER SYSTEMS* ¶ 1.02[2] (1980). The provisions of the original Articles 3 and 4 did not address this then-emerging technology.

the UCC are replete with assumptions of the existence of pieces of paper, whether explicit or not.⁶ Whenever the law requires a piece of paper, the law may stall and hamper the rapidly increasing flow of transactions negotiated, confirmed and transacted through fully electronic communications. The inefficiencies caused by legal requirements that transactions be memorialized on paper can only increase as progressively more transactions are accomplished through direct computer-to-computer communications. Any assumption, whether explicit or implicit, that a piece of paper exists, represents a burden to free commercial adoption of electronically based operating procedures.

For these reasons, one of the first targets for reformers has been UCC section 1-201(46) which states: " 'Written' or 'writing' includes printing, typewriting or any other intentional reduction to tangible form."⁷ While some commentators have argued that "any other intentional reduction to tangible form" may be interpreted to include the saving of information onto a disc or drive,⁸ others have been less sanguine.⁹

6. The statutes of frauds are the obvious examples. See U.C.C. §§ 1-206, 2-201, 2A-201, 8-319. Other references to paper may be found in §§ 2-207, 5-104 and 9-203(1)(a), in the definitions of "order" and "promise," § 3-103(a)(6), (9), and in § 9-402(1), which requires that the debtor sign a financing statement. A number of provisions throughout the Code call for written notice, see, e.g., *id.* § 2-609(1) (demanding written assurances of performance), and others have been interpreted to require written notice, see, e.g., *id.* § 9-504(3) (requiring written notice to debtor before collateral is sold). Any random survey of Code provisions will find numerous references to notices, sending, delivering or receiving, conspicuous terms and the like.

7. *Id.* § 1-201(46).

8. BERNARD D. REAMS, JR. ET AL., *ELECTRONIC CONTRACTING LAW* § 6.01(b), (c) (1992); BENJAMIN WRIGHT, *THE LAW OF ELECTRONIC COMMERCE: EDI, FAX, AND E-MAIL: TECHNOLOGY, PROOF, AND LIABILITY* § 16.1 (1991).

9. Another provision that has received attention from the reformers is U.C.C. § 1-201(39). That section defines "signed" as including "any symbol executed or adopted by a party with present intention to authenticate a writing." U.C.C. § 1-201(39). Thus some commentators believe that the definition, as it stands, may be interpreted to accommodate personal identification codes or other identifiers used in computerized communications. Others disagree and argue for revision of the definition in order to explicitly accommodate such identifiers.

The issues surrounding the meaning of "writing" and "signed" were the subject of detailed discussion in REAMS ET AL., *supra* note 8, § 6.01; WRIGHT, *supra* note 8, § 16.1; and Electronic Messaging Services Task Force, *supra* note 2, at 1679-97.

The difficulties with the tangibility element can be illustrated by examining facsimile transmissions. In the most familiar case, the information received by a fax machine is printed onto paper. It is possible, however, for the fax message to be received on a computer screen. In this case, the information consists of electronic messages to a computer software package. If the information is saved onto a computer disc, the information arguably has been reduced to tangible form, but the form of the message itself is an unintelligible digital code stored in the magnetic material of the disc until the message is once again retrieved on a computer screen or printed onto paper. See REAMS ET AL., *supra* note 8, § 6.01; WRIGHT, *supra* note 8, § 16.4.4; and Electronic Messaging Services Task Force, *supra* note 2, at 1680-97 for a general discus-

Of immediate concern to many, moreover, is the pragmatic difficulty posed to commerce if paper must be generated or retained before transactions will be enforceable. Every piece of paper that is retained, because it is required by law or because of uncertainty about legal requirements, reduces the efficiencies made possible by the use of new technologies.

A. First Stage: Attempting Redefinition of Existing Concepts

One approach to writing requirements is to revise the definition of "written" or "writing" contained in section 1-201(46).¹⁰ The revision might explicitly include certain forms of technology, as was done in the United Nations Convention on Contracts for the International Sale of Goods (CISG).¹¹ While such an approach furnishes clarity, it may be outdated as soon as new technologies are adopted; the Convention does not incorporate into its definition computer-to-computer communications or electronic storage of data, although both are used increasingly in commerce.

A second method of revision would seek to devise statutory language broad enough to incorporate future technologies as they emerge (in other words, be media neutral). Benjamin Wright made the following proposal in 1991:

Lawmakers could address problematic laws indirectly with amendments to general statutory definitions. Some jurisdictions have statutes that define terms used generally within the jurisdictions' statutes. . . . A law such as this might, for example, be amended to say that "writing" includes "any expression (other than oral) of letters, numbers or codes that is, or in connection with its communication from one party to another becomes, fixed in a tangible medium of expression." This definition serves these purposes: (1) The "fixed in a tangible medium" language requires a record. (2) The "letters, numbers or codes" language requires more articulateness and delibera-

sion of ways in which electronic transaction records can satisfy the writing requirements of the statutes of frauds.

10. Another approach that has been adopted by parties using electronic media for their transactions has been to enter into agreements that define their transactions as satisfying writing requirements. These agreements may incorporate a number of strategies to deal with such requirements as statutes of frauds. See, e.g., Electronic Messaging Services Task Force, *supra* note 2, at 1717-49 (model agreement).

11. United Nations Convention on Contracts for the International Sale of Goods, Apr. 11, 1980, S. TREATY DOC. No. 9, 98th Cong., 1st Sess. (1983), reprinted in 52 Fed. Reg. 6264 (1987). Article 13 states: "For the purposes of this Convention 'writing' includes telegram and telex." *Id.* art. 13, reprinted in 52 Fed. Reg. at 6265.

tion than oral communication. (3) The "letters, numbers, or codes" language forces the communication to be conspicuous—at least conspicuous enough for business transactions. This definition may, however, be inappropriate for consumer transactions that must be in writing. The definition may not properly ensure that the consumer receives a message that he can easily recognize and use.

This approach's advantage is that it covers many laws at once. The hazard is that a handful of laws may be affected in unforeseen ways; this requires us to rely on courts to use common sense in interpreting the definition.¹²

Turning more specifically to the Uniform Commercial Code, several revisions of the section 1-201(46) definition have been proposed. In comments dated September 13, 1990, the Working Group on Electronic Writings and Notices developed several possible revisions.¹³ Thereafter, building upon previous proposals, John L. Crawley, Patricia M. Howe and Benjamin Wright proposed the following revised definition: "'Written' or 'writing' includes printing, typewriting or any other expression (other than oral) of letters, numbers or codes that is, or in connection with its communication from one party to another becomes, fixed in a tangible medium of expression."¹⁴

12. WRIGHT, *supra* note 8, § 16.7.4 (footnote omitted). Although Mr. Wright was not discussing the Uniform Commercial Code in this excerpt, his approach might be applied to the definitions in UCC Article 1.

In the same chapter, Mr. Wright argues that courts and regulatory bodies could reinterpret existing requirements, legislatures could eliminate formal requirements from statutes or explicitly recognize electronic methods of doing business, and industry groups could adopt customs and practices recognizing electronic commercial practices. *Id.* §§ 16.7.5 -8.

13. Working Group, Comments to ABA Study Group on the Revision of Article 2 (Sept. 13, 1990). The proposals included:

1. "Written" or "writing" includes printing, typewriting or any other expression reduced, or capable of reduction, to tangible form.
2. "Written" or "writing" includes any statement which is, or concurrently with its transmission, becomes printed, typewritten, magnetically or optically recorded or otherwise reduced to tangible form.
3. "Written" or "writing" includes any statement fixed in any medium, now known or later developed, from which the statement can be perceived, reproduced or communicated, either directly or with the aid of a machine or device.
4. "Written" or "writing" includes any statement fixed, using paper or any other tangible medium of expression, from which the statement can be perceived, reproduced, or later communicated, either directly or with the aid of a machine or device.

Id.

14. Memorandum from John L. Crawley, Patricia M. Howe & Benjamin Wright to the Working Group (Oct. 1991) (on file with author).

Discussion of this series of potential definitions made several principles evident to those debating redefinition. First, any effort to revise commercial law to incorporate new technologies needs to be media neutral, rather than embracing and including specific technologies. As illustrated by the CISG provisions incorporating telex and telegrams,¹⁵ by the time the drafting and adoption process has been completed, new technologies not included in the definition may be part of established commercial practice. The process of drafting and adoption is too expensive and time consuming to permit change every time a new technology appears.¹⁶

Second, any proposed definition should be tested against emerging technologies and against business practices presently in use. The first attempts to revise the definition in section 1-201(46) built upon the existing definition, but testing the 1990 proposals against existing technologies revealed flaws. While all agreed that any record would have to be capable of being translated into readable form in the event of litigation, there was concern that requiring "tangible form" might be read to require that a paper or other legible record be prepared at some point. It was believed that references to "tangible form" might prove to be as medium-specific as the CISG references to telexes and telegrams.

Even in the absence of technological developments, definitions must be tested against existing methods of conducting business. For example, questions were raised and time was spent debating whether "fixing" information in a medium required accurate reproduction of the information in the format and with the content originally received, or whether it permitted reproduction in any format provided the correct content was available.¹⁷

Third, any proposed definition must be tested against existing legal principles to ensure that redefinition does not distort existing legal concepts. Mr. Wright's proposal has the advantage of media neutrality but, as he notes, presents certain hazards.¹⁸ Both reinterpretation and redefinition appear to be attractive solutions to the problems raised by electronic media. They bring information stored on electronic media within

15. See *supra* note 11.

16. It might be possible to accomplish such a result by regulation. The prospect of bureaucratic regulation of commerce presents problems beyond the scope of this Article. This alternative has not been viewed with favor by the members of the Working Group.

17. Because full implementation of computer-to-computer communication for the sales cycle involves both the buyer and seller using the data for a number of functions—for example shipping instructions, billing or payment—it is probable that some companies using electronic data interchange do not store the information in the same format in which it is received.

18. See WRIGHT, *supra* note 8, § 16.7.4.

the concept of "writing," without requiring the expensive and time-consuming process of examining all the commercial law provisions and revising them as needed to accommodate electronic media. Unfortunately, on closer examination it becomes clear that these approaches are insufficient.

Writing requirements serve a number of different functions in commercial law, and some of those functions may be served better by pieces of paper than by electronic media.¹⁹ At a minimum, it is necessary to explore each writing requirement to ascertain the function(s) it serves and then determine whether it is appropriate to permit the use of electronic media in light of that function. While additional functions served by writings might be identified, any list of the functions served by writing requirements should include:

1. *Memorial and evidence of transactions.* Words on paper may be stored and retrieved in the future, if a dispute arises. The existence of a piece of paper created, and perhaps signed, contemporaneously with a transaction in and of itself offers some evidence that the transaction occurred. In addition, the words on the paper offer evidence of the terms of that transaction, without the necessity of relying on human memory in order to reconstruct the transaction. Thus, such a piece of paper supports the conclusion that a transaction has occurred and assists in determining the terms of the parties' agreement. This reality permeates the provisions of the parol evidence rule in section 2-202.²⁰

2. *Communication and notice.* Words on paper may be sent by one party and received by the other, and the law assumes each party "knows" or has "notice" of the information contained on the paper. Numerous provisions of the Uniform Commercial Code require that written notice be given or received before obligations arise or consequences oc-

19. As noted above, any requirement that a piece of paper be generated or stored reduces the efficiencies that may be gained through the use of computers to communicate and store information. Proponents of expanded use of electronic media have urged that all paper requirements be abolished. Nevertheless, the possibility remains that sound policy will require the retention of some requirements for the foreseeable future, even if no negotiable instruments are involved. For example, in order to ensure that debtors, and particularly consumer debtors, consciously have chosen to waive their rights subsequent to a repossession, it may be wise to retain the requirement that the debtor have signed a written waiver subsequent to default. See U.C.C. § 9-505(2).

20. *Id.* § 2-202. For example, the opening paragraphs of § 2-202 refer to "a writing intended by the parties as a final expression of their agreement." *Id.* Comment 1 states in part: "This section definitely rejects: (a) Any assumption that because a writing has been worked out which is final on some matters, it is to be taken as including all the matters agreed upon . . ." *Id.* § 2-202 cmt. 1. Equating writing with paper is inescapable. Nevertheless, it seems that the intention is to refer to the parties' memorial of their transaction, without relying on memory.

cur. For example, section 2-605(1)(b) permits a merchant seller to make a written request for a written statement of defects after goods have been rejected.²¹ If a merchant buyer fails to specify defects in a written response, the buyer is precluded from relying on such defects as a basis for rejection of the goods. Section 2-609(1) permits a party to a sales contract to demand adequate assurances of performance from the other party, but only when reasonable grounds for insecurity exist and when the demand is made in writing.²² If such a demand is communicated by a writing, the recipient is required to furnish assurances within a reasonable time, and failure to do so has the effect of a repudiation of the agreement.

3. *Ritual and precaution.* Writings, and the formalities attendant upon their reading and signing, may be used to impress upon parties to agreements or transactions the significance of their actions. Indeed, this ritual function is one that has been used to justify the continued existence of the statutes of frauds. The provisions in Part 5 of Article 9 serve a precautionary function by requiring that any debtor waivers of afforded protections be made in writings signed subsequent to default in the security agreement. Requirements that information be contained in agreements or other writings in "conspicuous" form—such as the requirements in section 2-316 that written disclaimers of implied warranties be conspicuous—are similarly precautionary, intended to ensure that even parties to standard-form, preprinted adhesion contracts are warned of the risks imposed on them in the sales agreement.

4. *Token or res.* The writing itself may be a token, an item of property that may be transferred and sold. Articles 3 and 7 define specific types of negotiable instruments that are created when writings are issued and specify the consequences of transfer of such instruments to good faith purchasers for value. In each case, when the appropriate delivery has occurred, the transferee acquires rights in the property—the paper itself—which have legal consequences. In the provisions governing negotiable instruments, the fundamental assumption is that some token exists on paper or other medium, which may be signed, issued and physically delivered, and which may be transferred by indorsement and delivery. Displacement of that fundamental assumption, without consideration of and adjustment to its consequences, would play havoc with significant elements of commercial markets.²³

21. *Id.* § 2-605(1)(b).

22. *Id.* § 2-609(1).

23. Some advocates of the emerging markets in electronic data have argued that it is appropriate to redefine "written" and "writing" to include electronic data, notwithstanding the

B. Second Steps: Developing New Concepts for Commercial Law

Thus it becomes clear that when attempts to redefine "writings" to incorporate electronic media are tested against the functions identified above, a broadened definition will cause unacceptable distortion. Even if paper is not essential to memorialize or evidence transactions, to communicate or give notice, or to serve ritual and precautionary functions, the problem of the token remains. Reinterpreting or redefining the definition of "writing" in section 1-201(46) to include electronic media would disrupt the structure of Articles 3 and 7 and cloud the appropriate interpretation of provisions in other articles dealing with the consequences of negotiable instruments.

Furthermore, the experience garnered in the process of drafting Article 8, as it relates to uncertificated securities, and Article 4A, which governs wire transfers, demonstrates that it is not sufficient to subsume electronic media into provisions for paper-based information. The use of electronic media may cause risks that are distinct from those implicit in the use of paper, and other risks, common to both forms, may be of varying significance. Thus the 1977 revision of Article 8 contained separate provisions governing transfers of interests in securities for certificated securities—those printed on paper—and for uncertificated interests, accounted for only on the records of an issuer or intermediary. Article 4A contains provisions for security procedures to vouchsafe the authenticity and accuracy of payment orders, while Article 3 uses signatures as the vehicle for assuring authenticity.²⁴

The beginning of a solution to the problems presented by technological change is the definition of a new concept for the Uniform Commercial Code. This concept would embrace both paper-based and electronically based communications and information storage. Its elements would be crafted carefully to ensure that those factors that are characteristic of the traditional reliance on paper may be satisfied. In instances where either medium is sufficient to serve the purposes of the Code, the new concept would be used. In those instances where the

impact on the clearly paper-based assumptions contained in Articles 3 and 7. This author disagrees and believes that the disruption of the existing structure of Article 3 in particular is unacceptable. On the other hand, it seems equally clear that there is no reason why the consequences of negotiability cannot exist in an electronic environment. Indeed, both Articles 4A and 8 provide that, upon the occurrence of stated and objectively identifiable events, rights are transferred free of claims and defenses.

24. In addition to its reliance on signatures, Article 3 contains a number of provisions allocating the risk of forgeries to the party perceived to be in the best position to protect against loss. See U.C.C. §§ 3-404 to -406. Article 4A, on the other hand, states specifically that a signature is not a sufficient security procedure. *Id.* § 4A-201.

drafters believe that electronically based information cannot serve the functions of paper, the existing defined terms "written" or "writing" would clearly signal that paper is required.

A necessary first step is to determine what it is about paper-based information that permits it to serve the identified functions and then to evaluate those characteristics against electronic information. After substantial debate, the Working Group²⁵ concluded that the first essential characteristic is the existence of a record of information that is capable of being perceived or intelligible to humans. While words stored on paper instantly qualify, the same is not true of words or information stored in electronic form. Before humans may use information that has been stored electronically, computer software must be applied to convert the data into "plain English." The Working Group, however, did not believe that the information must be stored in a legible form, as long as it is capable of retrieval in a form intelligible to humans. Encrypted information on paper is satisfactory for legal purposes. No principled distinction between encrypted data and information stored electronically was identifiable. The essential characteristic is that the information may be converted accurately and reliably into a form that is intelligible to humans. For encrypted information it would be necessary to retain the decoding key or algorithm. In the case of information stored in electronic or other technology-based media, this would mean that word processing or other software be available to retrieve and reproduce the information in intelligible form.

Secondly, the information must be reliable and accurate. One fundamental justification for requiring a memorial of information is the perception that human memory is not always reliable. Any method of storing information that permits the information to be accurately retrieved in the future eliminates the need to rely on human memory for the reconstruction of a past transaction.

The information must be capable of communication in a manner calculated to inform the recipient of its contents, or via a medium that the recipient may be required to monitor at his or her peril. In the case of communication and notice, an argument may be made that paper should be required until the day arrives when all individuals and organizations may be expected to utilize and monitor electronic mail systems.

25. At the commencement of the efforts outlined in this paper, the Working Group was chaired by Thomas J. McCarthy (now chair of the Task Force on Article 2, Business Law Section, ABA). It is now chaired by Terrance Maher and Henry Dyhouse. Development of the concepts and processes discussed herein continues, as does analysis of the Uniform Commercial Code to identify explicit and implicit writing requirements and analyze their functions.

Advocates of electronically based methods of business communication argue, on the other hand, that retaining any requirement that paper be used, particularly in commercial settings, hinders the acceptance of such methods.²⁶

Once it was agreed that redefinition was not feasible and that the Code needed a defined term which would incorporate both paper and nonpaper media, and after substantial debate, the following definition was derived: "X is an intentionally created symbolic representation of information, in an objectively observable medium or in a medium susceptible to reduction to objectively observable form, with the potential to last indefinitely."²⁷ This definition has the advantage of embracing within its terms both paper-based and technology-based information, while focusing attention on the need to store the information in a manner permitting it to be understood by humans in the future. In addition, it does not require that any particular, or even existing, method of stating or storing the information be employed—it is technologically neutral. The definition is silent concerning the need to store the information accurately. It was the belief of the Working Group that accuracy was related to the admissibility of the information and thus should be governed by the rules of evidence.²⁸

26. These advocates may be correct. Despite the fact that provisions of Article 4 prior to the 1990 amendments arguably permitted check truncation and electronic presentment, bankers consistently voiced concern about the feasibility of truncation systems without express authorization for such systems.

27. The neutral label "X" was selected deliberately as the discussion commenced, in order to avoid having connotations from preliminary or tentative labels obscure or confuse the search for an appropriate definition.

28. At the same time that the Working Group was developing the "X" concept, other bodies were addressing identical issues. The drafting committees revising Article 5 (Letters of Credit) and Article 8 (Investment Securities) of the Uniform Commercial Code both were struggling with the need to accommodate existing and predictable future uses of electronic technologies in the creation and processing of transactions within the field governed by the respective articles.

The May 1, 1992 draft of revised Article 8, reviewed by the NCCUSL at its 1992 Annual Meeting, approached the problem in a manner consistent with the Working Group approach. It affords a good example of how the Code might be revised once the drafters decide to incorporate a new concept into the Code that embraces both paper and nonpaper media. Revised § 8-103 defines securities in a manner that does not relate to the medium in which information concerning the security is stored. U.C.C. § 8-103 (Tent. Draft May 1, 1992). Indeed, a "security" under revised § 8-103(f) "may, but need not be, represented by a certificate." *Id.* § 8-103(f). The rights and liabilities incident to dealing with certificated securities are distinct from the rights and liabilities incident to dealing with uncertificated securities, in both the 1977 version and the proposed revised version of Article 8.

More significantly, however, the 1992 draft of revised Article 8 avoids referring to writings or paper except as implicit in the references to the existence of a certificate. Instead, the draft refers to communications, and defines a "communication" in revised § 8-105(6) as "a

As was true at earlier stages of the debate when attempts were made to redefine "writing," the preliminary definition was tested and found wanting. There were objections to the requirement that the record be intentionally created and the requirement that the information have the potential to last indefinitely.

With respect to the requirement that the record be intentionally created, it was pointed out that the definition in section 1-201(46) includes "any other intentional reduction" to tangible form.²⁹ On the other hand, there is no requirement that any particular person record the information, and the intent element appears to refer to the act of putting the information into a record, rather than to any desire or motive to create a record. Courts do not explore the motivation of individuals who transcribe information before determining whether paper requirements are satisfied.³⁰ There was concern that decision makers might regard any element of tangibility as imposing requirements that the record be made at some particular point in the course of a transaction or some particular format. Participants in the debate did not wish to impose technological limitations, which might hinder future technological innovation, by retaining definitional elements that were not essential to the functions or characteristics identified.

Another element that raised concern was the requirement of a "potential to last indefinitely." It was pointed out that paper does not and is not required to last indefinitely. The Internal Revenue Service imposes record-keeping requirements on commerce.³¹ Those requirements are imposed quite independently of legal provisions requiring paper. Rules concerning the admissibility and relevance of evidence similarly impose

signed writing or any other form of transmitting information and authenticating its source that has been agreed upon by the persons transmitting and receiving the information." *Id.* § 8-105(6). This definition is not identical to the concept developed by the Working Group, because the Article 8 "communication" requires that the sender and recipient of information have previously agreed to use of the medium. The Working Group rejected any requirement of prior agreement, focusing on the characteristics of the information or message rather than on whether, in any particular situation and in relation to any particular parties, an appropriate medium had been selected. Nevertheless, the overall drafting approach of revised Article 8 is consistent with the Working Group's recommendations, because the existence of a writing is assumed only in the case of certificated securities. In all other respects, "communications" are required, and, as noted above, the definition of "communication" incorporates both paper and nonpaper media for information.

29. U.C.C. § 1-201(46) (1990).

30. Such motivational questions may be relevant on other points, such as whether the record is intended as a full or partial integration of an agreement. They were not, however, considered relevant to the question of whether the record is a "writing."

31. See Rev. Rul. 71-20, 1971-1 C.B. 392, and Rev. Proc. 86-19, 1986-1 C.B. 558, for provisions relating to record retention in an electronic environment.

requirements concerning durability and reliability of records, but these rules also exist independently of paper requirements.³² Concern was expressed that including an indefinite duration requirement in the definition might be regarded as imposing requirements independent of (rather than incorporating and restating) the needs for evidence and audit purposes. On the other hand, it is clear that one of the characteristics of paper records is that they may be relied upon to survive in unchanged form over a period of time. Questions were raised concerning whether the durability requirement related to the information, its symbolic representation or the medium of storage, and thus it was agreed that the formulation contained an inherent ambiguity. Finally, it was suggested that the requirement that the record be capable of translation into an "observable" form suggested a format that could be perceived by visual means, rather than by any of the senses.

As a result of these discussions, the definition of the concept was revised as follows:

X means a durable symbolic representation of information in objectively perceivable form or susceptible to reduction to objectively perceivable form.

This definition involves several changes from its earlier form. While the idea of a lasting record has been retained, it is clear that it is the representation of the information that must be durable. No element of intentionality has been retained; it is sufficient that a representation of the information exists. Finally, the word "observable" has been changed to "perceivable," permitting resort to any mode of perception.

C. Labelling X: Naming the Concept

For purposes of discussion, the new concept was labelled "X." No word was attached to the new concept as it was being refined, in order to avoid obscuring the search for the necessary elements of that concept through connotations or inferences conveyed by any word that might be selected as a preliminary label. Any word selected should not carry with it a strong inference that a piece of paper exists, because such an inference could confuse the issue for the unwary. Thus such words as "text" would be excluded. A new word might be created, but the use of "made up" words carries with it the risk that the new word might create its own confusion and contradict the style of existing UCC drafts.

32. See, e.g., FED. R. EVID. 1005.

A number of words have been suggested, but at the moment "record" is favored as a label for the concept.³³ The dictionary definitions of the word "record" include the idea of "writing" something down, or placing the information in some permanent or durable form. The word also embraces the idea of a number of other media, including phonographs, tapes and compact discs. Thus, the connotations borne by the word "record" suggest the desired media neutrality.

III. CONCLUSION: THE PROCESS OF CONCEPTUAL CHANGE IN THE PROCESS OF LEGAL REFORM

New technologies are challenging both the commercial law and lawyers in ways far more fundamental than may have been foreseeable even a decade ago.³⁴ Experience with the commercial practices that have developed seems to be essential to effective revision of commercial law, if only because that experience illustrates that existing conceptual frameworks may be inadequate to the task of reform. With the benefit of such experience, efforts can be made to avoid media-specific rules and to anticipate future directions of technology. It must be acknowledged, however, that these may be only efforts. Without the benefit of crystal balls, perfect prediction of the direction and impact of future technologies is impossible. Perfection will not occur, but it is clear that existing provisions of commercial law hinder commercial developments both in the sphere of transaction processing and with respect to agreements in which the subject of the transaction is technology. It is also clear that efforts must be undertaken today to adapt commercial law, to the extent practicable, to each of these circumstances.

One aspect of this challenge is the task of bringing computer software and programming disputes into existing bodies of law. A task force of the American Bar Association has spent several years studying an appropriate method for accomplishing this, and the Article 2 drafting

33. Other suggestions have included terms such as advice, communicate or communication, document, memorial, message, representation and text. Thomas J. McCarthy prepared a memorandum analyzing substitution of the word "document" for writing references in Article 2, as well as a similar analysis for the word "record." Memoranda from Thomas J. McCarthy, Member, Working Group (on file with author).

34. Several years ago the author heard an address by Professor Peter W. Martin, in which he compared the impact of electronically based information technologies to the impact of writing on preliterate societies. Professor Peter W. Martin, Address at the Meeting of Mid-Continent Association of Law Schools (Summer, 1989). As farfetched as the idea may have seemed to some, Professor Martin proceeded to illustrate numerous ways in which new technologies offered new research techniques, and rendered obsolete existing techniques of legal research. *Id.*

committee has the subject under active consideration.³⁵ This Article illustrates that a similar conceptual challenge exists when computers are not the subject matter of the contract, but are the vehicle through which the transaction has been conducted.

Conceptual change requires a frequently time-consuming and taxing process or evolution of analysis. However, effective and efficient revision of commercial law for the era of electronic media demands that revisers submit to this process. Students and historians of cognitive processes identified the process of conceptual development long ago: Concepts are formed by individuals to explain the world they experience; once formed, the concepts stabilize until, at some point, the individual will confront new experiences that require reevaluation of the concept, which will then destabilize and undergo modification until a new synthesis is achieved.³⁶ The process that has become manifest as the definition of "writing" includes the elements of conceptual development consistent with these theories. Experience with an existing concept—for example, "writing"—revealed that it was flawed because it assumed that all records of information involved the existence of a surface bearing words and numbers. The assumption became false with the development of methods to store and communicate information electronically. Attempts were made to redefine the concept in order to accommodate new perceptions, but ultimately the concept of "writing" was found wanting.

Once it has become apparent that existing concepts no longer fulfill the needs of present realities, it is possible to develop new conceptual structures. As has been manifested in the process of exploring "writing," it may be appropriate to retain the existing concept, supplementing it with new concepts that address technological development. The elements or characteristics of the concept to be described may be identified through analysis of both traditional and emerging commercial practices, and with the help of substantial brainstorming and debate. When those characteristics have been identified, it is possible to express them in language.

The first attempts to express the characteristics of such a new concept inevitably will require refinement and clarification. If commercial

35. For further information concerning these points, and analysis of their impact on the Article 2 drafting process, see Raymond T. Nimmer, *License Contracts—Article 2 Code Sections* (Feb. 4, 1993) (prepared for Article 2 drafting committee) (on file with author).

36. The work of Jean Piaget on intellectual development is perhaps the most familiar to American students. See JEAN PIAGET, *THE CHILD AND REALITY* (1973). An excellent historical investigation of how experiences influence perceptions of reality, and accompanying conceptualizations of that reality, may be found in DANIEL J. BOORSTIN, *THE DISCOVERERS* (1983).

law is to have relevance for commercial practices, a number of technological and legal experts must be willing to engage in a process of discussion and debate. This process of discussion and debate must test concepts against both recent experience with new technologies and long experience with old technologies, as well as educated predictions of future technologies. Such a process, however expensive and time consuming, seems best calculated to successfully identify the insufficiency of existing conceptual structures and to define new concepts that can survive marked technological shift and the challenges it poses for our legal infrastructure.

In the particular instance of UCC paper requirements, incorporating into the Code's text a defined term embracing both paper- and nonpaper-based information permits revisers to find real solutions to the problems presented by electronically based commercial practices. Analysis of the underlying functions served by writing requirements in the UCC will reveal that, as a rule, pieces of paper are not necessary. It is clear, however, that information stored or communicated in electronic media cannot satisfy the policies being served by one of the writing requirements—the token or property function—without causing major difficulties. With respect to other functions, drafters and legislators may wish to demand that paper be used in some instances, notwithstanding the fact that the information may be stored and communicated via electronic media. For these reasons, the quick fix of redefining or reinterpreting the definition of "writing" will not solve the problems presented by electronically based commerce. Real solutions necessarily start with adding to the Code a defined concept that will include both paper-based and nonpaper-based information. A possible definition for the new concept is "record." Once this concept has been recognized, drafters and legislatures may focus on the functions served by each writing requirement and determine whether paper is necessary. The bias should favor eliminating specific paper requirements in the interests of encouraging further commercial evolution of efficient business practices.