

# E-Contracting Challenges



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## INTRODUCTION

A decade ago, IT — through its innovations in business process reengineering — led the way in breaking down the inefficiencies within companies. Firms in the new millennium now face relentless pressure to perform better, faster, cheaper, while maintaining a high level of guaranteed results. Firms must thus focus on their core competencies and outsource all other activities. Working with a partner, however, requires breaking down the inefficiencies between organizations and coping with frequent change across the entire end-to-end value chain. In this new world of collaborative commerce and collaborative sourcing, a standard business process is simply inadequate. Using e-contracts to build new business relationships and to fulfill e-contracts through the Internet are important trends. E-contracting is however not a new concept. The history of e-contracting can be reviewed from legal and technology aspects.

Over the last 20 years or so, a growing body of research in artificial intelligence has focused on the representation of legislation and regulations (Sergor, 1991). As specific regulations, contracts are used to regulate the actions of two- or multi-party interactions. Gardner (1987) has developed contract formation rules. Her work concerns legislation about the nature of exchanges that lead to contractual relations. The ALDUS project and Legal Expert project investigated drafting the Sale Goods contract (ALDUS, 1992) and the United Nations Convention on contracts for the international sale of goods (Yoshino 1997, 1998), respectively. Detailed information on developing logic-based tools for the analysis and representation of legal contracts can be found in Daskalopulu (1997, 1999).

The law regards contracts as collections of obligations; research in this area includes automated inference methods, which are intended to facilitate application of the theory to the analysis of practical problems. The purpose of a legal e-contracting system is to clarify and expand an incomplete and imprecise statement of requirements into a precise formal specification.

In the early 1990s, the development of EDI (electronic data interchange) was a significant movement for electronic commerce. EDI was considered a term that refers solely to electronic transactions and contracts (Justice Canada, 1995). EDI requires an agreement between trading partners that not only dictates a standard data format for their computer-

to-computer communications, but also governs all related legal issues of EDI usage. In 1987, the first set of EDI rules was named the Uniform Rules of Conduct for Interchange of Trade Data by Teletransmission (UNCID, 1987). In 1990, the American Bar Association (ABA) published a Model Trading Partner Agreement and Commentary, together with an explanatory report (Winn & Wright, 2001). In 2000 IBM submitted to OASIS (for standardization) the first example of an XML-based EDI TPA language, called Trading Partner Agreement Markup Language (tpaML).

While the EDI standard introduced efficient communication channels between companies, its implementation was not widely accepted due to its high installation costs, lack of flexibility, and technological limitations (Raman, 1996). With the development of the Internet, electronic contracting began to be interpreted in broader terms. In this new view, an e-contract is not only used as a legally binding agreement between a buyer and seller, but it can also be used across different workflow systems to cross different organizational business processes (Koetsier, Grefen, & Vonk, 1999; Kafeza, Chiu, & Kafeza, 2001; Cheung, Chiu & Till, 2002) to integrate different Web services (Cheung et al., 2002, 2003). E-contracting has become synonymous with business integration over electronic networks.

## BACKGROUND

New technologies, the Internet, and other networks have changed business environments and provided the trading processes in e-business more efficiency. Legal regulations, such as the European directive for electronic signatures (EU Directive, 2000) and national e-commerce regulations, have set up a framework for using electronic contracts in business. Concepts of e-contracts under the network environment definitely have different characteristics than the concepts for traditional paper contracts. Whereas a paper-based contract document is a static view on the obligations, an e-contracting system could monitor the responsibilities of each contractual party and the performance of the obligations.

In a networked environment, the definition of the concept of e-contracts can be emphasized as “a contract is a guarantee” or “contracts build new business collaborations between contractual partners” (Xu, 2004a). First, the contract provides a guarantee to all contractual partners according

to the clauses of the signed contract and relevant laws. An agreement between consumers and retailers in B2C commerce is a typical example of “a contract is a guarantee.” The agreement provides protection to both consumers and retailers. Second, contractual partners build a business relationship using a contract such as an “arm’s length transaction.” Two (or multi) parties who used different workflows can cooperate using e-contracts to support business automation (Koetsier et al., 1999; Kafeza et al., 2001). Web service composition can also be implemented using e-contracts. There also exist some e-contract applications that actually cover both sides’ concepts. For instance, Trading Partner Agreement (TPA) in ebXML provides a guaranteed business exchange with a certain quality. It also specifies a long-term business relationship/collaboration between partners to conduct the business. It is important to realize though that the concept of e-contract has only a partial overlap with the concept of a paper contract. Both have features that do not have their representation in the other one.

Under electronic communications, e-contracting processes have their unique characteristics. The result of e-contracting, the contract, is a semi-structured document, which stored in any format (e.g., MS Word, PDF, or XML, etc.). Most e-contracts contain semi-structured information, such as XML-based words, sentences, clauses, or meta-information. Furthermore, some e-contracts have the legal status of digital documents. Depending on whether networks are used during the e-contract establishment stage, e-contracts can be created online (i.e., through networks) or electronically without networks. The collaboration in the contract formation phase can be asynchronous (e.g., by e-mail) or synchronous (e.g., through online collaboration). Moreover, the e-contracting process can be finished on a shared platform (e.g., e-marketplace) or be interconnected between contractual partners. The ownership of the contracting platform can thus be with a third party (ASP) or with the contractual partners. The e-contract can be fulfilled online (e.g., digital goods, services) or off-line (e.g., physical goods). As e-contracts serve different purposes, different opportunities will bring extra values during the e-contracting stages. For example, in the contract execution/performance stage, extra monitoring information can be provided by different messages over networks. This is a significant difference with traditional contracting.

In short, e-contracting can protect contractual partners in electronic environments, reduce time-to-contract, and reduce process costs. It can also provide new opportunities on contract management, contract content re-use, and contract monitoring. Benefits of e-contracting are:

- Avoiding errors,
- re-using content after closing,
- reducing time-to-contract,
- providing machine-processable document,

- minimizing risks in a contractual agreement for ad-hoc business relationships over public networks (such as the Internet), and
- reducing contract management costs.

## E-CONTRACTING

Although there exist different descriptions for the e-contracting process (Milosevic & Bond, 1995; Goodchild, Herring, & Milosevic, 2000), the general e-contracting process includes two stages: contract establishment (contract formation) and contract enactment (contract performance or contract fulfillment) (Xu, 2004a; Angelov, 2005). E-contracting activities such as identifying, checking, and validating of contractual parties, negotiation, and validation contract are included in the stage of contract establishment. The contract enactment is further separated into two phases: performance and post-contractual activities. Monitoring of contract performance and compensation activities belongs to the contract performance phase, while contract enforcement may be involved in both the contract performance and post-contractual activities.

The research area of electronic contracting focuses on negotiation of the terms and conditions of the contract and the monitoring of contract performance (Lee, 1998). Contract negotiation is described as the process in which contracting parties come to a mutual agreement on the contract content. Contract negotiation can be performed with or without the help of a third party. There are three critical aspects for the negotiation of a contract (Burgwinkel, 2002a). First, the subject of the contract needs to be defined exactly. Second, the legal validity is formulated. Third, the price and conditions of each clause need to be negotiated in relation to the quality of deliverables and the quality of services, and in relation to the legal terms.

Contract monitoring is the process of observing the activities performed by the parties for the purpose of proactive imminent contract violations or detecting contract violations. To prevent undue costs, it is important for the contractual parties to monitor the performance of the other collaborating parties, especially if the transactions are business critical. The monitoring of contract performance can be split into two parts divided by the occurrence of an anomalous action (Xu & Jeusfeld, 2003; Xu, 2004a). The part preceding the occurrence of anomalous actions is called the proactive monitoring of contract performance. The part following it is called the reactive monitoring of contract performance. In the proactive monitoring stage, anomalous actions can be avoided and anticipated before contract violation occurrence — for example, by warning about impending deadline violations. In the reactive monitoring stage, anomalous actions can be detected, the partners who are responsible for the violations need to be identified, the relevant partner needs

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