A Framework for Analysis of B2B Electronic Contracting Support

Samuil Angelov, Paul Grefen
{sangelov, grefen}@cs.utwente.nl
University of Twente, The Netherlands

Abstract

Contracts are fundamental to all economic production and exchange processes. The fast introduction of IT into the business domain both facilitates and requires changes in core business processes and relations between business organizations. In the context of the latter, the use of IT in business-to-business contracting processes aims at optimisation and globalisation of these processes by improving their speed, efficiency and reach. Electronic contracting can thus be used on the one hand to improve existing business relationship paradigms and on the other hand to enable new forms of contractual relationships. In this paper, we propose a conceptual framework for business-to-business e-contracting support. The framework provides a complete view over the contracting field. It allows positioning research efforts in the e-contracting domain, placing their goals into perspective, and overseeing future research topics and issues. It is the basis for drawing conclusions about basic requirements to contracting systems and can be used for establishing a common terminology and improving mutual understanding among users and domain researchers.
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1. Introduction

Since the very beginning of human history, the problem exists of mutual trust when people exchange values. Contracts between the exchanging sides have been adopted as a solution that will guarantee the rights of the participants and will increase mutual trust. In case of discord or contract breach, an independent institution should take appropriate steps, based on the rights and obligations specified in the contract.

In business-to-business relationships, contracts form the foundation of business relations in a market. “All economic production and exchange processes are organized through contracts. Contracts are the instruments and the means for the organization of exchange relations based on the division of labour” [Wig97]. Establishment of a contract allows other business process to be performed, e.g., start of production, service execution, etc.

Efficiency and reach are the factors that can give more value to the contracting process. They reflect issues like cost, time, and distance. Contracting parties require establishment of contracts at a lower cost, in a shorter time and without geographical restrictions. Nowadays, information technologies are used in many spheres of life, aiming at facilitating and improving certain aspects. Electronic contracting aims at using information technologies for improving the values of the cost, time and distance indicators and at extending the opportunities to the contracting parties. A number of new opportunities are revealed by the introduction of electronic contracting. For example, it allows us to present micro-contracting, analogously to micro-payments and micro-transactions [Cha02]. We use this term for contracts that specify exchange of small quantities of inexpensive values. Micro-contracting becomes affordable as the costs and time, previously being too high for this type of contracting, are decreasing to reasonable values.

In this paper, we present a framework for the analysis of B2B electronic contracting support. First efforts in this direction are presented in [Ang01]. This framework is a complete description of the contracting elements and the relations between them, giving a structured vision over the contracting domain. Most other approaches deal with specific aspects or are based on specific contexts. The framework allows us to observe basic requirements on contracting systems, analyse existing approaches for electronic contracting and define new research issues in this field. Being a conceptual framework, it can be mapped to any project in this domain and used for its analysis.

To illustrate the benefits from the presented framework, we describe three projects in this domain and we position them in the framework. The framework helps us to identify the context of each of these projects, their goals and issues related to the projects. We use it also to identify future research issues and to position our future research work in it. It assists in providing a clear view of the goals of our research work. Until now, the contracting concepts were used intuitively and for this reason often they were used with different intentions. The structuring and description of these concepts gives a possibility for establishing a common terminology and for improving mutual understanding among users and domain researchers.

The content of this paper is organised as follows. In section two, the proposed framework is presented at high level of abstraction. Section three gives detailed views on the discussed concepts in section two. In sections four and five, we use the described framework to position current research efforts in it and to identify future research issues.
2. General view of B2B electronic contracting framework

The central concept in the framework we propose is the contract concept. There are many definitions for contracts. A popular definition that we also use in this paper is:

“A contract is a legally enforceable agreement in which two or more parties commit to certain obligations in return for certain rights” [Rei89]

This definition gives us an idea for four groups of general contracting concepts that can be modelled. The participation of “two or more parties” leads us to a “Who” concept. An agreement that is “legally enforceable” shows that there is a context for every contract i.e. a “Where” concept. The “obligations in return for certain rights” relates to a “What” concept. And finally, the parties’ commitment illustrates the existence of a “How” concept. These four general concepts represent four groups of contracting concepts. They are directly related to the contract concept (see Fig. 1).

Next, we briefly describe each of the general concepts.

**Who** – A contract has a number of *actors* associated with it. They participate in the contract establishment and enactment.

**Where** - A contract is established and enacted in a certain *context* (e.g. business, legal, etc.).

**What** - A contract has a *content* that describes the exchanged values, the processes that will take place for the exchanges and the accompanying provisions.

**How** - A contract has a set of concepts related to the contracting *processes* (e.g. discovering of a contract partner, establishment of contract, its enactment, etc.).

There are certain relations between the four groups of concepts (see Fig. 2). These relations show the tight coupling between them and the complexity of the contracting process. Contracting models and software solutions for electronic contracting should take into consideration these relations and the consequences that follow from them.
Next, we describe these relations.

Relations of **Who** to:
- **Where**. The participating actors define the contract context.
- **What**. Contracting parties and their rights and obligations are recorded in the contract content. Actors that are not contracting parties can be also included in the contract content (see Section 3.1).
- **How**. An actor plays a certain role in the contracting processes.

Relations of **Where** to:
- **Who, What and How**. The contract context affects the contract actors, the contract content, and the contracting processes. Apparently, the context can influence all aspects of the contracting and must be regarded with special attention by domain researchers and contracting software developers.

Relations of **What** to:
- **How**. The contract content specifies the contract enactment process (a “How” concept).

Relations of **How** to:
- **What**. The contract content results from the contract creation process (a “How” concept).

The next section provides a detail description of each of the four groups of concepts and their “internal relations” i.e. relations between concepts within the group and “external relations” i.e. relations to concepts that belong to other groups.
3. Detailed view of B2B electronic contracting framework

In this section, the four groups of concepts that we have identified in the previous section are described. For simplicity reasons, most of the relations between the four groups of concept outlined in Section 2 (Fig. 2) are not repeated at the detail level. In the last subsection, we illustrate that further specialization and refinement of this elaboration is possible.

3.1. Who

The “Who” concept aggregates the actors that participate in the contracting processes. At a more detailed level, we identify the following sub-concepts: a party, a mediator and an auxiliary implementor (see Fig. 3). Of course, the party concept as a basic one for the contract existence has the main role.

![Figure 3: Detail view - Who](image)

**Party**

In business-to-business relations, two or more companies want to exchange values. To explicitly state the regulations for this exchange and to protect themselves in case of violation of the negotiated conditions, the companies create a contract, which describes their mutual rights and obligations. The companies that participate in the established contract and exchange values are called parties. A contract has at least two parties. In contracting relations with an exchanged product or service for the respective financial reward, the party that offers the product (the service) is considered as value supplier and the party that offers the financial reward - value consumer (see Section 3.3, Fig. 10). In the case of barter exchange between two parties (a product /service is exchanged for an alternative product/service) the parties are both consumers and suppliers.

Throughout the contract life cycle, a party can use other actors (mediators or auxiliary implementors) that will facilitate the contract establishment or enactment. Next, these two categories are described.
**Mediator**

A mediator is a company or a public institution that facilitates the contract establishment and contract enactment. A mediator can be just a repository, a certificate authority, a financial or legal institution, a language translator, etc. A mediator can be a legal body that will act in case of contract breach or dispute between parties. As the lack of trust is a major problem in business-to-business relationships, Trusted Third Parties (TTP), performing trust management, are mediators of high importance [Kee00]. Mediators are not involved directly in the product or service delivery.

**Auxiliary Implementor**

During contract execution parties perform processes that are in accordance to the negotiated contract terms. It is often the case that a party outsources to an auxiliary implementor part of the processes to be executed. The auxiliary implementor can be mentioned in the contract, but there are separate contract relations with the auxiliary implementor.

**3.2. Where**

Every contract is established and enacted in a certain context. Different conditions can affect the contracting process. As it can be seen from Fig. 2, the contract context affects the contract content, but still it affects the contracting processes and actors. Thus, only part of the contract context is reflected in the contract content. In this paper we depict three context dimensions i.e. legal, geographical and business (see Fig. 4), which we consider as basic. Many other circumstances (e.g. social, political, etc.) can be present during the contracting process. For reasons of brevity, we do not discuss them.

![Figure 4: Detail view – Where](image_url)

**Legal**

In cross-border business-to-business contracting, parties can choose the law that will govern their contract. If it is not specified in the contract, in case of need, the appropriate jurisdiction will decide which law is applicable [ITC00]. Parties are also recommended to specify in the contract the jurisdiction that will handle the situation in case of dispute (otherwise the national court will decide if it has jurisdiction over the case). These and other legal issues position every contract in a certain legal context.
**Geographical**
In cross-border contracts the contracting parties are from different countries. This affects the contracting processes among them. For example, huge geographical distances delay communication (even electronic communication can be delayed, as one of the companies can be inactive at this time). Another example for a consequence of the geographical context of the contract relations is the foreign language of contracting. This can be a hindrance for smaller companies that are used to operate at national level.

Even for national contracts the geographical situation is important. It can reveal typical company or product characteristics for a given region. For countries with huge territories some of the cross-border aspects are also valid (e.g. distance). Further on, each country has its own national specifics that can affect the contracting process.

Geographical context of contracts can affect the contract content, its representation, contracting processes, etc. That is why, it is a concept important to be modelled in the contract context.

**Business**
According to [Wig97], contracts can be classified as classical, neoclassical and relational. The business context determines which of these types the parties will conclude. The context can be, for example, the type of the contracting companies, the industry specifics, the level of trust in a specific business situation, etc. Classical contracts usually aim a short-term service or product exchange between partners with no prior relations and with no plans for future such. Neoclassical contracts exist for a longer, but still fixed, period of time. This longer time of existence affects the content of the contract, which is usually incomplete. Relational contracts are long-term contracts and are characterized by many implicit arrangements and high level of trust that accompany them. Thus, the business context can determine the contract duration and content. This popular classification of the types of contracts is based on the contract context. For this reason, we do not model it in the contracting framework and we use it only as an illustration of the effects of the business context over other contracting concepts. Contracting relations should not be excluded from the business context. In real-life business scenarios, parties often have many contract relations, some of them depending on other contract relations. The topology of parties shows the contracting parties, which have one or several contract relations in a given business scenario. Most often, a standard (one-to-one) contracting situation is described as an example for a contracting scenario, with two parties that establish and execute a contract (see Fig. 5). For simplification reasons, we exclude the barter exchange situation and assume that the party in a contract relationship is either a consumer or a supplier.

![Figure 5: One-to-one contracting](image)

However, in business scenarios, it is often the case that one contract depends on the existence and execution of another contract. A contract management system
should implement this extended vision on contracting, thus reflecting and tracking contract dependencies. Next, we provide a description of the possible scenarios.

**Simple scenarios**

- **Chain contracting:** CompanyB establishes contracts with two parties (see Fig. 6). It is a consumer in one of the contracts and a supplier in the other. CompanyA is a consumer in the contract with CompanyB and CompanyC is a supplier in the contract with CompanyB.

![Figure 6: Chain contracting](image)

One of the contracts e.g. ContractAB (the contract established between CompanyA and CompanyB) induces the other i.e. ContractBC. Often both contracts depend on each other. A typical example of this scenario is a value chain. The chain can be prolonged if several companies in the chain perform the role of CompanyB.

- **Cyclic contracting:** In this situation CompanyA is also a supplier and CompanyC is also a consumer and both CompanyA and CompanyC can mutually satisfy their requirements, establishing ContractAC. The result could be one contract specifying the rights and obligations of all parties or several separate contracts (this situation is shown on Fig. 7). An example of this scenario is provided in [Gri97].

![Figure 7: Cyclic contracting](image)

- **One-to-many contracting:** Often CompanyA is engaged with two or more parties at the same time, being a consumer in all of the contracting relationships e.g. a manufacturer that requires different units from several suppliers (see Fig. 8). As all contracts serve to satisfy one goal of CompanyA, there is strong dependency between the contracts.
Figure 8: One-to-many contracting

Compound Scenarios

Sometimes, business scenarios are more complex and are an aggregation of several of the described simple scenarios. Examples of such scenarios are shown on Fig. 9.

3.3. What

The contract specifies in its content the rights and obligations of the contracting parties. Viewed from another point, the contract content has a core describing the exchanged values and an optional surrounding, which is a set of provisions (see Fig. 10). The exchanged value between the parties can be a product, a service, and in the case of non-barter contracts a financial reward. When a product is the exchanged value, a product specification is required. The product properties are listed in the contract. In case the exchanged value is a service, the contract contains a service description and the processes that will be performed by the service supplying party (see section 3.5, Fig. 13). Thus in this case the contract contains a specification of one or more processes. According to [Asp97], the accompanying provisions may:

- Define various terms (fix the meaning of some terms in the context of the agreement).
- Prescribe behaviour for the parties under certain circumstances (e.g. manipulation with confidential information).
- Specify procedures to be followed in certain circumstances (e.g. change of delivery times, appointment of an arbitrator to settle a dispute, etc.)
- Contain formulae used to calculate values for certain parameters (e.g. price of goods for particular periods).
- Specify conditions under which other provisions apply (e.g. general provisions).

This list is not exhaustive and gives only a notion of the role of the provisions in the contract content.

Depending on the contract context, contracts are classified as complete or incomplete [Wig97]. Complete contracts contain exhaustive specifications of the exchanged values and the provisions that accompany them. Incomplete contracts allow to parties unspecified behaviour, which requires higher level of trust among them. In electronic contracting, where parties are unknown and business relations are short, complete contracts will probably play dominant role.

Certainly, the contract contains information that is required for its establishment e.g. contracting parties, their addresses, signatures, contact persons, etc. This information, however, is standard and is out of the scope of this paper.

### 3.4. How

Concepts related to the “How” aspects of contracting (See Fig. 11) are most challenging for researchers. They provide possibilities for automation of the contracting process, and thus for increasing its efficiency. Next, we briefly describe these concepts and relations. We start with the contract representation and standards in this domain, proceed with contracting phases, and end with the contract structure.
Figure 11: Detail view - How

**Representation**
Until now, paper contracts had only one representation and that was the actual document manifesting the established agreement. The efforts in the direction of electronic contracting showed that besides the human-readable representation of contracts, a machine-readable representation is also necessary. This representation structures the document and allows its automated processing. Depending on the used technology (as in the paper contracts), there can be different machine-readable representations (e.g. XML based representations are offered by [ebX01], [Ros], [xCB], etc.). The need for a contract to have a separate human readable representation is caused by the human being element that still has a role in contracting. This dual representation will facilitate the gradual transition to the full automation of the contracting process [ebX01]. Contract representation might be defined by a standard. In the next paragraph is described the role of standards in the contracting processes.

**Standards**
In order to achieve interoperability between the contracting parties and processes to be speeded up, standards are set. Standards date from paper contracts e.g. INCOTERMS, UN LayoutKey [UNC], and they aim at facilitating the contract creation, especially in the international context. The use of information technologies in contracting requires standardization in new areas. Business standards are still required (e.g. for the human readable representation of an electronic contract, for the representation of business processes [ebX01], or for the predefined contract structures used in contract creation). Additionally, IT standards are required to allow automated contract processing and to provide interoperability between parties. For example, parties need communication standards to communicate with each other electronically. Further on, standards
can also define processes representation, achieving interoperability between the contracting parties.

**Phases**
The contracting process consists of several phases. In the standard situation, it passes through four phases: *informational*, *pre-contractual*, *creation*, and *enactment* phase (see Fig. 12). The context of the business situation, however, can change the contracting phases of a contract: e.g. when there were previous contracting relations or the level of trust is high, the informational and pre-contractual phase can be skipped or considerably sped up. In the information phase, parties search for partners, compare prices, require additional information on conditions, etc. In the pre-contractual phase parties check each other and provide their general provisions. A contract offer ends this phase and initiates the contract creation phase. Contract creation is a process based mostly on communication, negotiating the terms and conditions for the contract. As the process of contracting involves several parties that agree on one common goal and its subsequent achievement, *communication* between parties plays an important role in all contracting phases. As it can be seen from Figure 11, the contract content results from the contract creation phase and is used in the contract enactment phase. These relations between the “How” and “What” groups were described in section two and here they are simply refined.

![Figure 12: Contracting phases](image)

**Structure**
For the faster creation of a contract offer a party can use a partially or completely predefined contract structure. *Contract Templates* (CT) are instances of Standard Form Contracts (SFC) and provide completely defined contract structure. Parties can also start contracting by using a template that is further on elaborated and extended for the specific situation, thus the contract has partially predefined template structure and partially unique one. In all scenarios, even when the contract is created without using a predefined template, parties can use *standard contract clauses* (SCC) that speed up the contract creation process.

**3.5. Processes in detail**
In this section, we investigate the enactment and service concepts at a level of detail below 3.1 – 3.4 (see Fig. 13). At this level of abstraction, we identify the process concept that is common for the “What” and “How” groups of concepts. Next, we elaborate the processes concept. We use this elaboration to explain our future research plans (see Section 5). It also shows that each of the concepts can be further refined (e.g. contracting phases [Ang01]).
Processes
The enactment phase is a set of one or more processes that are negotiated and specified in the contract content. As it was already outlined in section 3.3, if the exchanged value is a service, the contract content will contain an elaboration on the processes to be performed for the delivery of the service. Provisions can also define process to be executed or procedures to be followed by the parties. During contract enactment phase these processes are performed by the contracting parties or by an auxiliary implementor. Usually many processes accompany the contract enactment phase. From the contracting perspective, however, only an external view of the processes performed by a contract actor is manifested [Gre01]. The level of the external process specification depends on the contracting parties. In the simplest case the contract enactment can be one process and with its end the contract enactment is completed (e.g. delivery of goods). In other, more complex cases, contract enactment is a set of processes that the parties execute, coordinate, evaluate, etc. The complexity of contracts, with many processes in the enactment phase, requires adequate support for their proper enactment. For their advanced execution, processes can use cooperation support services (CSS) e.g. monitoring. These services introduce possibilities for more efficient contract enactment and contract management.

Each process is a collection of processes elements i.e. a step and a connector between two steps [WMC99].

Messages
Throughout the process execution, messages with requests, corresponding responses, and informational messages (e.g. notification for a completed step) are exchanged. Each message requires an appropriate reaction from the receiving party. The result of a reaction of a party receiving a message could be a
corresponding response message (confirmation of the received message, answer to a query, etc) or a process initiation (could be preceded/followed by a response message).

**Time**
Processes are situated in the time dimension. A process starts when certain conditions become true. It ends in a certain time point, according to the negotiated terms. The process end point in time can be specified as a fixed time point (absolute), as a fixed period of time (relative) or as a condition dependent time point (conditional). Apparently, as messages serve process elements to exchange information they are bound also to time limits.

This section has described the contracting framework at a lower level of detail. This level of refinement allows us to use the proposed framework for the analysis of research efforts in this field and to define new research areas. The next two sections explore these issues.
4. Existing research efforts and their position in the contracting framework

The work on the transformation from paper contracting to the electronic form of contracting is based on newly emerging and quickly developing information technologies. Information technologies can be used for support of the “How” issues in contracting and that is why the research efforts concentrate on this topic. Advanced research projects, however, should pay attention not only to the “How” concepts, but should take into consideration the whole contracting framework, with its full complexity and the abundance of relations between the concepts. In this section, two research projects and a standardization process are taken as examples, and are positioned and analysed from the perspective of the described framework. They are examined according to the four general concepts discussed in Section 2. The selected projects have already established results in their research and with their completeness and richness illustrate best the use of the described framework. More information on current research projects and standardization processes is provided in [Ang01].

4.1. CrossFlow project

CrossFlow is an ESPRIT project looking into the support for cross-organizational workflow management in virtual enterprises. It was successfully completed in the end of 2000.

Who. In the CrossFlow project [Gre00], a workflow service outsourcing within a service consumer/supplier paradigm is considered (a one-to-one contracting business scenario, see Fig. 5).

Where. The business context is contracting and enactment of standard services in vertical markets. No other legal, geographical and business dimensions are regarded.

What. In the contract content are specified the exchanged service and the processes that are to be performed for the successful contract fulfilment (see Section 3.3, Fig. 10). In other words, the project focuses on the functional description of the relationship between the two organizations. Provisions can be optionally specified, but they have no machine-readable representation [Koe00].

How. Three of the contracting phases are considered, i.e., informational, creation and enactment. The pre-contractual phase from Figure 12 is not referred to explicitly. The project concentrates on the contract enactment phase. The contract is created on the base of a contract template (see Section 3.4). This results from the vertical market paradigm implied in the project. The contract representation is machine-readable. Optionally, the contract can contain a human-readable section as well. CrossFlow is one of the few projects that focus on the processes description and performance and the cooperation support services that contribute to the contract enactment (e.g. contract monitoring).

Positioned in this way in the framework, we can observe that the project does not pay attention to the legal and geographical contract context, to the second exchanged value (presumably a financial reward), and to the contract provisions. These aspects are omitted for reasons of simplicity.
4.2. Queensland University project

At Queensland University a research on electronic contracting is ongoing for several years. In consecutive publications, the contracting phases, a contracting architecture and a contract model are described.

**Who and When.** The research does not take into consideration the contract context. It concentrates on the “How” group of concepts, and more specifically on the contracting phases and the required IT support throughout these phases. By leaving out the contract context, the research work is limited to standard business scenarios.

**What and How.** The first efforts were in the description of the contracting phases (see Fig. 12) and the architecture that can support it [Mil95]. The two major contracting phases were next researched i.e. contract creation and contract enactment. The contract creation phase as first in the time dimension is discussed in [Goo00]. In this paper a contract model is presented, providing structuring of the contract content. The authors describe possible refinement of contract provisions, with respect to subsequent automatic contract enactment and monitoring. This refinement is included in the contract and extends the general contract model described in Section 3.3. Observations on the use of the contract content in the contract enactment phase are made. A possible implementation of contract monitoring (a CSS on Fig. 13) is described. In [Her01] the contract enactment phase is discussed.

The approach chosen for this research was to follow the consecutive in time contracting phases and to observe the related concepts i.e. standards and contract structure.

4.3. ebXML standardization effort

Among the many standardization initiatives, ebXML gained attention from many businesses and IT researchers and developers. It is an initiative sponsored by UN/CEFACT and OASIS and is supported by many well-known companies (Sun, IBM, OMG, SWIFT, etc.). It has strong industry supporters and globally recognized sponsors that stay behind it and will maintain and support it in the future. Further on, it is a successor of Open-EDI and EDI, which is the currently used solution for exchange of electronic data among companies.

**Who, When and What.** The goal of ebXML is broad - to provide a global solution for every company to exchange electronic business information. Thus, ebXML provides standards for many of the “How” concepts, considering all possible actors, contexts and values to be exchanged.

**How.** ebXML supports all phases (see Fig. 12) of the contracting cycle, but does not pay specific attention to the pre-contractual and enactment phases, as this is out of its scope. In the informational phase the parties produce the contract offer, called Collaboration Protocol Profile (CPP). The electronic contract in ebXML is called Collaboration Protocol Agreement (CPA) and is derived from the intersection of the CPPs of the parties. In ebXML, a repository should facilitate the information and contract creation phases by storing the parties’ profiles, data and process definitions to be used by the parties for the offer and contract creation. The repository can serve also for storing contract templates (see Fig. 11).

Under specification are common business processes that should enable parties to
use them directly in their contracting relations. ebXML has also a messaging service that handles the communication between the parties. ebXML requires the business processes description to be both human-readable and machine-readable. The machine-readable representation shall be expressible in a XML syntax.

ebXML provides a methodology for business process specification aiming to achieve in this way interoperability between different parties on a process specification and execution level. It is, however, not concerned with the enactment phase. From the framework perspective, it can be noticed that this leads to omitting examining the execution of the specified processes and the accompanying cooperation supporting services.
5. Future research work

Apparently, identifying solutions for electronic contracting as a substitution for paper contracting is the primary goal for a future research work. However, it is interesting, how contracting can be improved regarding not only efficiency and time aspects, but by adding to it new functionalities as well. Thus, the new opportunities that are revealed by the implementation of the information technologies are another research topic. An example of the new business opportunities is micro-contracting.

Structuring of the contract content and its extension with additional information can lead to the automation of the contract enactment. This in turn provides opportunities for the elaboration of contract supporting services (CSS) that will improve efficiency and will introduce new possibilities for the contracting parties. Contract monitoring and sending of notification messages to contracting actors are examples of such services. The CrossFlow project [Gre00] has already performed a pilot research on enactment services. Other services are still to be investigated and specified. Their requirements over the contracting process and the contracting content must be also researched.

The goal of our future research is modelling the contracting processes and contract content and defining a contract enactment architecture that will allow sophisticated contract enactment, with flexible cooperation support services. Mapping between the enactment architecture and the contracting processes is to be researched.

The results provided in this paper will be used in the future modelling work. The models to be built should take into consideration the tight coupling between the contracting concepts from the four concept groups identified in this paper.
6. Conclusion

In this paper, we have described a business-to-business contracting framework. For its better understanding, it is presented on different levels of abstraction. The framework is used to position its research activities in this area. From the perspective of the defined framework these activities, their goals and related work are commented. Research efforts concentrate on the “How” aspects of electronic contracting, predominantly on the informational and contractual phases, often omitting the contract context and some contract content elements (e.g., contract provisions). Contract enactment is the last contracting phase in the time dimension. A complete investigation of contract enactment aspects requires research into the preceding phases as well. For this reason, few projects concentrate on it and the services that accompany it.

The framework allows observing what research areas exist and how they are situated in the overall picture of the contracting process. This work gives a broad view over the contracting area and can be used as a reference in any subsequent work. It defines a broad dictionary of terms and relations and can improve mutual understanding in this research area.

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