

# CONEVTO: Contract Evaluation Tool for Software and Services Acquisition Organizations\*

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## Abstract

Contracts play an important role during the period of time that the outsourcing relationship is in effect. If an organization decides to acquire software and services products, the contract is a fundamental mechanism to ensure that expectations are realized. This paper describes a contract evaluation tool for Software and Services Acquisition Organizations, to achieve this, a contract model and an evaluation method through the tool have been developed. This tool allows the acquirer to know the coverage level related to the clauses of a contract in order to select or reject it. Besides, a case study is presented.

## Keywords

Contracts, Contract model, Evaluation method, Contract evaluation tool, Acquisition.

# 1 Introduction

Outsourcing as a concept was accepted in the 1980s and is still used today to describe "a contractual relationship with a specialized outside service provider for work traditionally done in-house" [7]. Since then the Information Technology (IT) services outsourcing market has grown rapidly every year [4, 10, 14, 15, 20, 21, 28].

However, while the outsourcing is experiencing a considerable growth, the number of reported cases of failure is also increasing [14]. According to a study from the Software Engineering Institute (SEI) [25], 20 to 25 percent of IT acquisition projects fail within two years and 50 percent fail within five years.

Mismanagement, inability to articulate customer needs, poor requirements definition, inadequate provider selection and contracting processes, uncontrolled requirements changes and important gaps in the contracts are some of the factors that contribute to project failure.

The majority of project failures could be avoided if the acquirer learns how to prepare or evaluate properly the contracts [25].

Contracts are [22] "a framework which almost never accurately indicates real working relations, but which affords: 1) a rough indication around which such relations vary, 2) an occasional guide in cases of doubt, and 3) a norm of ultimate appeal when the relations cease in fact to work". Moreover, a contract is considered to be the only means to guarantee the expected achievement, and also the primary means to explain the acquirer to provider relationship [12, 16].

Usually the product or service to be exchanged is specified in a contract, in a way that the acquirer and the provider know what they can expect and what is expected of them, the disagree resolution mechanisms, the rules of the engagement, the financial exchanges and the change management procedures [13,18].

An important principle for IT outsourcing was formulated by Beuten and Ribers [3]: "If a company decides to outsource, the contract is the only mechanism to ensure that expectations are achieved. It constitutes the foundation for transferring responsibility and includes the agreements that form the basis for executing the IT service".

The purpose of this paper is to present a contract evaluation tool (CONEVTO) that allows the acquirer to know the coverage level related to the clauses in order to select or reject it.

This paper is organized as follows. Section 2 shows a brief description of the framework tool, this is the contract model (structure, categories and its main clauses and the evaluation method). Section 3 describes the tool for evaluating contracts called CONEVTO. Section 4 addresses a case study. And finally, Section 5 covers the conclusions.

## 2 Framework Tool

A contract model for software and services acquisition and a method for evaluating contracts in accordance to the proposed model have been established. A tool to automate the method has been developed.

### 2.1 Contract Model

This model establishes the main components and clauses to be included in a contract grouped in 7 categories. Each category contains the clauses which are related to the same subject (see Figure 1).

A clause is a set of components that are related among them. A component is a basic activity that must be included within a contract. To establish the contract model, the following steps were developed:

- **Execute a systematic review:** The systematic reviews apply an explicit and rigorous method to identify, critically appraise, and then synthesize relevant studies in the published research, using quantitative methods to assess work fields from different studies [13].  
The search for issues related to outsourcing contracts was based: 1) on the work of Biochini et al., and Kitchenham et al., [4, 19] that proposed a protocol for systematic review, 2) on the guidelines proposed by Biochini et al., and Goo et al., [4, 12] and 3) on the forms of extracting information from software engineering papers developed by Jens et al., [15] and other similar systematic reviews. As a result of the systematic review, 31 primary studies were found. These studies refer to make important considerations about Outsourcing Contracts, but not all of them refer to a definition of the structure or clauses in an Outsourcing Contract.
- **Discover the similarity among clauses:** The similarity is the correspondence among the clauses or information provided by the authors into the 31 primary studies. The similarity allows us to establish what clauses and information within the clauses should be considered in the definition of an acquisition contract. 20 clauses were obtained.
- **Identify the Categories:** Further analysis was conducted to gain an in-depth understanding of the twenty obtained clauses. This analysis allowed us to see that some clauses are related to the same subject and it was possible to group them into 7 categories.

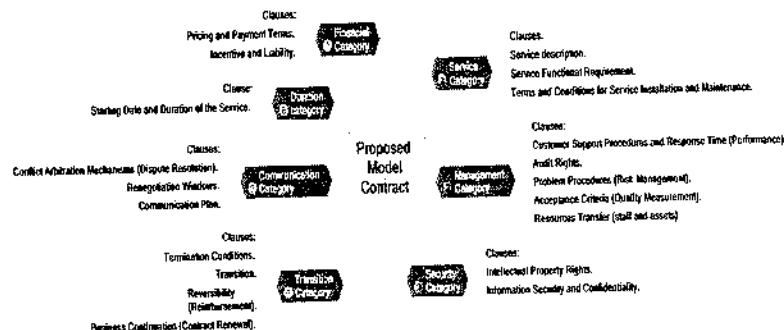


Figure 1. The main clauses and categories in proposed contract model

The legal regulations were not considered in establishing these categories because they are different in each country and proposed sector.

Figure 2 shows the contract model, structured into seven categories (Figure 1), and each category has several clauses which contain a number of components. The components are the elementary information found in the clauses.

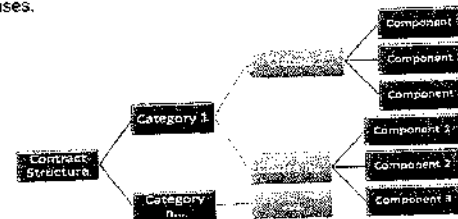


Figure 2. The structure of the contract

## 2.2 Evaluation Method

This method seeks to obtain the coverage level of the clauses and categories of a contract. Two evaluation criteria have been defined to obtain the coverage level:

- Evaluation Criterion 1 based on the contract model.
- Evaluation Criteria 2 based on the business goals.

### 2.2.1 Evaluation Criterion 1 based on the contract model

This evaluation criterion seeks to calculate the coverage level of each clause, category and contract based on the sum of the percentages achieved by each component in the proposed model contract. To achieve this, the following steps are established.

#### 2.2.1.1 Calculate the Percentage

The same weight is assigned to all the categories, the clauses in these categories and components within these clauses to obtain the percentage value for each component, clause and category in the proposed contract model. For the overall contract, 100% is divided by the total number of categories, and this is the weight assigned to each. Then, 100% is divided by the total of clauses in the category, and this is the weight assigned to each clause. Finally, 100% is divided by the total components in the clause, and this is the weight assigned to each component.

**Formula 1:**

$$\text{Porcentaje } X_i = 100/nX_i$$

Where  $nX_i$ : is the number of components, clauses or categories of the element, component, clause or category  $X_i$ , in a contract

#### 2.2.1.2 Identification the total percentage

Once the percentage of each component, clause and category is assigned, the total percentage by each clause, category and contract is calculated. Formula 2 is used, which calculate the percentage value of each component covered and the value obtained is multiplied by the percentage assigned in formula 1 to obtain the clause coverage. Formula 3 is used, which calculate the percentage value of each clause covered and the value obtained is multiplied by the percentage assigned in formula 1 to obtain the category and finally, the formula 4 is used to obtain the contract coverage. By adding the results obtained and multiplying each clause coverage by its weight corresponding to the clauses of that category, we obtain the category coverage. For the categories, we obtain the coverage of the contract in a similar manner.

**Formula 2:**

$$X = \% \text{ Coverage by Clause} = \left( \sum_{i=\text{component}}^{\text{Component by Clause}} i = \text{yes} \right) (\text{Clause} = \text{Formula 1})$$

**Formula 3:**

$$Y = \% \text{ Coverage by Category} = \left( \sum_{i=\text{clause}}^{\text{Clauses by Category}} X \right) (\text{Category} = \text{Formula 1})$$

**Formula 4:**

$$Z = \% \text{ Coverage by contract} = \sum_{i=\text{category}}^{\text{Categories by Contract}} Y$$

### 2.2.2 Evaluation Criteria 2 based on the business goals

This method seeks to identify the coverage level of the clause, category and contract based on the weight given to each contract model component, clause and category according to the business goals. In other words, the acquirer will assign the percentage that reflects the degree of importance of each component, clause and category.

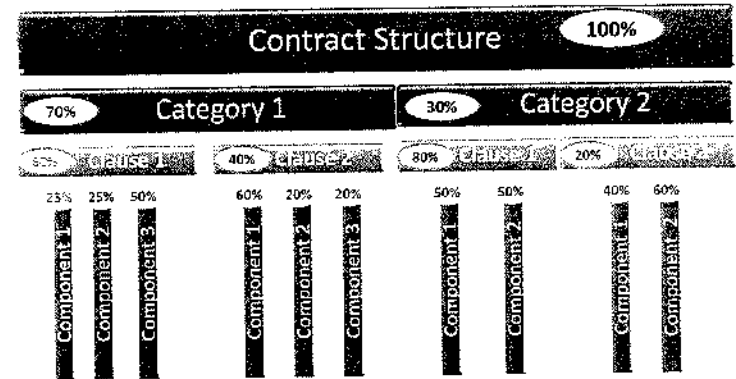


Figure 3. Assignment of percentage based on business goals

As Figure 3 shows, the percentage established in each category represents 100% distributed among the clauses. As in the category, the percentage established in each clause represents 100% distributed among the components in each clause.

### 2.2.3 Coverage Criteria

To evaluate the obtained values by using formulas 1 and 2, the criteria were created to define the type of coverage. If the value is equal to 100, the coverage (clause, category or contract) is considered complete. If the value is greater than 75 and less than 100, the coverage (clause, category or contract) is considered large and so on, as Figure 4 shows.

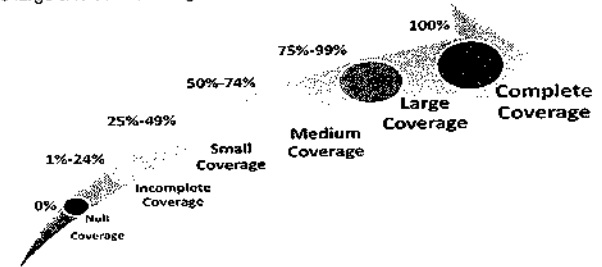


Figure 4. Coverage Criteria

### 3 Contract Evaluation Tool (CONEVTO)

This section describes the Contract Evaluation Tool (CONEVTO) which allows recording and getting automatically the contract coverage level. This tool has been developed taking into account the previous contract model and evaluation method. This tool has been developed in a Microsoft excel sheet.

The contract is analyzed manually to check if it contains the components defined in the contract model. If a component is found, it is highlighted and a sticky note is allocated for writing the component name (see Figure 5).

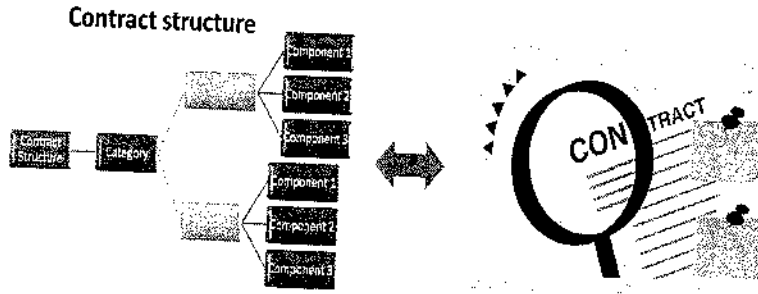


Figure 5. Example of Contract Analysis

Once components are manually detected within the contract content, the following steps in the tool are performed: information recording, percentage assigning and finally getting the results.

#### 3.1 Information recording

In order to evaluate contracts, the contract elements (categories, clauses and components) are organized in a table according to the contract structure defined in section 2.1.

Table 1. Organization of Contract elements

Category	Clause	Component	Contract 1 Found Component
Services	Services Description	Functional requirements	YES
		Schedule	YES
		Rules	YES
		Assignments roles	YES
		Technical information on functionality	YES
		Technical information on capacity	NO
		Technical information on quality	NO
		Technical information on the interface	YES
		Capacity Criteria	NO
		Quality Criteria	NO

As Table 1 shows, in order to record the components that were found in the contract content, the "Found Component" column is selected (choosing YES/NO). In this way, the clause, category or overall contract coverage level percentage based on the evaluation criterion 1 (based on the model contract) is obtained. Besides, to carry out the evaluation criterion 2 (based on business objectives) these recorded components are used.

#### 3.2 Percentage assigning

In order to perform the evaluation criterion 2 (based on business objectives) the percentage (weight) that reflects the importance degree for each category, clause and component is established (see Table 2).

Table 2. Organization of Contract elements

Service Category	Clause	Component	Contract 1
	Clause 1	Component 1	10.00%
		Component 2	40.00%
		Component 3	20.00%
		Component 4	5.00%
		Component 5	10.00%
		Component 6	20.00%
		Component 7	10.00%
		Component 8	5.00%
		Component 9	10.00%
		Component 10	5.00%
			100.00%
	Clause 2	Component 1	30.00%
		Component 2	30.00%
		Component 3	10.00%
		Component 4	20.00%
		Component 5	10.00%
			100.00%
	Clause 3	Component 1	30.00%
		Component 2	30.00%
			100.00%

Table 2 shows the options of the Excel sheet to assign the weight given for each model category, clause and components.

#### 3.3 Getting results

Once the information is recorded as shown in Tables 1 and 2 is recorded, the tool shows the coverage level results of the evaluation criteria 1 and 2 through charts. According to these criteria, the charts show the percentages each clause, category and overall contract achieved (see Figure 6).

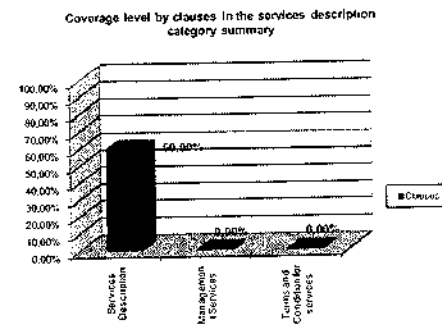


Figure 6. Example of the coverage level by clauses

## 4 Case study

In order to confirm the feasibility of the contract evaluation tool four contracts were evaluated.

The outsourcing contracts analyzed are from Spanish companies related to the IT area. The company related to contract 1 is a company with over 20 years of experience in the market for computers and telecommunications. Their commitment is to provide their acquirers a comprehensive and timely solution and support of a real added value.

The company related to contract 3, is a small company that develop software projects (applications to web, mobiles and Windows systems) and provide assistance support (process and product audit, business analysis and requirements specification).

The company related to contracts 2 and 4 is a multinational consulting firm that offers its acquirers comprehensive business solutions covering all aspects of the value chain, from business strategy to systems implementation. They are active in the sectors of Banking, Healthcare, Industry, Insurance, Media, Public Sector, Telecom and Utilities.

The contracts are analyzed manually to check if they included the components for each clause then the found components are recorded in the contract evaluation tool described in section 4.

Figure 7 shows the overall coverage of the contracts.

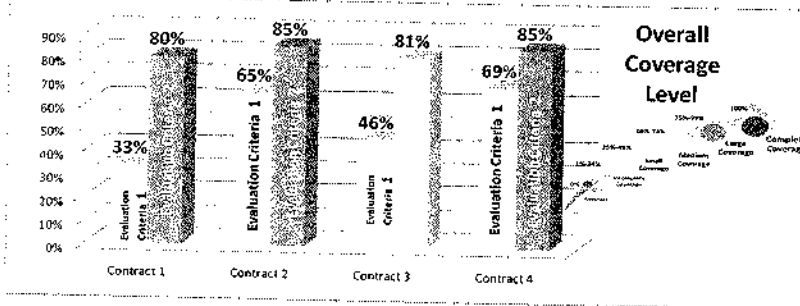


Figure 7. Overall coverage by each contract

On the one hand, according to the evaluation criterion 1, the Contracts 1 and 3 has small coverage, with 33% and 46%, respectively of overall coverage level. Moreover they lack information in most of the clauses defined in the proposed contract model. Contracts 2 and 4 have a medium coverage level (65% and 69%, respectively). Contracts 2 and 4 have higher coverage level in the 4 categories (services, management, financial and duration) than the contracts 1 and 3. They can be considered well defined according to the proposed contract model.

On the other hand, according to the evaluation criterion 2 (based on business goals), the Contracts 1, 2, 3 and 4 have a large coverage (80%, 85%, 81% and 85% respectively).

The results obtained with the evaluation criterion 1 for the contracts 1 and 3 confirmed: a) poor clauses definition, b) future problems between the acquirer and provider related to the contract 1 which was confirmed later by a lawsuit between them.

The results obtained with the evaluation criterion 2 indicated that the most of the business goals of the acquirer organization are covered.

The results obtained with the evaluation criteria 1 and 2 in the contracts 2 and 4 indicated a large coverage. However, the acquirer should make a contract review to include clauses in order to improve the overall contract, which was confirmed later in the case of the contract 2 having a renegotiation with the provider.

## 5 Conclusions

CONEVTO allows acquirers to evaluate the contract coverage level in order to select the best contract for a future acquisition. With the established evaluation criteria in the evaluation method, it is possible to determine the coverage in terms of the contract model and the weighting given for each contract model component. Moreover, the contract model provides a guide, in order to establish which clauses must be included in the contract proposal submitted to potential acquirers.

The evaluation method, the contract model, as well as the contract evaluation tool are confirmed by the case study in section 4. This case study is an evidence of the adequacy of the CONEVTO.

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