

A Context-aware Inter-organizational Collaboration Model Applied to International Trade¹

Jie Jiang, Virginia Dignum, Yao-Hua Tan, Sietse Overbeek

Delft University of Technology, 2628 BX Delft, the Netherlands

1 Introduction

With the development of international trade, collaborative organizations are involved in the value chain to accomplish their cooperative goals. Business organizations try to operate as efficiently as possible while governmental organizations have to regulate business performance. Governmental regulation of multi-organization alliances is not only complex but also time-consuming. Hence, interactions between business and governmental organizations is changing from monolithic control by regulatory authorities to distributed environments where private enterprises are free to regulate their affairs within the boundaries set by the regulatory authorities. The former way of controlling is called *direct control* and the latter is named *self-regulation*. In order to determine the effects and possibilities of different approaches for direct control and self-regulation, a careful analysis is required to make sure that integrated business processes are performed in a secure and smooth way. To this end, based on an existing agent based organization modeling approach OperA [1], we propose a framework that enables modeling and comparisons between different inter-organizational collaborative approaches.

2 A Context-aware Inter-organizational Collaboration Model

We first illustrate several concepts extended from OperA. A *role* is a set of objectives which indicate individual responsibility. To facilitate multi-level modeling from abstract to concrete, we define two kinds of roles: (1) atomic roles with relatively general objectives provide a macro-level understanding of what tasks will be carried out, and (2) composite roles with more details on how to accomplish the objectives through lower level organizations. An *organization* is a set of interdependent roles. There is only one top level organization marked as *org₀* in each model and all the other organizations are derived from composite roles.

To provide actors with an evolutionary understanding of their responsibilities, a modeling process for organizational interactions is depicted in Fig. 1. First, a general specification is constructed to express the common objectives of inter-organizational collaborations in an abstract way. Then according to different contexts, the general specification is contextualized into different contextual specifications which describe

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the interactive relationships in a more detailed way and present the differences between different collaborative situations. Contextualization transforms some of the atomic roles to composite roles which contain more information on how to regulate the actors' behavior. Finally, the whole set of contextual specifications is transformed into different operational specifications which depict complete pictures of an inter-organizational collaboration model in different executable situations. That is, actors will match their status with the contexts in contextual specifications.

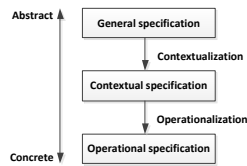
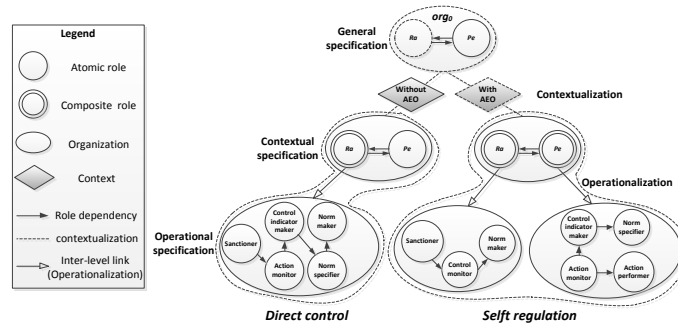


Fig. 2 shows an example to explain how *Regulatory authorities (Ra)* and *Private enterprise (Pe)* interact in two scenarios, direct control and self-regulation by a specific case of AEO [2] in international trade. At the top, *Ra* and *Pe* have the same interactive relationships at an abstract level. Contextualization generates concrete regulations according to different situations. In the direct control context (without AEO), *Ra* has to do most of the regulative tasks specifying by the five sub roles in the lower level organization. While in the self-regulation context (with AEO), some of the tasks shift to *Pe*. Each operational specification contains a complete description of organizational interactions associated with its context, which is an executable specification that can be seen as the assembling processes of different agents.



The proposed model describes inter-organizational interactions from abstract attitudes to concrete implementation, which supports users to understand their models during the procedure and reflect their design patterns even at the final operational stage. Moreover, it provides a potential solution to deal with the communication problems between multi-agents that jointly create shared norms.

References

1. Dignum, M.V.: A model for organizational interaction: based on agents, founded in logic. Doctoral Thesis. DSpace at Utrecht University (2004)
2. European Commission: AEO Guidelines, http://ec.europa.eu/taxation_customs/customs/