Chapter 15

Simulation for Business Engineering of Electronic Markets

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Developments in Information and Communication Technology (ICT) enable information systems to intermediate between sellers and buyers in electronic markets (e-markets). A business engineering methodology can be of help to design and develop e-markets by providing insight into current market and potential e-market structures, matching mechanisms and processes, and by evaluating the implications of e-markets. In this chapter, a first concept of an interactive, discrete-event, agent-based simulation approach for the analyses and design of e-markets is presented and evaluated.

INTRODUCTION

As a result of technological developments in the field of ICT e-markets are emerging as the new way of doing business. E-markets can be characterized by the exchange of data, between information systems of buying, selling and other facilitating organizations, over telecommunication networks to accomplish and execute market transactions. The core of e-markets is the coordination of the various interdependent activities performed by autonomous organizations during the information, agreement and settlement phases (Lindemann and Schmid, 1999). Coordination theory provides a multi-disciplinary approach to the study of process (Malone & Crowston, 1994). In a coordination approach the design of processes is dependent on the coordination mechanisms that manages the dependencies between tasks.

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E-markets can use a large variety of coordination mechanisms and market structures to coordinate demand and supply, often categorized as cooperative or competitive (Guttman & Maes, 1998). A taxonomy of market structures based on how traders search out their counterparts is shown in Figure 1 (Garbade, 1982). The design and development of e-markets meet with a number of pitfalls and bottlenecks (Janssen, 1998), including:

- which mechanisms and structures are most beneficial for which situations is unclear,
- lack of insight into the processes of organizations,
- unclear implications of coordination mechanisms
- uncertainty about the added value of e-markets,
- a lack of trust, and
- different goals and interests of stakeholders.

As a result there is a need for a business engineering methodology that can support the decisions-making processes of organizations by providing insight into, and by evaluating the implications of possible structures and mechanisms. The goal of this chapter is to derive and evaluate a business engineering approach for e-markets.
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