

The expectations which are associated to agent-based electronic commerce currently exceed the abilities of existing systems. While agent-based systems have been subject to scientific investigation for more than a decade, and while a few success stories have been written during that period, the break-through for agent-based electronic commerce has yet to come. It is still not much more than a vision that millions of independent digital agents populate the Internet or corporate intranets, acting and interacting on behalf of their owners or even on their own command. In such agent-populated environments of electronic commerce new economic laws are to be established. Psychological patterns and social conventions usually associated to humans and human societies will not necessarily mean very much to digital agents. On the other hand, digital agents have the potential to increase market efficiency and liquidity. In well-structured decision-making scenarios, such as day trading, travel booking, spot markets, and commodity shopping, digital agents generally act quicker and are better aware of changes and resource limitations than humans.

This issue of *Electronic Markets* focuses on three important aspects of agent-based electronic commerce: The trading agent competition; the analysis of business models for agent technology; and the topic of multilateral negotiation and multi-attribute preference modeling. The concept of a digital agent

in electronic commerce tries to grasp key elements of humans acting in economic environments. Like humans in the sense of an "homo oeconomicus", digital agents are required to be autonomous, goal-directed, rational, and persistent. It is still an open research issue how resource and psychological limitations of human beings can be mapped into computational / functional agent models. The first attempts to apply agent-based technologies to economic problems were clearly driven by the rise of the Internet.

These attempts mostly focused on the contracting phase in electronic marketplaces, where selling agents and buying agents negotiate prices according to their owners' preferences. Trade efficiency depends on market liquidity. Hence, buyers have an interest to get a faster and better access to more sellers. Sellers in turn intend to reach more buyers. The agent metaphor and corresponding technologies provide means to establish new large-scale and small-scale marketplaces. The information phase, which proceeds the contracting phase, is only touched by few but seminal publications. Other phases of electronic commerce, such as signaling and settlement have been hardly investigated so far.

Despite these shortcomings it is apparent that introduction of agent-based systems in real economic environments will change the way economic transactions and communications are done. Humans need to learn and understand how to use agents for their purposes. Therefore researchers need to develop means to make interactions between humans and agents easier and more enjoyable, thus

allowing humans to understand the languages and logics of agents in order to use them for their needs and to build trusted relationships. The ability to easily instruct an agent and delegate tasks to it is key for agent technology to enter economic environments. On the one hand, agents will extend humans economic reach; on the other they can protect them from different types of overloads. This will influence how companies and governments interact with market participants and inhabitants. Agents can act as their digital representatives (avatars). This, however, will considerably impact legal, political, and economic frameworks. From this point of view it becomes clear that agent-based electronic commerce is about to enter our existing worlds, even though this process is slow.

This special issue highlights a number of key topics for agent-based electronic commerce. They give directions how the computational concept of agent-based systems can grow together with established economic concepts. As a final goal this might become the basis for a new computational theory of economics. How agents will affect economic systems is part of future intensive experimental work and field studies.