

Business-to-Business e-Commerce: Experiments with Intermediaries in the PC industry

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Business-to-business e-commerce is the new battleground for firms in the PC industry. Dell Computers pioneered the direct-sales business model that every other PC maker is trying to emulate, but with limited success. In this disintermediated model, an OEM abandons distributors, wholesalers, and retailers and sells directly to the end customer. There are several advantages to this model. First, by building computers to order, the company economizes inventory and prevents the depreciation due to technological obsolescence. Second, it allows the OEM to be paid before it builds computers and pays its suppliers. Third, it allows the OEM to capture the lucrative add-on services such as warranties, financing, upgrades, and portal services.

So, what prevents the other PC makers from adopting the direct model? With the traditional business model OEMs developed a web of relationships with the channel firms, who do the assembly and supply to the final customers. The problem is that the latter "own" the customers, and provide the profitable parts of the computer value chain - the add-ons. By going direct, a traditional computer company runs the risk of alienating the channel. If that happens, the intermediary can set up competing operations by teaming up with generic PC makers.

This paper analyzes the evolution of intermediaries in the PC industry using a controlled experiment in the synthetic environment for analysis and simulation (SEAS). SEAS is a distributed, interactive, real-time synthetic economy populated with human and artificial agents. It allows realistic representations of markets and economies at any level of detail. Why is this important? In a provocative paper, Rust (1996, 1998) has argued that one of the reasons inhibiting the progress of Economics (and by implication, Management) is the "toy" character of the models used. Each researcher essentially builds models from scratch, thereby preventing modularity and the efficient accumulation of scientific knowledge. SEAS embodies these ideas. However, Rust's paradigm has a significant limitation. We simply do not have enough accumulated knowledge to program even moderately complex human behavior into artificial agents. Clearly human agents alone can make complex decisions at this stage in our understanding. It is a crucial feature of SEAS that it incorporates human agents and their attendant decision support systems in an effective way. The artificial agents represent decision-makers who engage in relatively non-strategic decision making, such as consumers in large markets. Human agents, on the other hand, represent decision-makers such as firms and governments that engage in strategic interaction.

The experiment design is as follows:

1. In the SEAS environment, we create a synthetic economy representing the PC industry and populate it with three classes of agents – computer makers, channels, and business customers.
2. We allow human agents to play as computer makers and channels while thousands of artificial agents perform the roles of business customers.
3. We divide the business customers into three segments – small, medium, and large. Each of these segments has two sub-segments -- the "self-integrator" segment and "need help" segment. We calibrate the behavior of the artificial agents to closely resemble that of the segment they represent in the "real economy."
4. There are two classes of products sold in the economy – goods and services. The goods sold in the market are the base units and option loads. Each of these goods has five levels representing different five different qualities. There are four classes of services – warranty, implementation, financing, and portal.
5. Firms can make several different types of investments to improve their performance.

In this experimental setting, we analyze a variety of strategies such as: move slowly to direct market, move fast, sell strip down base units, sell rich base units, sell to a target market, expand footprint and bundle service.