ON THE FINANCIAL IMPLICATIONS OF EXPLOITATION VS. EXPLORATION IN AMBIDEXTROUS ORGANIZATIONS – AN INVESTIGATION WITH AGENT BASED MODEL

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ABSTRACT

Ambidextrous organizations are firms that are able to balance its focus on exploitation of their current knowledge about the markets it serves vs. its focus on exploration, which is directed at enhancing knowledge about either current markets or new market opportunities. This paper uses an agent based model to investigate the financial implications of exploitation vs. exploration in the face of uncertainty and under changing customers' preferences. Preliminary results suggest that a firm that focuses on exploiting their current knowledge performs better when customers' preferences are fixed. However, when customers' preferences fluctuate randomly over time, a firm that employs moderate exploration tends to perform better.

THE MODEL

We use an agent based model (ABM) to investigate the evolutionary potentials of ambidextrous firms. In a nut shell, the ABM approach is an attempt to simulate real-world phenomena using models that are built from the microscopic actions and interactions of individual agents. An agent-based model is a form of artificial life simulation. In business applications, an agent-based model is typically built with institutional features (or constraints) that mimic those of the real markets. Living in the artificial market are autonomous artificial agents that act like real-life participants in a real market. As in a real market, these artificial agents are heterogeneous, have bounded rationality, and do not have complete information about the issues they confront. Clearly, these artificial agents are NOT endowed with the superhuman abilities that are commonly assumed in analytical neoclassical economic models. But just like their counterparts in the real market, these artificial agents have the ability not only to learn but also to create new knowledge based on their past experience and information available to them.

Since our focus is to investigate the financial implications of the firms' decision making rules as these firms evolve and learn from their interactions as they compete with each other for sales, we model the decision rules as collections of fuzzy if-then rules. These rules govern how each firm prices a product, and makes decision on the product attribute and the level of production. Further, the process in which useful rules of thumb are distilled from their experience is modeled with a genetic algorithm. A genetic algorithm is a computer program that is designed to mimic how genes evolve through a process of crossovers and mutations. In our case, we treat the rules of thumbs as if they are genes and we crossover and mutate these rules to produce better rules. Since crossover of the rules aims to refine the rules through different combination of existing rules and it does not introduce new information, we associate crossover with exploitation. On the contrary, we associate mutation with exploration because new information is introduced to replace existing information in the event of a mutation.