The Contribution of Social Simulation in the Advancement of Marketing Issues and Challenges

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ABSTRACT

For some years now, marketers have been praising for a more holistic approach of a company’s marketing efforts across all areas. However, traditional models show serious limitations to address the complexities of managing all of a company’s touch points with a customer. Agent-based modeling (ABM) has opened the door to explore the unfolding behaviors and outputs of an increasingly connected and interactive marketplace. The contribution of this paper is twofold. On the one hand, it provides researchers with a state-of-the-art repository for this strand of research. This facilitates the identification of relevant gaps in the literature and future research avenues. Second, it contributes to assess the way ABM has improved our understanding of the dynamics of markets and its participants when marketing strategies are implemented. Both goals aim at showing the various ways that social simulation has expanded our understanding of marketing and the future research opportunities for both, marketing and computer scientists.

Keywords: Agent-Based, Complexity, Consumer, Emergence, Marketing, Marketing Strategy, Social Simulation, Social Systems

INTRODUCTION

The marketplace is a complex social system due to the interaction of multiple individual agents (i.e., consumers, firms or distributors) pursuing very different objectives. In addition, agents in a marketplace respond distinctly to a particular incentive or situation. For example, a particular marketing message could raise brand awareness among some people while remain innocuous among others. In turn, this gives rise to the emergence of collective behaviors, such as the development of fads, the viral adoption of products and services, or even crowdsourcing behaviors. However, the emergence of these aggregate behaviors is often overlooked by traditional empirical techniques.

Traditional modeling approaches, such as regression-based or structural-equation modeling, present important limitations when it comes to study complex business phenomena. As North et al. (2010) point out, one important
limitation relates to the constrained number of factors these approaches can incorporate as well as the level of detail they can accommodate. Kiesling et al. (2012) highlight that some of these traditional methodologies are not properly designed to account for the pervasive effect of interaction and community-building on an agent’s behavior. They argue this limitation significantly constraints the utility of traditional approaches to address policy implementation (what-if) questions, which are quite frequent in managerial decisions. Finally, these traditional techniques fail to explicitly incorporate consumers’ heterogeneity and the complexity behind social phenomena (North et al., 2010; Kiesling et al., 2012); two features that are bound to be present in every marketing interaction between two or more agents.

It is until recently that marketing scholars started to explore the complexities of marketplaces by applying social simulation approaches. This rising interest is motivated by the possibility, opened by these simulation models, to more effectively monitor and evaluate the outcomes of marketing actions and policies. In particular, agent-based modeling (ABM) is one of the most popular simulation approaches applied by marketing scholars thanks to its ground-up or bottom-up nature. This is because, in ABM, the group-level structures emerge as a result of the simulation, based on a population of heterogeneous agents and the operational rules of their interactions. In other words, the model is defined at the individual or micro-level, and the representation of these features in a simulation result in the emergence of collective or macro-level phenomena. In more traditional linear approaches, the emergence of such aggregate behaviors must be explicitly accounted for in the model and hence, not a result of the model itself. This significantly limits the traditional scope’s ability to address the non-linearity of effects that certain factors have, in the presence of different contexts, on an agent’s behavior. By favoring complexity over simplicity, ABM is able to capture and simulate this hierarchical system of interactions between the individual elements and its aggregate structures.

In marketing, examples where the presence of this non-linearity of effects exists can be found abundantly. For example, when a marketer is considering launching a new product or brand, one of the key criteria used by decision-makers is the speed of adoption this product will have in the market. This determines, in turn, a myriad of other marketing variables such as the stock level needed to meet the demand or the time it will take to recover the funds invested in the launch. The rate of penetration of a new market offering is highly influenced by the intrinsic features of the population it will be introduced to. This encompasses not only the distinct behaviors of each individual member of this population but also the collective or aggregate behaviors emerging from the interaction among them. Examples of collective behaviors range from word-of-mouth phenomena in the diffusion of messages or fashions to group-identification effects, such as brand communities, in consumer’s behaviors.

Much effort is being put by companies and marketing practitioners to integrate all business areas and departments in the achievement of marketing objectives. This concept has been named holistic marketing. It means that a company must leverage all its resources to ensure the customer experiences a 360-degree interaction through all possible points-of-contact. This entails the consistency of policies and actions across all of a firm’s functional areas, which implies the coordination among employees not only at the individual but also at the group-level. Effective application of a holistic marketing strategy heavily relies in the understanding of how incentives have distinct outcomes at inter and intra departmental levels. The interdependence of multiple layers of aggregate structures with the heterogeneous nature of individual agents requires the explicit consideration of non-linear effects brought by