

PROJECTING THE POTENTIAL

Using Agent-Based Modeling to Model Possible Outcomes of Marketing Decisions

by Robert “Mick” McWilliams, PhD

At LRW, we are continually asking ourselves “so what?” Usually, we’re actually asking, “so, based on the results of the research, *what* should our client do because of these results?” How often have you asked yourself these questions when trying to increase trial, market share, or revenue of a brand, product, or portfolio of products?

- How many products should you have in your portfolio?
- How should the products in your portfolio differ in their features and how should they be priced?
- Which of the brand’s strengths should be emphasized?

Every marketer asks themselves these questions and, of course, many methods can be employed to help answer these questions. One of the most powerful methods is simulation modeling. A well designed



simulation modeling tool helps compare potential outcomes from various product design and marketing options.

For example, a product designer can input different possible product design options into a modeling tool and get an idea of how

that specific product with those specific features will compete in the current marketplace. Experimenting with different product design inputs enables the product planner to identify the most competitively promising product designs.

A new tool in a marketer's toolbox is called "Agent-based simulation modeling" – ABM for short – and it offers the potential to significantly extend the capabilities of simulation modeling. ABM has multiple advantages as compared to more typical simulation modeling approaches.

HOW IS AGENT-BASED MODELING BETTER THAN CURRENT SIMULATION MODELING TECHNIQUES?

ABM can deliver more realistically forward-looking decision support. Typical simulation modeling approaches provide what is basically a single "best guess" of modeled outcomes. Agent-based modeling provides more realistically forward looking planning support tools because it can predict the relative probabilities of multiple potential planning scenario outcomes.

ABM can model the "complex interactivity" in the marketplace. For example, ABM can model the effects of real-world consumer interactions, such as word-of-mouth and social media. It can concurrently model the effects of consumers' interactions with brands, including exposure to different brands' advertising. Through this ability to model the "complex interactivity" that characterizes the real-world marketplace, ABM is capable of indentifying potential

"emergent" outcomes that cannot be foreseen using current popular simulation modeling approaches, such as conjoint or choice modeling.

ABM can integrate disparate simulation models into a synergistic "uber-model."

The ABM approach is flexible enough to lend itself to integrating other simulation modeling perspectives, such as conjoint modeling for product optimization or messaging, that have typically only been studied in isolation. For example, you might previously have used two separate simulation models to support decisions regarding product design optimization vs. product advertising. However, ABM offers the potential to incorporate both product planning and brand communications planning into an integrated decision support tool. Such an integrated simulator would take both inputs and more realistically predict consumers' probable brand choice decision outcomes.

UNDERSTANDING AGENT-BASED MODELING REQUIRES THINKING ABOUT SIMULATION MODELING IN A NEW AND DIFFERENT WAY

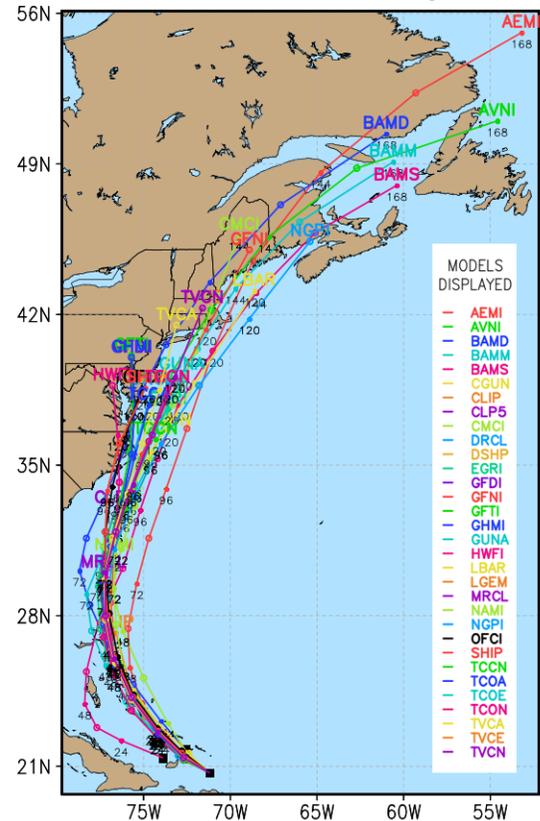
Designing and marketing successful products is all about deciding which of various competing decision alternatives will most likely influence the future in your favor. Though we often don't explicitly recognize it, the fact is that product designers and marketers try to predict the future on an ongoing basis. A product planner decides what features a product will have and thereby predicts that the product will be more attractive to consumers than

competitive products in the future. A brand manager decides what aspects of his brand's promise and image to emphasize and so predicts that the resulting "brand story" will win against competitors' brand stories in the future. The product planning and marketing challenge would be best approached through comparing different sets of decision alternatives by comparing the many possible outcomes. Unlike more common simulation modeling approaches, agent-based modeling does not produce just a single "best guess" result but, rather, reveals the probability of different possible outcomes in the marketplace.

The venerable Jedi master, Yoda, once wisely noted, "Always in flux, the future..." And he was right. Anyone who tells you they can confidently and accurately predict the exact future outcome of a given product design or marketing decision is lying; either to themselves, to you, or both. The key challenge is that, in a very real sense, there is no single, certain future out there. The future is more realistically thought of as a range of different outcomes. Marketing planners would do well to recognize that any specific product design or marketing decision – or set of decisions – actually has many possible outcomes, some of which are more likely to happen than others.

Agent-based modeling is an improvement upon other simulation modeling techniques in that does not implicitly ignore the reality of this situation. A well designed agent-based modeling simulator does not report a single "best guess" as to the future outcome of a given set of product design

Atlantic HURRICANE IRENE Model Tracks
Valid Time: 1800 UTC 23 August 2011



and marketing decisions. Rather, it reports the probability of each outcome of a set of possible outcomes.

An excellent example of determining the probability of different possible outcomes is forecasting the paths of hurricanes. The multiple curving colored lines extending from the hurricane's present location combine to create a curving "cone of possible outcomes" containing several paths which the hurricane might take, depending on multiple semi-predictable influences actually evolve over the days to come.

The forecast illustrated above is powerfully useful, in large part, because it does not

create a false illusion of certainty. The forecast is actually a combination of several models which, together, project that the greatest likelihood is that the storm will mainly impact the coast of North Carolina. However, the forecast nonetheless warns disaster planners up through the rest of the Eastern Seaboard to be ready for the possibility that any one of their states could suffer a direct hit.

Agent-based modeling combines multiple simulation models to produce something like a marketing decision “cone of possible outcomes.” Most methods of simulation modeling currently used in marketing research are like a single-model hurricane forecast that produces just one curving dotted line. And, importantly, success in the marketplace will suffer to the extent that that single-outcome forecast turns out to be wrong. ABM’s ability to produce a “cone of possible outcomes” enables the marketing

planner to consider the wider range of possible results from one set of decision alternatives versus another.

MARKETERS CAN IMPROVE THEIR ODDS OF SUCCESS IN THE MARKETPLACE USING ABM TO ENVISION THE FUTURE MORE REALISTICALLY

This more forward-looking approach to simulation modeling can integrate with other modeling techniques helping us to address more complex business problems and marketplace realities. Agent-based modeling allows us to think about simulation modeling in a new way as it reveals the probabilities of different possible outcomes in the marketplace and not just a single “best guess” result. ABM holds great promise for marketers, helping us envision how potential consumers will interact with brands, products and other consumers.



Lieberman Research Worldwide