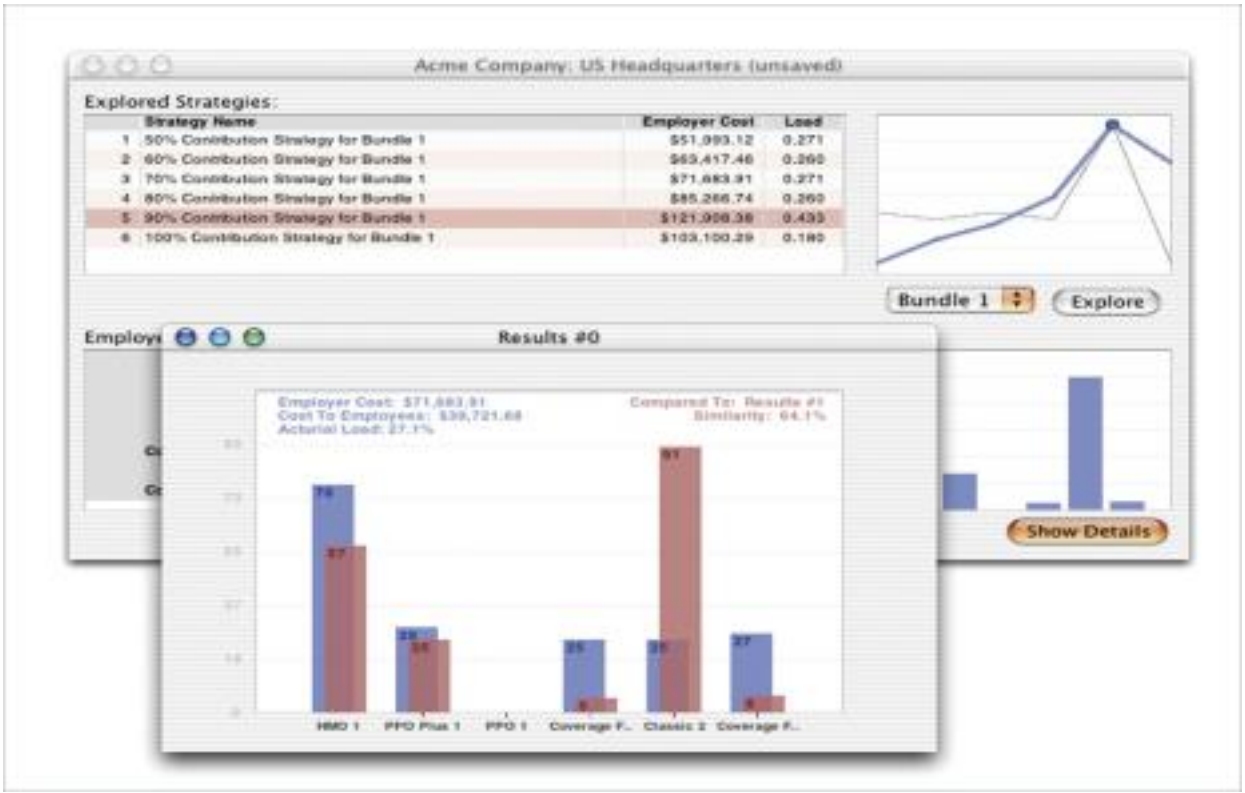
Breaking Traffic Jams in Strategy Development

Every day, traffic helicopters hover above the morning and evening rushes on highways, explaining where traffic is crawling and why. From this 2,000-foot view, it's easy to see how an initial incident reverberates backwards to quickly screw up your commute.

What begins with a fender-bender (or flock of geese crossing a road), rapidly erodes as individual driver behaviors — following or flouting legal, societal, and personal rules — cause traffic to slow considerably, from the source point backward. Some drivers stay in their lanes, determined to wait out the delay. Others try to use the shoulder as an express lane. Still others constantly shift lanes in the belief this will get them to their destination quicker.

Federal, state, and municipal governments are increasingly turning to advanced analytical techniques to help anticipate likely traffic choke-points and identify solutions to easing them. Marketers have begun to harness the very same tools to plan strategies for business or product launches. What, for example, causes a "traffic jam" at a grocery store shelf, keeping one product stuck while another one whizzes out the door as fast as it can be restocked? Why do Razor scooters take off and the meant-to-be-cooler three-wheel Trikke scooters stall in sales?



Comprehending the Incomprehensible

The approach, known as agent-based modeling (ABM), attempts to simulate highway traffic based on modeling the actions of drivers in response to random events and determining the resulting effect on traffic. In this case, each driver is an "agent" who may act or react in one of a dozen or so ways based on the situation in which she finds herself. What happens when you have thousands (or tens of thousands) of these agents interacting with each other is, upon initial view, nothing short of chaos. But on closer examination of agent interaction, patterns emerge that can help predict outcomes and lead to better planning and building of roads and intersections.

ABM, as with many of our best technologies, was developed in military applications. It's easy to envision how governments, generals, battalions, divisions, and even individual soldiers can be agents in a complex war-planning exercise, each with its own motivations, conditioning, and response profiles.

Manufacturers, competitors, regulators, distributors, retailers, and various consumer segments can also be viewed as agents. Each has its own interests, profiles, influence, and likely behaviors under various circumstances. Putting all of these agents together in a model guided by a set of well-defined business rules (describing how Agent A responds when Agent B acts in Manner C) helps predict where blockages may occur and identify steps that can be taken early to speed the route to success.

Here are a few examples of how ABM is being applied in marketing today:

Too Many Customers Spoil the Sales

Sainsbury's, the British supermarket chain, has developed a model of one of its London locations and incorporated sophisticated details, including the average length of time shoppers spend in various grocery departments and actual customer shopping lists (drawn from transaction histories) that help plot the path of the individuals in the virtual store. And the model turned up some surprising behavior. For example, an increase in the number of customers shopping the store at one time can decrease the sales of wine.

Macy's modeled shopping patterns to determine the best locations for cash registers and service desks — decisions that traditionally had been based on aesthetics. Macy's virtual store allowed for changes in department layout but also staffing in different departments.

Eric Bonabeau

According to Eric Bonabeau, CEO of Icosystem and a leading authority on ABM, "the potential for improved resource allocation is enormous." If your marketing plan has but a single small misfire in it, you can be 100% wrong. But seeing the whole picture can eliminate the blockage to success and, in retail, often improve sales by 20% or more. Why? Because retailers have tremendous stores (forgive the pun) of data. They know which specific products sell minute-by-minute, basket-by-basket, and increasingly customer-by-customer.

Predicting Beyond the Failure of Free

For a very different application of ABM, Bonabeau offers up an example of how pricing strategy dictated the evolution of an entire industry.

Free Internet service providers flashed onto the scene in the late 1990s, differentiating themselves by providing free services while making money on advertising. As more free ISPs entered the arena, they began to pressure the fee-based ISP population into a downward revenue spiral.

ABM techniques successfully predicted that, based on the interactions of consumers, advertisers, competitors, and technology suppliers, the early free ISPs might be successful, but the likely influx of others would make it very difficult for any of them to differentiate themselves and survive in the long term because of the low switching barriers. ABM further predicted that when the free ISP business model disappeared, the rest of the industry would be left stuck in a monochromatic structure in which all business models looked alike. All would be constrained by a fierce battle for customer acquisition in which consumer expectations were already set to pay only a few dollars per month, if that.

Using this insight, several of the smart marketers exited the business entirely before sinking billions into fruitless competition. Others took the jump directly to broadband, bypassing the fight for the low end of the dial-up market.

Help for Health Care

Humana Inc., the Louisville, Ky.-based health insurer, wanted to design new insurance plans to sell to employers. The challenge was the complexity of the potential impact on the marketplace of consumers, agents, employers, regulators, and competitors.

ABM of benefit pricing, contribution strategies, and predictions of plan choices amongst 225,000 Humana consumers sought to identify solutions with the greatest likelihood of meeting employer, consumer, and Humana needs. The resulting customized plan offerings not only saved employers money but created plans employees found appealing and easy to use. They also led to an overall reduction in employers' benefits costs.

Moreover, Humana now can use the models to identify points at which it can intervene in employee use of an insurance plan and potentially improve its offerings by changing individual behaviors likely to influence collective behavior. This powerful new tool also allows large employers to model different benefit bundles and contribution strategies to achieve their health care and savings targets.

ABM typically involves the observation of customers moving within a virtual or play space.
You can have a bit of play yourself. Try Icosystem's agent-based modeling game at http://www.icosystem.com/game.htm.