



***The World Leader in
Enterprise Marketing
Management***

Agent-based Modeling

*A valuable new weapon for
Chief Marketing Officers in the
fight of their lives*

EMM Group CONFIDENTIAL

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Executive Summary

Insight

Conventional marketing metrics are virtually worthless as a tool for the new business model for marketing. Consumer, customer, competitive and market change is so complex, dynamic and fast paced today that new models and metrics – and a new understanding of when and how to apply them – are required if marketing dollars are to be allocated efficiently and if the effectiveness of new style marketing plans is to be objectively and accurately assessed. The only new tool to emerge to meet the challenge is agent-based modeling, and the leading marketers are already learning to apply it.

Recommendation

Chief Marketing Officers should quickly reallocate funds and resources to develop a mastery of “agent-based modeling” (ABM) as part of the strategic shift towards a confident, analytically sophisticated, and highly effective and efficient marketing capability. A detailed set of recommendations is provided in Next Steps at the conclusion of this White Paper.

Summary

The traditional model for the mass marketing of consumer goods and services has broken down. Consumers today have new lifestyles and new attitudes that cause them to receive and process information from new sources in new ways, evaluate product alternatives differently and shop in new ways. B2B customers have totally new ways to manage business relationships and evaluate product-service bundles offered by their suppliers. As a result, the old truths about marketing aren't true anymore.

Marketers are facing an unprecedented crisis because this destruction of their professional knowledge base has occurred just as Wall Street is demanding faster growth in a slow growth environment and the CEO is demanding accountability from the marketing function in the form of an improved marketing ROI.

Fortunately marketers have a new and powerful weapon to help them balance the twin demands for faster growth and an improved marketing ROI. This new weapon is market simulation modeling driven by the emerging science of “agent-based modeling” (ABM).

We believe that mastering ABM is a critical ingredient for survival in today's hostile and demanding marketplace.

Background

At the recent ANA conference at Dana Point, Jim Stengel, the Global Marketing Officer for Procter & Gamble, The Advertising Age Marketer of the 20th century, announced the death of the traditional mass marketing model used by consumer marketers around the world. According to Mr. Stengel, everything has changed more rapidly than any of us would have expected. The way consumers absorb information, the way they shop—all of these have combined to destroy the profitable mass marketing model we have used for generations.

The end-game for the traditional marketing business model was relatively easy to predict but hard to time. EMM Group has, for several years, been developing a new disruptive model, Enterprise Marketing Management, which has three major principles:

- 1 Best practice end-to-end processes which are tactically agnostic and evaluated solely on their objective capability to build brand equity, accelerate brand driven growth and increase marketing ROI.
- 2 Proprietary best practice marketing content to drive the end-to-end processes.
- 3 Rigorous measurement of every marketing input to justify its role in building brand equity profitably.

The biggest challenge for everyone, including EMM Group, has been the development of measurement and metrics sufficiently sophisticated to capture the complex, multi-faceted nature of a consumer's real life experience. Conventional equation-based analytics, such as market mix modeling, have proven useful but extraordinarily limited, slow and expensive. These models simply cannot capture in real time all of the influences bearing down upon today's consumer. Using what happened in the past to model the future behavior of consumers in today's maelstrom of change offers extremely low odds of success.

Fortunately, a new development, "agent-based modeling," offers unsurpassed functionality, speed and predictive power at precisely the moment it is most needed. No one should be surprised that one of the first consumer packaged goods company to embrace agent-based simulation modeling has been Mr. Stengel's own P&G. This paper will provide an insight into the advantages of agent-based modeling as it begins to be applied to a marketing environment where the existing model for influencing consumers and building equity in a profitable manner is collapsing before our eyes.

What is Agent-based Modeling?

Chances are your children have more experience with agent-based modeling than you. That's because several popular software games, *SimLife* and *The Sims*, use the principles of agent-based modeling to simulate "real" life. These software programs allow players, such as your children, to assign characteristics to individual "agents" in the software (people, animals, plants, cars, the weather, etc.) and then watch as a unique story plays itself out based upon the information ("the rules") input by the player.

As a business tool, agent-based modeling attempts to simulate reality. Under ideal circumstances, agent-based modeling becomes a test market on your desktop.

This modeling technique has three components:

- ▶ **Agents**, such as a consumer, a brand, a retail store, a media plan, etc.
- ▶ **Rules or Behaviors**, such as a buying pattern, decision criteria, etc.
- ▶ **Interactions**, such as those between a consumer and a store, a consumer and another consumer, a consumer and an advertising medium, etc. driven by the rules.

The interactions between numerous diverse individual agents following numerous rules can create group behavior that is unpredictable, non-intuitive, fascinating, and most importantly accurate. The software models that simulate such individual interactions can:

- ▶ predict market shares, sales and profitability;
- ▶ provide strategic and tactical insights into marketplace behavior into the future.

Four unique characteristics of Agent-based Modeling

Agent-based modeling has four remarkable characteristics that differentiate it from all other analytical tools previously available to marketers:

- 1** Consumers are modeled at the individual level. The interactions of thousands of consumers are “rolled up” to provide a “total market” result. This makes enormous intuitive sense, in that marketing seeks to influence the behavior of consumers and not of abstract concepts like markets. Agent-based modeling realistically simulates what marketers are attempting to accomplish.
- 2** This modeling approach can utilize an enormous variety of data ranging from conventional time series point-of-sale data to custom research such as consumer attitude data, even product preference data. This ability to utilize data from dozens of sources and in multiple forms gives the model its extraordinary richness and power.
- 3** Agent-based models work with exceptional speed, giving marketers the capability to create and analyze dozens of marketing scenarios in a day.

- 4** Lastly, sophisticated agent-based models produce realistic and often unexpected results, so-called “emergent behavior.” Because consumers are modeled at the individual level, the millions of interactions play out in unexpected and unforeseen ways.

This ability to uncover or reproduce unexpected outcomes from the interaction of various agents following multiple rules supplied by dozens of different pieces of research or information is one of the fascinating strengths of agent-based modeling. This characteristic has been pointed out in one of the only broadly published articles on agent-based modeling (“Explaining the Unexplainable” by Eric Bonabeau in the Harvard Business Review in March, 2002).

Recent Applications of Agent-based Modeling

The discipline of agent-based modeling is only about ten years old, primarily because of the incapability of immature software and hardware to manage the multiple interactions that typically occur in ABM. Some of the original ABM models were used experimentally by biologists and sociologists to understand evolutionary phenomena in animal species and cultures. One famous application explained the hunting and gathering practices of ants in an anthill. Somewhat closer to business reality has been the use of agent-based simulation models by companies like:

- ▶ P&G to understand the impact of alternative shipment and payment terms on retail in stock positions and company inventory.
- ▶ Macy's to generate new store layout options for maximizing customer satisfaction and spending.
- ▶ Hewlett Packard to understand the effect on organizational performance by a change in hiring practices.
- ▶ NASDAQ to understand what would happen when the "tick size" goes from 1/8 of a dollar to 1/100 of a dollar.
- ▶ The U.S. Department of Defense to conduct war games predicting battlefield outcomes in a networked information environment.

The Advantages of Agent-based Simulation Modeling

Versus the other alternatives available to the business planner, agent-based modeling seems to have the following advantages:

- ▶ ABM creates a test market in your computer that permits the testing of numerous hypotheses at warp speed. It is inherently future oriented not backward looking. No other approach has its broad functionality and speed.
- ▶ It can provide a rank order of the influence of variables within the holistic marketing environment, thereby helping you understand why a certain result is occurring and provide direction on how to affect the marketplace. For example, a bank could estimate the relative likelihood of generating more new accounts by locating more ATM's on a college campus versus increasing credit card mailings to new residents in the service area, an issue difficult to address rapidly with virtually any other single analytical tool. Although structural equation approaches or "pathway modeling" can provide ranking analyses under certain quite constrained circumstances, the speed, flexibility and data friendliness of ABM is superior by orders of magnitude.
- ▶ Agent-based modeling can rapidly address changing marketing conditions. A marketer may hypothecate market activities and generate a reading of their effect in a matter of minutes.
- ▶ Once developed and calibrated, an agent-based simulation model becomes a reusable knowledge base. It does not have to be replicated repeatedly at great expense and time as do market mix models. Rather, it becomes an evolving and improving source of information.
- ▶ Agent-based modeling leverages an existing base of data across numerous sources, thereby providing a much richer outcome in an efficient manner. Unlike traditional market mix modeling, which depends totally upon historical time series data and cannot accommodate other data types, agent-based modeling can utilize virtually any custom piece of research or even exogenous data such as weather patterns or changes in public relations "buzz."
- ▶ Not only can agent-based modeling accept and utilize a broader variety of data than virtually any other kind of modeling short of actual test marketing, but it can also answer a broad variety of questions, including, "What if I..."
- ▶ Lastly, agent-based modeling rapidly becomes a tool for strategy development as well as mere tactical response. For example, it could help financial institutions understand which target audience is more responsive to what incentives at what cost, thereby allowing the company to place its strategic bets in a more efficient manner.

Agent-based Modeling:
A valuable new weapon for Chief Marketing Officers in the fight of their lives

The table below compares the leading agent-based modeling marketing software approach to various other alternatives across several key parameters.

	Statistical Regression	Conjoint/BASES	Test Marketing	MarketSim
Explains market dynamics (consumer, channel, & competitor behavior)	Few	Some	Some	Many
Adaptability to Change (power to forecast market when the future is not like the past)	Low	Medium	Medium	High
Scope (dimensions of "What-If?" analysis)	Low (Mass Media & Price)	Low (Attributes)	Medium (All variables)	High (All Variables)
Questions Addressed Per Model (profit, share, ROI, sales, media planning, brand portfolio optimization, competitive strategy...)	Few	Few	Several	All
Breadth of market behaviors modeled (awareness, trial, share, media flighting response, mix synergy, etc.)	None	Few	Most	Most
Accuracy within Scope	High	High	High	High
Use of Data (Time Series, consumer survey, assumptions, rules of thumb...)	Some	Some	All	All
Cost per Project/Question (software plus consulting)	Medium	Medium	High	Low

Why marketers should rush to master Agent-based Modeling

Two reasons come to mind immediately:

- 1 Marketing is in crisis. “SALY” marketing plans (Same As Last Year) simply won’t work in the marketplace and won’t be defensible to management much longer. That means marketers must build more sophisticated, broad spectrum marketing plans that integrate conventional television and print with new communication options, the internet, CRM, sponsorships, events, in-store and in-channels promotions, product placement, services bundled with products, and many more emerging tactical weapons.

Most marketers have NO success models suggesting how these new cocktails will taste to consumers. They desperately need advanced simulation techniques to provide guidance. An ABM approach such as Decision Power’s *MarketSim* software is a far better option than the historical analysis presently being employed.

- 2 Marketing history proves that those companies who master new marketing processes first often realize permanent advantage. While P&G is searching for a new solution today, they succeeded in the past by innovating before competitors. (For example, they invented the RADIO soap opera in the early 1930’s and converted them to TV in the 1950’s to retain their leadership in creative use of media). IBM was able to shift from separate “product” and “services” marketing to integrated “solution” marketing. American Express mastered segmentation better than any other credit card issuer. All of these companies are competitively advantaged today because they continue to be the first with marketing process innovations.

We believe rapid mastery of ABM could be one of those tectonic shifts that create advantage for years. Certainly the differences between competitors are so slight in most categories that mastery of a weapon like ABM could tip the balance. We find it deeply significant that P&G, the company with the most success in the old mass marketing model in the 20th century has been one of the first to focus on ABM as a potential guide to creating advantage in the brave new world of 21st century marketing.

Four action steps for CMO's

- 1 Benchmark your current marketing capability to assess the utility of Agent Based Modeling for your brands and businesses.
 - ▶ Identify the critical business issues and the needs for business analytics
 - ▶ Determine data availability and quality of data
 - ▶ Develop objectives and scope
 - ▶ Develop a business case
 - ▶ Produce a Project Plan
- 2 Identify the data sources that can drive an Agent Based Model.
 - ▶ Collect initial data
 - ▶ Verify data quality
 - ▶ Select, clean, integrate and format data
- 3 Apply an ABM model for a “quick win” on a business / brand where you anticipate or require major changes with unpredictable outcomes.
 - ▶ Select a pilot test case from a past situation with data available on the results
 - ▶ Develop the consumer purchase model
 - ▶ Identify the agents and the relationships of the agents
 - ▶ Develop the model
 - ▶ Run the model and collect model predicted results
 - ▶ Compare model-predicted results with actual results
 - ▶ Refine model as required
- 4 Develop an internal capability to use and apply the ABM modeling software in conjunction with EMM Group's *power processes and marketing metrics* packages.
 - ▶ Plan deployment
 - ▶ Plan monitoring and maintenance
 - ▶ Train
 - ▶ Implement

About EMM Group, Inc.

EMM Group transforms companies for growth. We do so by creating world class marketing organizations expert at building brands. Our clients grow by increasing share, grow by higher margins and grow by faster introductions of new products. The marketing culture and capabilities that we instill naturally deliver the ancillary benefit of increasing our client's marketing ROI.

EMM Group is the creator of and world leader in enterprise marketing management, the marketing transformation that deploys marketing best practice intellectual property (IP) across the entire marketing value creation chain so that it is available to the right people in the right process at the right time. This Best Practice IP is made available 24/7 through a collaborative IT architecture on a global scale.

Our mission is to embed the discipline of enterprise marketing management at thought leading companies in every business sector around the world.

EMM Group emerged from Emmperative, the P&G funded enterprise marketing system. Hunter Hastings was the CEO of that company, Gordon Wade its head marketing consultant, and Sat Duggal led the design of the first marketing knowledge centers. Over the past three years, the group has reviewed marketing best practices from P&G and dozens of other companies, thereby creating a best practice library of unparalleled breadth, sophistication and proven practicality.

Our consultants all have decades of client-side experience in senior marketing positions. In addition, we have world class subject matter experts in consumer financial services, telecommunications, technology, retailing, entertainment, durables, and health care.

EMM Group is the only company in the world that can:

- ▶ Offer a systematic benchmarking of your current marketing best practices against the very best emerging enterprise marketing management standard.
- ▶ Identify and leverage your best practices, and insert global marketing best practice where gaps exist.
- ▶ Create an integrated best practice marketing value creation stream aligned around metrics geared to measure marketing effectiveness and ROI.
- ▶ Design and construct customized marketing knowledge centers for Fortune 500 companies.
- ▶ Provide advanced technology design and systems integration to enable clients to integrate knowledge centers into their existing technology infrastructure.
- ▶ Offer world class training and change management capabilities specific to enterprise marketing management.

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