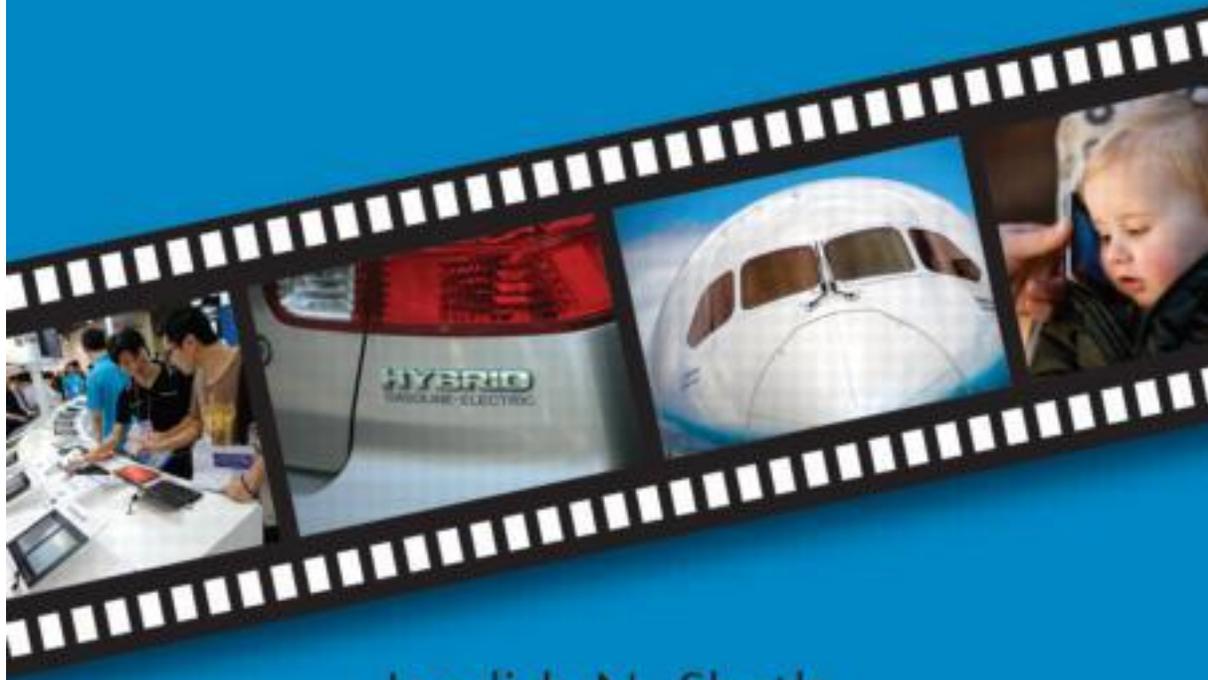


The 4A's of Marketing

Creating Value for Customers, Companies and Society



Jagdish N. Sheth
Rajendra S. Sisodia

"As a long time practitioner of the 4P's seller-oriented toolbox of marketing, I welcome the more customer-oriented 4A's toolbox... Sheth and Sisodia are to be complimented for their insightful development, application, and illustration of 4A thinking. I believe that the 4A's will rank as an important contribution to marketing theory and practice."

Philip Kotler, Northwestern University

ROUTLEDGE

TABLE OF CONTENTS

Introduction: How to Succeed in Marketing

Chapter 1: Marketing Remix: Introducing the 4As

Chapter 2: Think Like A Customer

Chapter 3: Managing Acceptability

Chapter 4: Managing Affordability

Chapter 5: Managing Acceptability

Chapter 6: Managing Awareness

Chapter 7: Applying 4A Analysis

Appendix A The “Market Value Coverage” (MVC) Audit

Appendix B Mini Cases

INTRODUCTION: HOW TO SUCCEED IN MARKETING

Among all the business disciplines, marketing routinely experiences and accepts the highest rates of failure. Consider the results of a study conducted by Copernicus Marketing Consultingⁱ that paints a grim picture of marketing performance:

- 84% of 500 marketing programs studied resulted in declining brand equity and market share
- Most customer acquisition efforts fail to break even
- Fewer than 10% of new products succeed
- Most sales promotions are unprofitable
- Advertising ROI is below 4%

Why do otherwise highly efficient free markets continue to experience high rates of new product failures, despite heavy annual expenditures on market research? Why do so many advertising campaigns flop, even when the managers who stand behind them are talented, experienced and hard working? Is it because of environmental uncertainty, unpredictable customers, or tough competition? Is it due to poor measurement systems? Or is it because of the way marketing managers plan and implement product launch strategies?

We have found that marketing failures can almost always be attributed to management decisions that reflect a poor understanding of what really drives customers. Marketing failures are often chalked up to fate (reflected in the statement “most new products fail anyway”) or poor timing (“the market wasn’t ready for this product”). Other convenient fall guys for failure: manufacturing, the advertising agency, and retail partners. While some of these excuses may be valid, more often than not they’re simply lame.

Of all the business functions, marketing is subject to the highest degree of uncertainty. Desirable customer behavior cannot be mandated; it can only be hoped for. The link between marketing actions and marketplace effects is often unclear and tenuous. Marketing managers too often operate in the dark, tinkering with marketing tactics and inventing new gimmicks to improve the odds of success. Examples of such gimmicks include “employee pricing for all” and “0% financing.”

Not surprisingly, CEOs and corporate boards are growing increasingly skeptical of the marketing function’s ability to deliver reasonable returns on resources invested. Scholars have suggested that marketing has lost its seat at the table when it comes to making strategic decisions at many companies, because of its failure to perform.ⁱⁱ

Marketing has failed to deliver because it has become too selling oriented and too obsessed with inventing tactics to get customers to buy. Too many marketers do not clearly understand the factors that fulfill marketing’s purpose, which is to acquire and retain satisfied customers at a profit. The principal drivers usually under marketing’s control or influence—the product’s attributes, price levels, distribution methods, and promotional

messages and approaches – do not readily map to performance indicators such as customer satisfaction, loyalty, market share, profit contribution and growth.

When marketing is done right, customers are happier, the business grows faster, and profits accumulate. To achieve this, *everyone* in the company must stand in the customer’s shoes, not just the marketing department. Marketing managers must ensure that the voice of the customer is heard throughout a company’s operations. Regardless of who “owns” R&D, logistics, finance, and all the other functions that define an enterprise’s activities, marketing must take responsibility for the final outcome as seen by customers. Managers must use marketing’s tools – the arts of understanding, informing, influencing, and persuading – to align all aspects of the organization around a set of common customer-centered goals.

A NEW TOOL FOR FOCUSING ON THE CUSTOMER

It’s not that most marketers don’t want to organize around the customer; it’s that they lack a tool that enables them to do so effectively. To understand the *true* causes of marketing success and failure, marketing managers must have a way to see the *effects* of their company’s myriad actions on the customer. They must look through the “other end of the lens” to view the marketing effort “coming” rather than “going.” From that vantage point, things look very different. The bottlenecks that lead to product underperformance or outright failure often become quite clear—and are not always found at the top of the bottle. Rather, they are spread throughout, especially in areas outside of the traditional marketing department’s domain. For example, logistics and customer service loom far larger on the radar screens of existing customers than do sales and advertising.

In this book, we present a powerful and tested approach that helps managers see a business’s every action through the eyes of its customers. This approach is organized around the values that matter most to customers: Acceptability, Affordability, Accessibility and Awareness. Taken together, these attributes are called the “4A’s.” The 4A framework derives from a customer-value perspective based on the four distinct roles that customers play in the market: seekers, selectors, payers and users.ⁱⁱⁱ For a marketing campaign to succeed, it must achieve high marks on all four A’s, using a blend of marketing and non-marketing resources.

The 4A framework helps companies create value for customers by identifying exactly what they want and need, as well as by uncovering new wants and needs. (For example, none of us knew we “needed” an iPad until Apple created it.) That means not only ensuring that customers are aware of the product, but also ensuring that the product is affordable, accessible and acceptable to them.

This book is based on over a dozen years of research on hundreds of products and services. We have used the 4A framework to study approximately 400 marketing successes and

failures. Products evaluated include such major marketing hits as the Apple iPod, DirecTV, Gatorade, Swatch, Quicken, America Online, Starbucks, Blockbuster, Chrysler Neon, Ford Mustang, Gillette Sensor and cellular telephony. We've also used the framework to dissect marketing disasters such as APS cameras and film, Crystal Pepsi, Crosspad, Sony's Betamax, the XFL football league, Webvan, and GTE Airfone. Throughout the book, we draw on these and many other cases to illustrate our discussion of the framework and elaborate on the individual elements within it. By analyzing these case histories in detail, we have arrived at many of the book's recommendations.

OUR PURPOSE IN WRITING THIS BOOK

Throughout this book, we will show how looking at the world through the 4A lens helps companies avoid marketing myopia (an excessive focus on the product) as well as managerial myopia (an excessive focus on process). In fact, it is a powerful way to operationalize the marketing concept; it enables managers to look at the world through the customer's eyes. This ability has become an absolute necessity for success in today's hyper-competitive marketplace.

Importantly, the 4A's define the requirements for overall *business* success, not just marketing success. First of all, business success and marketing success cannot occur in isolation from one another. Second, managers must use all of the tools and resources at their disposal – internal as well as external – to enhance each of the A's in the most cost-effective manner.

Though the 4A's drive overall business success, the marketing department must take the lead in achieving high levels on each of them. Most companies today understand that a strong customer orientation is a necessary requirement for sustained success. This proposition is widely supported at the board and executive levels, and is even acknowledged by other business functions such as finance and operations. The problem, as we have seen first-hand in many organizations, is that marketing has done a poor job of helping companies *become* truly customer oriented. Our analysis of marketing failures shows that too many marketers are preoccupied with relative trivialities such as cents-off coupons, media impressions and creative executions. As a result, they have gradually lost credibility and influence within many companies. A major reason for marketing's credibility problem is that marketers have lacked a tool that can help them communicate and spread the gospel of customer orientation throughout the corporation. We believe the 4A framework is the tool that managers have been looking for.

We will show how the 4A framework provides managers with an intuitively appealing yet conceptually rich way to examine and measure the results of their marketing efforts. By monitoring those results along four clearly defined criteria, managers can dynamically reallocate marketing resources to the various action levers at their command, until they

achieve the desired results. In some cases, they may quickly discover that the resource implications are so severe that they must consider a drastically different marketing strategy, change their target market, or abandon the project altogether. Either way, the 4A's can help prevent the company from investing resources unwisely.

As the required sophistication level of modern marketing grows, the value of simple, conceptually elegant frameworks also increases. The legendary Supreme Court justice Oliver Wendell Holmes Jr. once said, "I would not give a fig for the simplicity this side of complexity, but I would give my life for the simplicity on the other side of complexity." The 4A framework provides such simplicity.

Part of the value of any business framework resides in its capacity to be seamlessly transferred from one industry to another, where different types of customers are involved and different market forces are at work. We will demonstrate how the highly versatile 4A tool can be readily applied to any marketing context. It is structured and concise, an easy leap for managers who are already familiar with marketing's popular 4P framework.

What's more, the 4A's (with appropriately modified definitions) can be readily applied to most exchange situations: goods versus services, business-to-business versus consumer. It applies to customer acquisition as well as retention. It is our hope that the 4A framework will also serve an important societal objective, by helping to deliver life-enhancing technologies and services across a much broader spectrum of the world's population. By using the 4A's to identify the bottlenecks and craft creative ways to address them, companies, developmental agencies and governments can work together to raise the quality of life of millions of people.

HOW THE BOOK IS ORGANIZED

In the book's first chapter, we argue that the traditional approaches to marketing no longer work. We trace the long decline in marketing's productivity and credibility and highlight the forces that are contributing to marketing's problems. We then propose the 4A's as a solution to marketing's malaise, and show how the framework has grown out of two widely accepted business concepts: marketing's widely known 4P's formula and Peter Drucker's Management by Objectives theory. At every step, we draw on real-world case studies of marketing missteps and breakthroughs.

In the second chapter, we present the 4A framework in more detail. We start by discussing the four roles of a customer, and how those roles dovetail nicely with the 4A framework. We then discuss the various ways in which managers can use the framework to create value for marketers and customers. We also discuss the composite 4A score (known as Market Value Coverage) and its relationship with the market share that the firm can expect to capture. The chapter also shows how managers can leverage other functional areas

within the company, as well as a variety of external resources to achieve the desired impacts at the lowest net cost.

Starting with Chapter 3, we take a deeper look at each of the four elements in turn. Chapter 3 deals with Acceptability, Chapter 4 with Affordability, Chapter 5 with Accessibility and Chapter 6 with Awareness. In each chapter, we discuss issues relating to the definition, dimensions and measurement of that particular dimension. We also demonstrate how to create high levels of each value component for new offerings, as well as how to diagnose and correct problems relative to each component for existing offerings.

Chapter 7 focuses on how the framework can be used in day-to-day marketing. We discuss in more detail how the 4A's can be used as a planning tool for new products, diagnosing and troubleshooting existing marketing programs, and evaluating potential partners. We also discuss how companies can lower marketing costs while simultaneously improving market performance.

In an Appendix, we provide guidelines for conducting a 4A audit. This includes a generalized measurement instrument, along with recommendations on how it should be customized for different contexts. The book concludes with a second Appendix that contains a number of mini cases of 4A analyses of well-known marketing successes and failures.

It is our hope and expectation that this book will lead to a closer alignment between what businesses do and what customers truly need. By doing so, we will be able to save precious financial resources that can better be invested elsewhere. We will also reduce the tremendous amount of waste that is generated through poorly focused marketing activities. Ultimately, the widespread adoption of the 4A framework will result, we believe, in a better quality of life for customers, more satisfied and fulfilled employees, healthier and more profitable corporations, and more thriving societies worldwide.

CHAPTER 1: MARKETING REMIX: INTRODUCING THE 4A'S

WHY MARKETING NEEDS A MAKEOVER

Seeing a growing need for convenience, Kellogg launched Breakfast Mates, a product that combined cereal, milk, a bowl, and a spoon in one package, in August 1998. Breakfast Mates was originally targeted at working parents with small children. It was positioned as a product that children could use themselves without parental help, and something that parents themselves could take from the fridge and eat on the go. However, the packaging was too difficult for children to open by themselves. The product had many parts and required considerable effort to eat; you had to open the package, open the cereal, open the milk, pour the cereal in, and then sit down and eat it with a spoon. While promising greater convenience, the product was anything but convenient, especially compared to the portable breakfast bars that could be eaten with one hand on the road. Psychologically, the product's high level of packaging was unacceptable to consumers concerned about the packaging's impact on the environment. Americans believed that vacuum sealed milk was artificial and not nutritious, and most found the taste of warm milk disgusting. In response, Kellogg started selling the product in the refrigerator section, which caused the cereal to be cold. So customers had two unappetizing choices: warm milk and warm cereal or cold cereal and cold milk. Kellogg only offered four cereal options and customers could not choose the type of milk to be included in the package (e.g. 1%, 2% or skim). The product achieved a low level of accessibility, since it was found in the refrigerated section, which is not where most customers look for breakfast options. In terms of affordability, the cost per serving for 4 ounces of cereal and 4 ounces of milk was \$1.39 with the Breakfast Mate and only \$0.21 out of a regular box of cereal. Not surprisingly, Breakfast Mates was a big failure. One year and \$30 million later, Kellogg discontinued the offering.^{iv}

After its initial release in 1954, the Ford Thunderbird quickly became an icon: the epitome of a classic American automobile. Ford discontinued the line in the 1990s, but decided to bring it back in 2001 as a retro vehicle that harkened back to the T-Bird's 1950s and 60s glory days. The car's launch was highly anticipated by customers as well as the automotive press. However, Ford sold only 19,000 T-Birds in the first year, well below its sales target, and sales declined rapidly after that. The reasons for the Thunderbird's failure become clear when looked at through the 4A lens. While Ford was very successful in drumming up hype around the car, it failed to deliver in terms of the vehicle's design and function, availability and price. The re-launch was described as "one of the most hyped rollouts in history," with two years of appearances in auto shows, on magazine covers, and in TV shows. Initial demand was very high, but Ford ran into production issues and delayed

shipments to dealerships, frustrating potential customers. Because of the shortage of cars, initial customers paid \$8,000 to \$10,000 above its \$35,495 base MSRP. At nearly \$50,000, the car was competing with luxury models from Mercedes, BMW and Audi. Initially, the Thunderbird enjoyed a high level of psychological acceptability. Ford went to great lengths to ensure the new T-Bird was true to the spirit of its famous predecessors, even studying recordings of the '57 Thunderbird to ensure the new exhaust growl produced the same roar. The Wall Street Journal reported that the car literally “stopped traffic” during a road test. Functional acceptability soon emerged as a fail point, eventually taking psychological acceptability down with it. The car used molded plastic-chrome, and its grille, wheels, instrument panel, interior trim and switches all looked and felt cheap. Approximately 65% of the cars parts, including body structure, transmission, instrument panel, seats and even keys were borrowed from other cheaper Ford vehicles such as the Taurus. The T-Bird was ultimately psychologically and functionally unacceptable because it was a contradiction in terms: a “luxury” car constructed of common parts; an expensive car, but still a Ford; a sports car not strong or sporty enough to fit that bill, but not practical enough to serve as anything else. As production picked up and quality problems started to surface, the car went from commanding a \$10,000 premium to being sold for \$10,000 below sticker price. The car was discontinued in 2005.^v

“Marketing as usual” simply doesn’t work anymore. Fundamentally new thinking is needed to revive and rejuvenate this vital business function and to overcome growing skepticism and distrust among its stakeholders within and outside the company. Marketing executives need a new way of looking at the world because of two interrelated reasons: poor marketing productivity and the marginalization of the marketing function within the organization.

MARKETING’S PRODUCTIVITY CRISIS

Marketing budgets have been rising steadily over the past several decades, as companies in many industries have stepped up their marketing spending in order to survive in increasingly competitive markets where customers have a wealth of choices. The proportion of corporate spending attributable to marketing activities has grown from approximately 25 percent in 1950 to approximately 50 percent in 2006. Spending on manufacturing/operations has declined from approximately 50% to approximately 25%, while spending management went through a period of increase in the 1960s and 1970s before declining again back to approximately 25%.^{vi} The increased spending on marketing did not result in higher levels of performance. In fact, a study of Fortune 1000 firms found that companies that increased their marketing spending the most over a 20-year period (1985-2004) grew at a lower rate than those that increased their spending the least.^{vii} The explanation for these rather stunning results is that marketing spending is often aimed at trying to make up for fundamental weaknesses in products and overall strategy.

Nevertheless, marketers are for the most part responsible for marketing's malaise. Too few marketing campaigns capture the imagination or generate any excitement among customers. Customer satisfaction and loyalty are unacceptably low and customer trust is almost non-existent.^{viii} The majority of new products fail. Tactics such as advertising, sales promotions, direct marketing and telemarketing drain millions of dollars from corporate coffers, but usually fail to deliver sufficient value to the company or to customers. Customers typically view marketing efforts as irritants or entitlements. For example, too many "loyalty" programs elicit more gluttony than fidelity, by conditioning customers to always expect more rewards. The ironic result: Companies must fund ever fatter inducements to get customers to stick with the brand.

Marketing's productivity crisis is reflected in some startling numbers. Some lowlights:

- In the US, companies collectively spend \$11,000 every year per family of five on advertising and sales promotion alone – an amount that exceeds the per-capita income of 85% of the world's population!^{ix}
- Research shows that many large companies waste billions of dollars on unnecessary and poorly conceived advertising.^x For example, one study found that doubling advertising expenditures for established brands raises sales by only 1%.^{xi} Numerous companies with well established and universally recognized brands nonetheless spend hundreds of millions of dollars every year on advertising, much of it with nothing new to say.
- Yankelovich estimates that city dwellers today see up to 5,000 advertising messages a day today! Obviously, only a tiny fraction of those messages actually impact people's attitudes and behavior.^{xii}
- Studies have found that 84-90% of sales promotions for packaged goods result in lowered profits.^{xiii} This is because many sales promotions are very effective at moving large volumes of products but at very low or even negative net profit margins. The frequency with which they are used also diminishes their effectiveness over time in attracting and retaining new customers.

Most sales promotions are so poorly designed and targeted, they achieve redemption rates of 1% or less, and most of those who redeem are not the consumers the company needs to target; they are just the most "deal prone" and thus inherently less brand loyal customers in the market. For example, in 2005, companies sent out six billion pre-approved credit card applications to 120 million consumers in the US alone. The response rate fell from 2.8% in 1992 to 0.3% in 2005—that is, just three out of every one thousand offers generated a response. Yet most companies blithely ignore the implications of a 99.7% rejection rate, and continue to assail unwilling consumers with unwanted sales pitches. What a colossal misuse of society's resources!

Three primary forces account for marketing's troubles:

- **Misguided Resource Allocation:** Few companies allocate marketing resources in a way that maximizes profits. More typically, they respond reflexively to disappointing sales by increasing advertising and promotions and/or lowering prices.

- **Faulty Metrics:** Lacking reliable metrics for measuring the factors and variables that matter most, companies track weak proxies instead. “What gets measured gets managed” is not necessarily an effective marketing strategy!
- **Lack of Customer Focus:** Despite decades of paying lip service to the concept, very few companies are truly customer-driven. Most remain product and profit driven, focusing their measurement and management efforts on financial reporting and numbers. Ironically, such short-term, bottom-line thinking is usually detrimental to the company’s well being and that of its customers.

THE MARGINALIZATION OF MARKETING

Given the growing consensus around the need for companies to become more customer-centric, it was once believed that marketing would assume ultimate influence and control over the corporation and become the dominant business function. As Fred Webster wrote in 1992, “Marketing can no longer be the sole responsibility of a few specialists. Rather, everyone in the firm must be charged with responsibility for understanding customers and contributing to developing and delivering value for them. It must be part of everyone's job description and part of the organization culture.”^{xiv} However, this is not the case at the vast majority of companies today.

Marketing used to have a seat at the table for senior management meetings, even at the board level. In many start-up companies, marketing is still highly valued. But as industries have matured, the traditional approach to marketing is becoming less effective and thus devalued. Marketing departments have become largely reactive and tactical rather than proactive and strategic; they have failed to take the lead in conceiving or implementing initiatives that have a significant impact on customers. For example, the customer satisfaction movement originated in operations rather than marketing. Likewise, the Total Quality Movement and “Six Sigma” had little to do with marketing. Even the recent emphasis on brand equity did not originate in marketing; it’s an offshoot of the thinking around intangible assets, a concept that grew out of the finance function.

Despite marketing’s demotion in the organizational hierarchy, few commentators question its value. Researchers have amply demonstrated that companies that can objectively be classified as “market oriented” deliver superior financial performance.^{xv} However, many companies have marginalized their marketing departments, letting other parts of the organization control such important functions as pricing and decisions about new products. Often, the finance department sets the budget for advertising, not the marketing group.

MARKETING BY OBJECTIVES

Anyone who’s worked on a faltering marketing campaign knows the fruitless feeling that’s captured in this widely circulated, anonymous quotation: “We didn’t know where we were

going so we redoubled our efforts.” The 4A’s framework seeks to eliminate much of the guesswork that goes with marketing, because it lets managers leverage a set of objectives, rather than count on their intuition.

Fans of the late Peter Drucker will note that this notion of “marketing by objectives” owes a debt to “Management by Objectives” (MBO) , which Drucker first described in his 1954 book, *The Practice of Management*. Company leaders who utilize the MBO framework establish a detailed set of goals, communicate them throughout the organization, and work to achieve them in a resource-efficient manner. This ensures that managers and employees have a clear understanding of their own roles and responsibilities in achieving those aims. MBO lets companies focus on the essential drivers of business success, rather than fritter away organizational energy and resources on activities that don’t help it achieve key objectives.

Drucker suggested that objectives should be focused on results (not activities)—that they be consistent, specific, measurable, related to time and attainable. Corporate objectives are typically set at the board level; these then “trickle down” to specific objectives at the business unit, functional, and individual levels. Andy Grove, the former CEO of Intel and an ardent user of the MBO approach, emphasizes the need for focus: having a small number of precisely articulated objectives, and giving managers throughout the organization significant leeway in determining the best way to achieve the objectives.

Marketing departments often operate with clearly articulated objectives. Instead they rely on such fuzzy goals as “improve customer satisfaction” or “increase market share.” Since the factors that contribute to the attainment of such objectives are many and are diffused across the corporation, marketing has historically suffered from a lack of accountability and a poor ability to trace a problem back to its root causes and implement effective solutions.

This is where the 4A’s come in. The framework represents a powerful “marketing by objectives” approach to the management of this increasingly vital business function. The 4As deliver a clear and compelling set of goals; they can be easily communicated throughout the organization; and managers can be given far greater leeway in determining the most effective and efficient ways to achieve them.

Equally important, the 4As framework allows managers to predict the success of products and services *before* they are launched. Indeed, that is this book’s primary focus—to show managers how to use this framework to fine-tune their marketing plans so as to maximize their chances for success. Just consider the very different experiences of two widely heralded high-tech services, Airfone and DirecTV.

A key problem is that most marketing managers are not financially literate and therefore have difficulty demonstrating the return on marketing investments. Conversely, other

managers are usually not marketing literate. Too often, they fail to understand how loyal customers and the power of the brand positively impact the balance sheet. Many companies view marketing expenditures as discretionary rather than committed costs, so the marketing budget is considered “soft money” that can readily be cut. Marketers, except in consumer packaged goods (CPG) industries, are hard-pressed to justify their budget requests, since they command little trust and credibility within many organizations. And yet, anyone who doubts marketing’s capacity to make—or break—a promising product would do well to consider the very different fortunes of two technological marvels, the Roomba robotic vacuum cleaner and the Segway Human Transporter.

HITS AND MISSES, PART I: ROOMBA VS. SEGWAY

Two of the more intriguing and unusual products to come along in recent years are the Segway Human Transporter and the Roomba robotic vacuum cleaner. Both products represent significant technological breakthroughs and attempts to create new markets. But their track records have been very different.

The Segway HT, unveiled in December 2001, is a two-wheeled, battery-powered mobile device that looks like an old-style push mower. The Segway can transport a rider for an entire day using a battery charged with household electricity. Its gyroscopic sensors detect subtle shifts in the operator’s body and respond by moving the device in the appropriate direction. Most people who try the Segway HT are amazed at its stability, uncanny responsiveness, and ease of use.

The Roomba from iRobot (a company previously known for its successful military robots) is about the size of a home bathroom scale. It allows busy parents, pet owners and physically handicapped people to keep their floors impeccably clean with minimal effort. The Roomba uses intelligent algorithms and advanced sweeping and vacuuming mechanisms to cover 90% of a room with just a touch of a button. Employing a three-stage cleaning system, it brushes, sweeps, and vacuums, all in one collaborative motion. With its low profile, it can reach under sofas and other objects.

Owners love to demonstrate their robotic helper to families and friends. Watching a Roomba navigate through the house, turning in seemingly random directions, staying within the virtual walls’ limits, stopping just a few inches short of falling down stairs, and returning dutifully to its charging station once its work is done can be quite entertaining. Users are amazed to see the amount of dirt in its garbage bin after it completes its rounds. The product just keeps getting better; based on customer suggestions, the company has added features such as bigger bins, brush cleaning, dirt detection, rapid charging, and automatic return to the charging station. There are now eight members in the Roomba family, each with its own functionality, price and personality.

Two years after it was launched in October 2002, iRobot sold its one millionth Roomba, making the product a bona fide hit. By contrast, only 6000 Segways were sold in the first two years after its launch, a far cry from the company's expectations of selling 30,000-50,000.^{xvi} Both products are marvels of cutting-edge technology, and are easy to use, rugged and reliable. So why is one floundering while the other soars? The answer lies largely in how each technological wonder has been marketed.

Although both companies spent a minimal amount of money on advertising, their products were greeted with much fanfare, thanks to extensive media publicity. The Roomba benefited from a flurry of glowing write-ups in publications such as *Time*, as well as prominent appearances on hit TV shows including *Oprah*, *Friends* and *Arrested Development*. The Segway was the subject of enormous pre-release hype, attracting a "Who's Who" of famous investors and boosters. Many declared that the Segway would revolutionize personal transportation in the same way that the automobile had rendered the horse and buggy obsolete. Not many products can live up to such sky-high expectations. In contrast, the Roomba debuted with modest expectations (given the poor performance of previous robotic appliances) and was easily able to exceed them.

The Segway has run into some major challenges. From a customer perspective, using the product runs counter to the cultural trend of walking for exercise. Some people experience back pain with prolonged use. In terms of infrastructure, most cities and towns don't allow motorized vehicles on their sidewalks. The Segway was literally a product with nowhere to go. A savvy marketing group might have anticipated these issues and devised a better launch strategy.

For a long time, the only place where consumers could buy a Segway was Amazon.com, which meant that people couldn't experience the product before the purchase. Later, the company started selling the product at Brookstone. However, by July 2004, there were still only 35 Segway dealerships in the US. Soon after the Roomba's launch, however, the product was widely available at many retailers, including Home Depot, Sears, Target, and Brookstone, as well as Amazon.com, Hammecher Schlemmer.com and many other Web sites.

The lowest priced Segway sold for \$3995, way above the price of other motorized scooters. The Roomba launched with a price of \$199, comparable to the prices of "regular" vacuum cleaners and far lower than the \$1500-\$1800 price for other robotic vacuums.

The Roomba's stellar performance is largely the result of its ability to fully leverage the prime drivers of marketplace success, that is, the 4 A's of marketing. These are: Acceptability, Affordability, Accessibility and Awareness. Each is a rich, multidimensional construct measured strictly from the customer's perspective; each is equally vital to the success of an enterprise. In other words, a poor performance in even one of the 4A's will almost certainly derail a project.

The 4A framework is a tool that helps marketers align their actions with the four essential values sought by customers. These values can be summarized as:

- *Acceptability*: the extent to which the firm's total product offering meets and exceeds customer expectations. It has two dimensions: functional acceptability and psychological acceptability.
- *Affordability*: the extent to which customers in the target market are able and willing to pay the product's price. It has two dimensions: economic affordability (ability to pay) and psychological affordability (willingness to pay).
- *Accessibility*: the extent to which customers are able to readily acquire and use the product. It has two dimensions: availability and convenience.
- *Awareness*: the extent to which customers are informed regarding product characteristics, persuaded to try it, and, if applicable, reminded to repurchase it. It has two dimensions: brand awareness and product knowledge.

Looked at through the lens of the A's, it becomes relatively easy to understand why products succeed or fail. Let's re-consider the Roomba and Segway.

- *Acceptability*: The Roomba clearly meets a customer need for clean floors in an innovative, even fun way. The Segway addresses the need for individual transportation, but in a way that is not very compelling. To put it another way, Who needs the Segway? Is it meant to replace motorized scooters, walking or bicycling? The fact that most towns do not allow motorized vehicles on sidewalks further dampens the product's acceptability to potential customers.
- *Affordability*: At \$3995, the Segway is priced beyond the reach of most; it is priced more like a used car than a motorized scooter, which it resembles. On the other hand, the Roomba's \$199 price tag is affordable to most customers and is in line with what they expect to spend for an innovative home appliance.
- *Accessibility*: The Roomba is readily available in numerous stores, while the Segway has very few outlets. Moreover, customers are required to undergo several days of training, often in inconvenient locations, before they can start using the Segway.
- *Awareness*: Both products achieved high levels of brand awareness, primarily through extensive free publicity. However, product knowledge for the Segway is difficult to create without firsthand usage experience.

Put it all together, and it becomes clear why the Roomba is cleaning up but the Segway has stumbled. More importantly, this type of analysis immediately starts to suggest specific actions that companies with a struggling product can take to improve their odds of success. Indeed, Segway has done just that; it has been reimagined as a niche device (for mall/airport cops etc) and now largely complies with the 4As—for operators of malls, airports etc, the much ballyhooed Segway is far more Acceptable, Affordable, and Accessible, and increasing numbers are becoming aware of it as well.

HITS AND MISSES, PART II: AIRFONE VS. DIRECTV

In 1984, a number of airlines began installing a revolutionary new air-to-ground telephony service called Airfone, which was launched by GTE and later acquired by Verizon. Despite impressive technological achievements and great expectations all around, the service's business performance ultimately proved an abject failure. In the ten years before Verizon finally pulled the plug, Airfone generated only 50 million total calls—a fraction of the calls carried *daily* by cellular companies. While the Airfone service was heavily used when bad weather caused significant delays, the system's utilization at other times was extremely low. A typical plane was equipped with as many as 60 phones. From these, the average large jet generated fewer than 100 calls per day in about 16 hours of flying time. As a result, the expensive system, with its heavy load of fixed costs, remained idle well over 99% of the time.

On the other hand, few new product introductions in the past thirty years have been as successful as Hughes Network Systems' DirecTV, a Direct Broadcast Satellite service that uses a pizza-sized dish to beam hundreds of television and music channels directly into subscribers' homes. The service attracted over one million customers in its first 13 months, reaching that plateau faster than any other consumer electronics product—including color TVs, VCRs and CD players. In fact DirecTV was so successful, Hughes was hard pressed to keep up with the demand.

How did Hughes succeed so dramatically while Airfone delivered such dismal results? The 4A's dashboard helps us understand.

Acceptability: In the first years following the system's deployment (before the advent of digital systems), calls were noisy and barely audible. Second, passengers complained of a lack of privacy—a problem that ironically worsened when airlines installed phones in passenger seats instead of restricting them to a calling booth. These drawbacks made the service largely **Unacceptable** to most customers, except in emergencies.

Affordability: Airfone's princely pricetag—calls cost \$4 to set up, \$5 for the first minute and \$2.50 a minute thereafter—made it impractical for routine calls, even for individuals with deep enough pockets to pay. In other words, while many travelers were *able* to pay the high price, most were not *willing* to pay it, since they did not see a commensurate value in the offering.

Unfortunately, the company failed to anticipate Airfone's affordability problem. In 1994, Mark Schneider, Airfone's vice president of marketing, suggested that the price of in-flight telephony services was not unreasonable. "If you compare costs with ground cellular, it's not all that much more, especially when you consider the technology hurdles." Trouble was, customers *don't care* about technological hurdles—that's the company's problem. They

care only about the value they receive from a service relative to the price they are being asked to pay.

Verizon, who inherited Airfone in the merger of Bell Atlantic and GTE however, seemed to focus on only the ultra high-end business traveler. “If it's a million-dollar deal,” argued a company spokeswoman, “what's \$10 (on a phone call)?” Since million-dollar deals are few and far between, most travelers opted to delay their calling until they arrived at their destination airports. While Airfone claimed that some customers’ monthly bills topped out at \$4,000, there were not nearly enough of them to sustain the service’s sky-high fixed costs.

Awareness and Accessibility: Given that it garnered maximum media exposure—and the fact that the handset itself was literally in your face—the Airfone scored highly in terms of customers’ awareness and the service’s accessibility. But that was far from sufficient. Because customers decided that the Airfone was neither acceptable nor affordable, this technological *tour de force* failed to deliver adequate profits for the investment.

Within a few years of the service’s launch, airlines started to remove the expensive phone infrastructure from their cabins, since the Airfone cost them more in increased fuel consumption (because of the system’s weight) than it generated revenues through their revenue sharing arrangement with Verizon. In June 2006, Verizon announced plans to terminate the service altogether, closing the book on a service that should have been a slam-dunk success. The 4A’s framework would have predicted that the Airfone would never fly with its planned marketing approach and would have thus saved GTE/Verizon millions. If it had been used to diagnose the problem early on, it would have enabled Verizon to make mid-flight corrections that may have saved the service.

In contrast, DirecTV did almost everything right. First, Hughes’ outstanding technological capabilities and good relationships with content providers enabled the company to offer a service that provided 175 channels (now over 250) of sharp digital pictures and CD quality sound, making the offering highly **Acceptable** to the target market.

Second, Hughes picked Thompson Consumer Electronics of France as the sole manufacturer of the receiving units. As a result, DirecTV achieved widespread customer **Awareness**, since Thompson used its well-known RCA brand name, which it had acquired from General Electric some years earlier.

Third, the brand also helped Hughes win widespread **Accessibility**, since RCA had a well-established, 11,000-dealer network in the U.S., brought the product to market on a massive scale.

Finally, Hughes ensured that DirecTV was **Affordable**. Hughes, by giving Thompson exclusive rights to manufacture the first million units, was able to negotiate a reasonable price \$699. Wisely, Hughes abandoned its original plan to manufacture the units itself. Had

it done so, the cost would have been in the thousands, killing the venture or relegating it to a small niche.

Hughes' satellite technology was also instrumental in ensuring that DirecTV was accessible as well as affordable, since it was able to provide coverage for 93% of the US market using just two satellites. After meeting the initial surge of demand, Hughes licensed additional manufacturers to produce the units, driving prices down further and making the service affordable to even more customers. By 2008, the company had 17 million subscribers in the US and another 1.6 million in Latin America.

As we can see from these two examples, the 4A framework readily allows us to determine whether a marketing plan is likely to succeed, and if not, what needs to be done to correct it. Though neither of these companies consciously used the framework, DirecTV had an intuitive understanding of what needed to be done to make the product a success. GTE/Verizon did not, and would have benefited greatly from it had they been able to use it.

HITS AND MISSES, PART III: IRIDIUM VS. CELL PHONES

To further underscore the value of the 4A's as a planning and predictive tool, let's take a look at some more examples. Let's start with two technologies that (like the Airfone) were designed to enhance human communications.

Like the Airfone, Motorola's Iridium venture, with its 66 satellites orbiting the earth at 17,000 miles per hour (34 times faster than commercial jetliners), was an extraordinary technological, logistical and regulatory triumph. And like the Airfone, it was a colossal business failure.

The 66 satellites were launched and deployed in the span of less than one year (in 1998). The resulting wireless-communications network spanned the globe, providing voice and paging connectivity from the deepest forests to the highest mountains to the remotest oceans. Prior to launch, agreements were reached with 140 countries. Dozens of partners—companies as well as governments—were involved in managing and marketing the service.

Iridium targeted business executives who frequently traveled internationally. The expectation was that these executives could easily afford a premium service that would allow them to communicate from anywhere in the world. In the nine years between Iridium's conceptualization and launch, however, the communications world had changed dramatically. Cellular communications exploded worldwide, making a speedy transition to higher quality digital systems in the late 1990s. By 2000, when Iridium was fully deployed, the GSM system already allowed seamless roaming in 62 countries—and more countries were rapidly coming online. Airtime charges crashed as usage soared; customers could make unlimited calls domestically for 10-15 cents per minute.

Here is how Iridium stacked up on the 4A's:

Acceptability: Iridium fared poorly on all facets of Acceptability. The one-pound handset, roughly the size of a shoe, was huge by contemporary standards and service reliability and call clarity were poor. The phone could not be used inside buildings or cars, since it required a line-of-sight connection to satellites. Iridium's coverage was advertised as global, but in fact excluded many countries in Europe, Asia and Africa. Overall, Acceptability could be judged less than 5% for business travelers, though it was substantially higher for miners, oil and gas explorers and other specialized markets (segments that were targeted later).

Affordability: In an era of \$100 miniature cell phone wonders, the Iridium handset cost \$3000, and airtime prices ranged from \$4-9 per minute (before later price cuts). As with the Airfone, even most of those who could afford such prices were not willing to pay them. Affordability could be rated at 10% at best.

Accessibility: Not only was the service unavailable in many countries, it could serve only 25,000 simultaneous users. With an inadequate sales force and poor phone-based customer service, Accessibility could be rated 50% at most.

Awareness: This is the one area where Iridium truly excelled. In addition to garnering huge amounts of free publicity, the company orchestrated an intense \$180 million media blitz, running ads in the *Wall Street Journal*, *Fortune* and 37 airline magazines. In addition, it launched a major direct mail campaign in 20 markets and in 20 languages. It is safe to say that virtually everyone in Iridium's target market was quickly made aware of the service. Awareness could easily be rated at 90%, if not higher.

Iridium's conversion rate from prospects to customers was especially reflective of its problems. In the advertising and direct-mail campaign's first quarter, Iridium received 1.5 million inquiries from potential customers, of whom only a few thousand signed up – a conversion rate well below 1%! Given the problems outlined above, the reasons behind such a pathetic rate are not hard to gauge. What's more, the company's executives could have readily anticipated Iridium's pitfalls, had they looked at the market through the 4A lens.

Not surprisingly, Iridium went bankrupt a short time after its launch. And yet, satellite telephony lives on, in part through Iridium Satellite LLC, which bought the company (whose satellites and other assets had cost an estimated \$6 billion) for \$25 million in 2001. Like the Segway, Iridium, while far smaller than originally envisioned, has found viable niche markets with maritime, aeronautical, government/defense, public safety, utilities, oil/gas, mining, forestry, heavy equipment and transportation. A 4A analysis would clearly indicate Iridium's suitability for these markets, where users often operate out of the reach of terrestrial cellular networks and are not highly price sensitive.

In contrast to Iridium, the cellular telephony business has been one of the biggest business winners of the past quarter century. Nevertheless, it was by no means an overnight success. In the industry's early years, most observers were highly skeptical. In the late 1970s, a leading management consulting firm retained by AT&T to assess the future of cellular telephony, concluded there would be fewer than one million cellular phone users – *ever* – since there simply were not that many people who wanted to use a phone while driving their cars!

In cellular telephony's early years, it appeared that such pessimism was justified, especially since cell phones fared poorly on each of the 4As. Just consider:

Affordability: Because phone companies targeted only an elite market of business executives, airtime was expensive and handsets cost thousands of dollars.

Acceptability: Service was very unreliable and only available for cars; installation was cumbersome and the handset choice was limited.

Accessibility: Phones and service could only be obtained from a few authorized resellers, and the networks only covered limited areas.

Awareness: Little advertising or other promotional activity was done. The resulting low volumes of calling did little to offset the huge upfront infrastructure costs; cellular companies lost large amounts of money while delivering minimal value to a small number of customers. The industry was essentially irrelevant.

All of that changed when the industry adopted some marketing innovations. First, the target market was broadened to include many more segments, including sales people, professional service people, and women concerned primarily with safety. Second, the industry started to subsidize handsets by bundling them with service contracts, thereby removing upfront barriers to adoption and improving customer retention. Airtime prices were lowered and multiple pricing packages were created to appeal to different segments, vastly increasing cellular telephony's affordability.

The industry also took great strides in making the service universally accessible. Distribution was expanded to include electronics retailers, mass merchandisers and even kiosks, and the geographic reach of networks was expanded.

Finally, the industry rapidly accelerated its promotional efforts, which greatly increased awareness and changed consumers' negative perceptions about the service. The service's acceptability improved as handsets grew smaller and yet more fully featured, and voice quality and network coverage both improved. With the transition to digital technology, an even richer feature set became available.

With all cylinders firing on the 4A's front, the industry took off and experienced explosive growth rates of 40-50% per year. As a result, there were an estimated 100 million

subscribers by the year 2001 in the US alone, 100 times more than originally predicted. In 2005, an estimated 119 million handsets were sold in the US, generating revenues for handset vendors of more than \$17 billion. The number of worldwide cellular subscribers hit an astounding 5.3 billion by the end of 2010, and continues to grow healthily.^{xvii} With handset prices starting at \$30 and airtime charges as low as 1 cent per minute, much of the growth now comes from the emerging economies of India and China, which had a billion subscribers between them by the end of 2008.

While the human need for communication is universal, the dramatically different paths followed by the cellular and satellite telephony industries indicate the extraordinary potential that can be unleashed when an industry operates with an explicit or implicit understanding of the factors that lead customers to embrace new products. The 4A's enables this to happen on a far more consistent basis than we have become accustomed to.

BENEFITS OF USING THE FRAMEWORK

As we have seen with the examples above, getting each of the A's right can unlock the full market potential for any offering. Before we conclude this chapter, we would like to summarize how the framework benefits marketing managers:

- Enables true customer centricity
- Helps improve marketing productivity and accountability
- Enables more effective resource allocation
- Takes a holistic view of business success
- Provides clear managerial prescriptions

ENABLING CUSTOMER CENTRICITY

The 4A framework helps transform the marketing process from an un-measurable "blind push" effort based on traditional product marketing techniques into a measurable and optimized effort that is driven from the customer's perspective. Instead of answering how, where and when products can be sold, the framework focuses on *why* products are desired and the factors that can impede their success. Had Motorola used the 4A's lens to find and focus on Iridium's true market—the defense, oil, and other front-line industries—the original business might still be in orbit. By focusing on customers in a clear and direct way, the framework facilitates the creation of profitable long-term relationships. And by enabling the ready implementation of a customer-oriented philosophy, it eliminates the need for "hard selling" and helps reduce customer churn.

A key point to remember when considering the 4A's is that each variable generates value. Creating affordable products and services, for example, does more than recover costs—it drives sales. Ensuring that products are widely accessible not only clears the way for customers to take possession of the product—it increases market share.

HELPING IMPROVE MARKETING PRODUCTIVITY AND ACCOUNTABILITY

The 4A framework improves the marketing function's productivity and accountability, which, of course, is especially important in today's cost cutting environment. The reason for this is clear: measurability. Any marketing action that fails to measurably raise the level of at least one "A" should be questioned and probably rejected (unless it offers a lower cost way of maintaining the level of the "A"). And if the product or service fails to garner high marks on all 4A's, it too should be rejected. As we saw with the Airfone, which did well on Accessibility and Awareness but fared poorly on Affordability and Acceptability, scoring two out of four will result in a loss—a very, very big loss.

ENABLING MORE EFFECTIVE RESOURCE ALLOCATION

Allocating marketing resources effectively is a major challenge for all companies. The 4A's enable managers to take a focused look at the strengths and weaknesses of marketing programs and base their allocation decisions on clear objectives rather than gut intuition.

Moreover, the framework helps managers allocate resources to the marketing program's weakest link. For example, if Awareness is the area that is hurting the success of a product the most, then more resources (both people and money) can be made available to make adjustments to a myriad of factors that contribute to raising Awareness. After all, when the cell phone industry accelerated its promotional efforts and began to convince consumers to give the gadgets a second look, breathtaking sales soon followed. Of course, the issue may not be the quantity of resources dedicated to raising Awareness, but the manner in which they are deployed. By shifting resources into more cost-effective vehicles, a manager can increase Awareness while using fewer resources.

TAKING A HOLISTIC VIEW OF BUSINESS SUCCESS

A key strength of the 4A framework is its ability to encompass every aspect of the firm in service of its marketing objectives. By focusing a firm's activities towards achieving a clear set of directly measurable, customer-focused objectives, the approach also liberates managers from purely functional preoccupations. Managers throughout the firm should be thinking of what they can individually and collectively do to raise each of the A's for the firm's targeted customers. This approach views the entire business as a holistic system in which marketing is not solely responsible for satisfying customers.

For example, to get consumers to accept a product, every aspect of the purchase and usage experience must add value. Consider the Sprint Spectrum Digital phone service, first launched in Washington DC in 1996. Sprint's system appeared to have several advantages over its cellular rivals, including a smaller handset, clearer reception, more features (i.e., paging, call waiting, etc.), increased security, no service contracts and a cheaper monthly access fee (as low as \$15/month). However, when the product was first introduced,

numerous technical, billing, and service problems arose, causing major headaches for customers. While the product was superior, the overall customer experience was decidedly inferior. The product eventually achieved success, but only after these “acceptability” problems were addressed.

PROVIDING CLEAR MANAGERIAL PRESCRIPTIONS

The 4A’s framework can conserve human and capital resources by helping companies avoid marketing failures and preventing the launch of doomed products (those very weak on several or all of the A’s). It can also help turn potential failures (those weak on one or two A’s) into successes by pinpointing problem areas before the product is launched. Here are five ways in which the framework delivers clear prescriptions to managers:

- *Supports continuous improvement*: It allows companies to continually refine and improve their value proposition. No company ever truly attains a “100%” score on any of the A’s, but they can certainly get better than where they currently might be.
- *Enables “creative imitation”*: Fast followers can take advantage of the pioneer’s experience to address bottlenecks and raise their own chances of success. The 4A framework makes it easier to diagnose and avoid mistakes and seize on successes. For example, each of Microsoft’s office productivity applications benefited by learning from and surpassing its competitors: Word overtook WordPerfect, Excel overtook Lotus 1-2-3, PowerPoint overtook Harvard Graphics and Access overtook dBase.
- *Facilitates course correction*: Technologies, markets and customers can change quickly. The 4A’s can be used to make vital mid-course corrections. For example, each successive generation of Apple’s iPod has added features and functionality to continually stay ahead of its competitors.
- *Helps assess competitive threats*: By analyzing other companies’ levels on each of the A’s, companies can better identify their direct competitors and determine what they are doing right or wrong.
- *Enables companies and industries to grow the market*: For most industries, worldwide penetration rates are low, especially among the four billion people in the people at the base of the pyramid, who make less than \$2 a day. A big part of the reason is companies do not think about the constraints to adoption from a customer perspective, especially in terms of Accessibility and Affordability. The 4A framework can help identify ways to achieve a higher penetration rate sooner. This is clearly what has happened in the cellular industry, which has exceeded even the wildest expectations for growth and market penetration.

In this chapter, we provided a quick introduction to the 4A framework, without getting into great detail about each of the dimensions: how they are defined and how they can be maximized. In the next chapter, we will take a deep dive into the framework, and explore some creative and cost effective ways in which you can achieve high scores and maximize your product’s odds of success.

ENDNOTES

ⁱ Kevin J. Clancy and Randy L. Stone (2005), "Don't Blame the Metrics," *Harvard Business Review*, June 2005.

ⁱⁱ Frederick E. Webster Jr., Alan J. Malter, and Shankar Ganesan (2003), "Can Marketing Regain a Seat at the Table?" MSI Report No. 03-003. Cambridge, MA: Marketing Science Institute, 29–49.

ⁱⁱⁱ A fifth role is that of "evangelizers" Companies don't simply want customers to use the product—they want them to praise it to others. As we will discuss, this helps spread awareness and fits in with the "seeker" role played by other potential customers.

^{iv} Research paper by Elizabeth Papp, Bentley University, October 18, 2010.

^v Research paper by Elizabeth Naughton, Bentley University, October 18, 2010.

^{vi} Sheth, Jagdish N. and Rajendra S. Sisodia (1995), "Feeling the Heat," *Marketing Management*.

^{vii} J.C. Larreche (2008), *The Momentum Effect: How to Ignite Exceptional Growth*, Wharton School Publishing.

^{viii} Nearly 70% of Americans agree with the statement, "I don't know whom to trust anymore," according to a February 2002 Golin/Harris Poll

^{ix} Sheth, J. N, Sisodia, R. S, Barbulescu, A. (2006), "The Image of Marketing With Consumers and Business Professionals," in Sheth, Jagdish N, Sisodia, Rajendra S (Eds.), *Does Marketing Need Reform?* (pp. 360). Armonk, NY: M.E. Sharpe, Inc

^x John Philip Jones (2000), "The Mismanagement of Advertising," *Harvard Business Review*, January-February.

^{xi} http://www.copernicusmarketing.com/about/six_sigma_branding.shtml

^{xii} <http://www.nytimes.com/2007/01/15/business/media/15everywhere.html>

^{xiii} For example, see Abraham, Magid M. and Leonard M. Lodish (1990), "Getting the Most Out of Advertising and Promotion," *Harvard Business Review*, May-June; 68(3):50-1, 53, 56.

^{xiv} Frederick E. Webster, Jr. (1992), "The Changing Role of Marketing in the Corporation," *Journal of Marketing*, Vol. 56, No. 4 (Oct), pp. 1-17.

^{xv} For a thorough review of the empirical evidence on this, see Bernard J. Jaworski and Ajay K. Kohli, "Market Orientation: Antecedents and Consequences," *Journal of Marketing*, 1993 Summer, Vol. 57, No. 3; Pg. 53.

^{xvi} Papers by Bentley University students Nikki Parness, Hua Ye and Jens Kullmann, March 2005. Additional sources: <http://www.everydayrobots.com/index.php?option=content&task=view&id=2;>

[http://www.roombareview.com/roomba/roomba-review.shtml;](http://www.roombareview.com/roomba/roomba-review.shtml)

[http://www.onrobo.com/reviews/At_Home/Vacuum_Cleaners/on00rc3000rokac/index.htm;](http://www.onrobo.com/reviews/At_Home/Vacuum_Cleaners/on00rc3000rokac/index.htm)

<http://www.everydayrobots.com/index.php?option=content&task=view&id=5;> Tom Harris, "How Segways Work," www.howstuffworks.com; "Milestones In Our History," www.segway.com; Dawn Kawamoto, "Human Transporter sales move slowly," CNET News: March 31, 2003. www.CNET.com; "Creating Empowered Pedestrians with ANSYS Multiphysics." February 2004. www.ansys.com; Early Adopters Pick: The Segway, November 2002, www.amazon.com; Edward B. Driscoll, "Defying Gravity: The Segway in Action," *Lite Wheels Magazine*, April 2002.

^{xvii} <http://www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf>