

by
Gregor Harter
gregor.harter@booz.com
Prof. Dr. Gerhard R. Plaschka
gerhard.plaschka@booz.com
Prof. Dr. Rohit Verma
rvt54@cornell.edu

booz&co.

iChoose—
Customer Choice
Modeling Applied
*A Mobile Phone
Case Study*

Booz & Company is a leading global management consulting firm, helping the world's top businesses, governments, and organizations.

Our founder, Edwin Booz, defined the profession when he established the first management consulting firm in 1914.

Today, with more than 3,300 people in 57 offices around the world, we bring foresight and knowledge, deep functional expertise, and a practical approach to building capabilities and delivering real impact. We work closely with our clients to create and deliver essential advantage.

For our management magazine *strategy+business*, visit www.strategy-business.com.

Visit www.booz.com to learn more about Booz & Company.

CONTACT INFORMATION

Munich

Gregor Harter

Partner
+49-89-54525-554
gregor.harter@booz.com

Gerhard R. Plaschka

Senior Executive Advisor
+49-89-54525-336
gerhard.plaschka@booz.com

Cornell University, School of Hotel Administration

Rohit Verma

Associate Professor
+1-607-351-7854
rv54@cornell.edu

Originally published as:

iChoose—Customer Choice Modeling Applied: A Mobile Phone Case Study,

by Gregor Harter, Sven Heistermann, Prof. Dr. Gerhard R. Plaschka, and Prof. Dr. Rohit Verma, Booz Allen Hamilton, 2007.

iChoose—Customer Choice Modeling Applied

A Mobile Phone Case Study

Choice modeling is a powerful tool for understanding customers' choices. Here, we explain the benefits of this sophisticated methodology by way of a recently conducted Booz Allen Hamilton study with more than 1,800 consumers in the United States. The study provided insights to service providers and mobile phone manufacturers on how to best approach consumers and gain market share.

Irrespective of up or down economic cycles, today's business environment is more competitive and fluid than at any other time in recent history. To a certain extent, a company can reengineer, restructure, and cut costs, but at the end of the day, it must identify a sustainable and profitable product and/or service offering to nurture growth. The process of creating such an offering can prove to be as ruthless as surviving a reality-based television show.

Given resource constraints, it is virtually impossible for any firm to excel in all product and service aspects at once; that is, to provide the highest quality, fastest delivery, and most variety at the lowest price. Thus managers must have a clear understanding of their customers' needs and their firm's capabilities to increase revenue within the constraints of sustainability and profitability. While evaluating various possible market alternatives, managers typically refrain

from implementing revolutionary changes in their product or service offering; instead, they engage in evolutionary, often incremental, market moves. This is understandable, because the underlying problem in predicting customer choices resides largely in the fact that many people make purchasing decisions based on (potentially) many different criteria simultaneously, including brand, quality, performance, price, service, features, channel, and so on. Therefore, it is frequently easier to modify the "core engine" of a product or service offering by adding one or several "engine variants" rather than introducing "the new thing" that might capture new customers and market segments but, at the same time, risks a firm's market position and profitability.

Despite these constraints, the dramatic explosion in product and service offerings has become a challenge for the customer and business alike. Every consumer decision—from ordering a cup of coffee to buying a mobile phone or choosing a retirement plan—is becoming increasingly complex thanks to the abundance of choices. However, in the last few years, new research has expanded the management toolbox, so businesses can now clearly understand the impact that drivers have on the market and their customers' choices

Recent work on the art and science of customer choices has greatly improved management's ability to predict customer decisions—even under seemingly

complex and erratic market conditions. Pioneered by Daniel L. McFadden (a winner of the 2000 Nobel Prize in economics), this work focuses on both the economic reasons for individual choices and the ways researchers can measure and predict those choices. McFadden's boundary-breaking work and the corresponding developments in choice modeling have led to diverse applications, such as in the process of designing and developing new products and services (e.g., retail, hospitality, financial services, industrial automation, medical systems, and telecommunications), in repositioning and offering streamlined processes, and in transportation planning and pricing strategies in urban and interurban environments.

The Reluctance to Switch Packages

The saturation of the mobile telephony markets, the proliferation of products and services, new market entries, and continuously emerging technologies require many companies to continually redefine their preferred core business doctrine: Let customers choose what they want. Adhering to such a doctrine becomes even more challenging when a large number of potential decision factors are intertwined, such as

brand, wireless service providers, purchasing locations, phone sizes, and service plans (see Exhibit 1).

In addition, in any saturated or already exploited market, customers are reluctant to give up their current product-service provider if the advertised innovations have only incremental value, lack credibility, or do not seem to be true alternatives. Sometimes price is even an insufficient incentive to switch. In summary, customers tend to stay with status quo ("don't like to switch" or "inert"), remaining satisfied with the current product and service offerings already available to them. In addition, it is important to understand how much value "cash-like incentives" must have in order to acquire customers and avoid subsequent "customer reversal" if the customers discover that the offering has no value beyond the initial inertia-breaking incentive.

Finally it has to be noted that, in most cases, any product-service offering in the mobile phone market is "controlled" by the service provider—the consumer must either select a (heavily) subsidized device combined with a fixed-time-based service provider contract or acquire a significantly higher priced,

Exhibit 1

Decision Factors for Mobile Device Purchase

Phone Price	Purchasing price from consumer perspective, including subsidized or non-subsidized phones
Wireless Carrier	Service provider of choice offering the phone package (e.g., Verizon, T-Mobile)
Phone Functions	Phone functionality, ranging from entry-level phones (voice, SMS) to high-end multimedia phones
Phone Design	Form factor of the phone (bar, swivel, clamshell, PDA-style, and design/look and feel)
Brand	Device brand, including service-provider-branded phones and "Google" phones
Usage Range	Usability of the phone in the United States only or worldwide
Phone Size	Size and weight
Carrier Flexibility	Ability to freely choose service provider versus locked phones
Purchase Location	Preferred choice of purchase location, from service provider POS to electronics retailers to Internet

nonsubsidized mobile device packaged with one or more service contracts. Imagine how different a flat-screen television purchase decision would be if the acquisition costs were subsidized, but subsequently, such a television set could be used only with a particular channel content provider!

Measuring Mobile Phone and Service Value Structures

If a handset manufacturer or service provider now evaluates alternative mobile packaging, market, or channel approaches, it will be clear that a typical consumer survey cannot possibly resolve the complexity of all the relationships because of the many factors affecting the decision process.

In a recent study with more than 1,800 consumers in the United States, Booz Allen Hamilton simulated the actual consumer purchasing process with a choice model; i.e., current users of mobile devices were asked to compare their existing package—device and mobile service contract—with alternate packages. Choices included various price points, retail outlets,

calling features, and so forth. The earlier identified nine key decision factors, each with a unique set of options, were systematically presented to the study participants for evaluation. The customer choice model described two phone and service provider packages, each with a number of market drivers and specific value extensions (see Exhibit 2). Depending on the objective of the study, respondents were asked, for example: If these two phone and service provider packages were your only alternatives, which one would you choose: Package A, Package B, or neither one? If Package A were your only option, would you purchase it or continue to use your current package? These types of binary questions were reiterated with several alternative choices. The results of these simulated purchase interactions yielded measurements of the relative importance of different decision factors and attributes of the mobile package as well as of customers’ inertia; i.e., their reluctance to switch.

The U.S. Wireless Phone Commodity Chasm

Interestingly, the majority of the primarily low-end and mid-tier customers are highly commodity driven.

Exhibit 2

Choice Model Sample Screen Comparing Two Generated Offerings with User's Existing Package

	Package A	Package B	Current Package
Phone Brand	LG	Samsung	Sharp
Phone Size	It will fit into a jeans pocket, but it is too bulky to fit in a shirt pocket	Size of an oversized credit card with ¼ inch thickness	It is small enough to fit into a typical shirt or blouse pocket
Phone Design	Slide	Swivel	Monoblock
Phone Functions <small>In addition to voice calls, voice mail, short messaging (e.g., SMS, MMS)</small>	None	Business productivity tools (e.g., e-mail, schedule)	Media tools (e.g., camera, music player, TV)
Phone Price	\$250 or more	Between \$100 and \$149	Between \$50 and \$99
Wireless Carrier	Verizon Wireless	Nextel	Alternative carrier (e.g., MTV, Virgin Mobile, Boost)
Carrier Flexibility	Can be used with any other carrier of my choice	Can only be used with this carrier	Can be used with any other carrier of my choice
Phone Usage	Can be used in U.S. only	Can be used around the globe	Can be used around the globe
Purchase Location	Internet store/online	Department store (e.g., Macy's, JC Penney)	Wireless carrier retail store (e.g., Verizon, Sprint)
Which device package will you choose?	○	○	○

Source: Booz Allen Hamilton

Other than by offering an attractive handset price, it is almost impossible to convince a customer to change his or her current phone package. In addition, further analyses revealed that one-third of U.S. consumers are not at all willing to change their wireless package. In other words, consumers cannot be lured away from their current package by any possible combination of an alternative wireless package (see Exhibit 3).

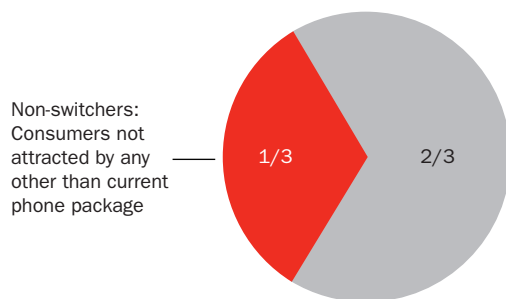
Such reluctance to switch is unusually high—much higher than in any other industry study previously conducted—and shows that the wireless device and service industry have largely failed to provide true value-added solutions since RIM's success in combining voice and data in the 1990s.

Although price is by far the most important decision factor both in the aggregate market as well as when differentiating between high- and low-end users (see Exhibit 4), high-end users have notably different utility values for wireless carrier choice and device-related criteria compared with low-end users.

Based on determined utility values, we were able to identify insightful differences and clearly differentiate wireless offerings for specific user segments. User preferences clearly differed by used brand and showed how service providers could use the phone package

Exhibit 3

U.S. Mobile Phone Market Inertia

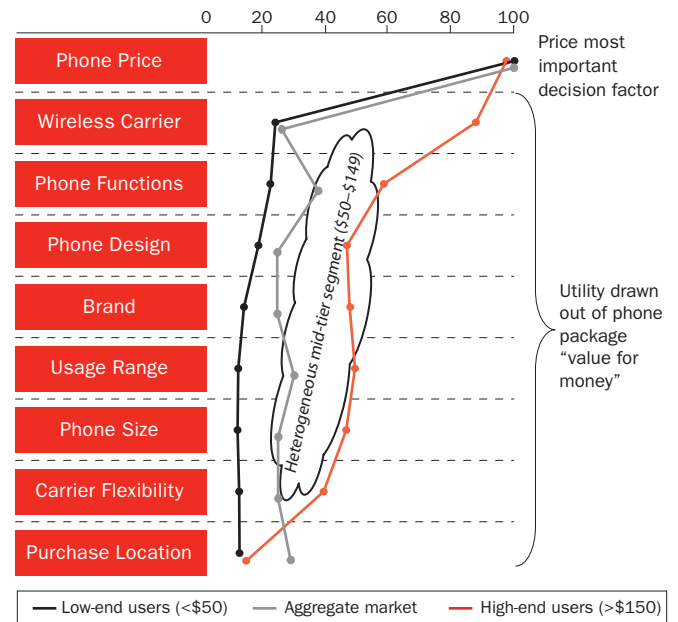


- Extremely high resistance to switching mobile phone package at all—higher than in any Choice Modeling study conducted before (100+)
- Majority of the market (primarily low-end, mid-tier) is highly commodity driven and requires substantial effort to be convinced to choose a different phone package

Source: Booz Allen Hamilton Choice Model

Exhibit 4

Importance of Decision Factors for Mobile Device Purchase (100 = maximum), Aggregate Market vs. High-End vs. Low-End Users



Source: Booz Allen Hamilton Choice Model

to lure users away from other service providers. Some facts to explain the opportunity: Of all phone users, U.S. Nokia users attribute the lowest value to their phone package—likely because Nokia users in the United States are mostly low-end users and such users generally attribute less value to purchasing a phone package. Consequently, Nokia users are more willing to switch their current mobile phone package than any other brand's users (see Exhibit 5, page 6). So why couldn't a service provider use the specific Nokia user base consumer preference profile to attack its competitor's Nokia base? Differentiating the consumer preference profile by brand allows for a service provider to do just that. An example is depicted in Exhibit 6 (see page 6).

U.S. Sony Ericsson users are willing to pay a price premium, tremendously value the Sony Ericsson brand and the provided phone features, and are attracted by the purchase location. It is useless to offer them a Nokia standard phone in a mass-market electronics

The Art and Science of Choice Modeling

Initially, management's preconceptions about current and future product and service offerings must be assessed and challenged, and the customer's decision-making processes must be uncovered (or deconstructed). By using qualitative market-assessment approaches, such as expert interviews, customer focus groups, case studies, macro- and microeconomic industry data, a list of core market-choice drivers can be developed that may influence various value extensions of a customer's buying decision. When identifying these market-choice drivers, it is important to critically assess whether they are truly relevant in the purchase decision, because any choice model will be only as good as its input variables. Finally, it is critical to find a balance between the realism of the situation and the ability of a customer to truly assess the presented alternative market choices.

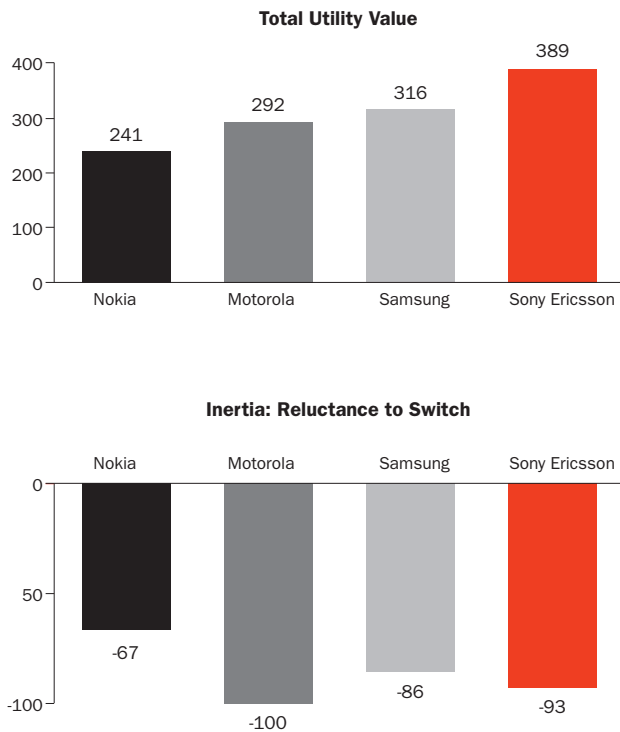
After identifying the relevant market-choice drivers, customer-choice configurations are scientifically reconstructed using experiments that satisfy necessary statistical and mathematical considerations. The number of potential choice configurations can multiply quickly; for example, 10 market drivers with four value extensions each can generate more than a million alternatives. Consequently, statistical techniques such as fractional factorial design and blocking can be employed to estimate the effects of major market drivers and their value extensions. In the customer-choice experiments, respondents are asked to choose among alternatives presented in "choice sets," e.g., to select one of two or more choice options in a series of choice sets. Within each set, respondents are asked to select either one of the two packages or neither.

Just a few years ago, the typical implementation of choice modeling involved asking respondents to react to lengthy paper-and-pencil surveys based on a series of preconfigured choice scenarios. Choice sets were presented as static tables, with little room for customization or adaptation for different respondents. However, recent advances in experimental designs and IT, including broadband Internet access, digital imaging, and video, along with faster computing speeds, allow researchers to develop more realistic choice experiments that can be adjusted to an individual respondent's decision scenario. In particular, Web-based technologies (e.g., hyperlinked pictures, brand logos, and audio and video files) allow the illustration of the choice scenarios.

Based on responses from a representative sample of customers (or potential future customers), econometric models can then be used to determine the relative weighting for each market driver and for interactions among drivers. After developing a suitable econometric model (e.g., multinomial logit, nested logit models), the results can be easily implemented in a decision-support program that can be used to perform various managerial what-if analyses. In this way, managers can select the optimal combination of operations and market drivers in order to develop the most profitable and sustainable value proposition while leveraging available resources as much as possible.

Exhibit 5

Total Utility Value and Inertia by OEM User Base



Source: Booz Allen Hamilton Choice Model

store. Rather, a service provider must position an offering against the specific Sony Ericsson consumer preference profile to convince a significant number of users to switch.

Predicting the Future

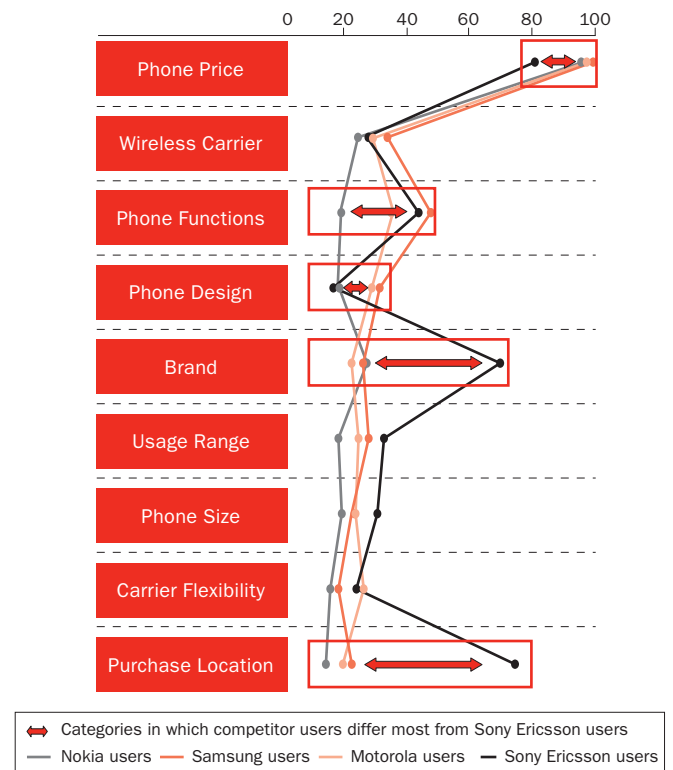
Choice modeling also has the capability to predict the impact future products and services will have on the market, even when they are not yet physically available. For example, our study revealed as early as February 2007 that the Apple iPhone would be extremely attractive to U.S. consumers, despite its higher price tag (see Exhibit 7).

Simulating the impact of a new phone package via choice modeling is a powerful tool for any service provider that wants to introduce new packages to the market. In our U.S. case, we used the choice model data

to simulate “the ideal high-end phone” and its value drivers’ set of characteristics. Exhibit 8 lists this set and describes this “ideal phone.” Guess what? Apple got it just about right, apart from the pricing. While the initial market hype and Apple-addicted consumers justify pricing to reap a premium, imagine the market share achievable if Apple or the subsidizing service providers were to adjust the purchasing price to competitive levels: Our simulated market impact analysis anticipates Apple’s market share boosted from a mere 3 percent to market leadership.

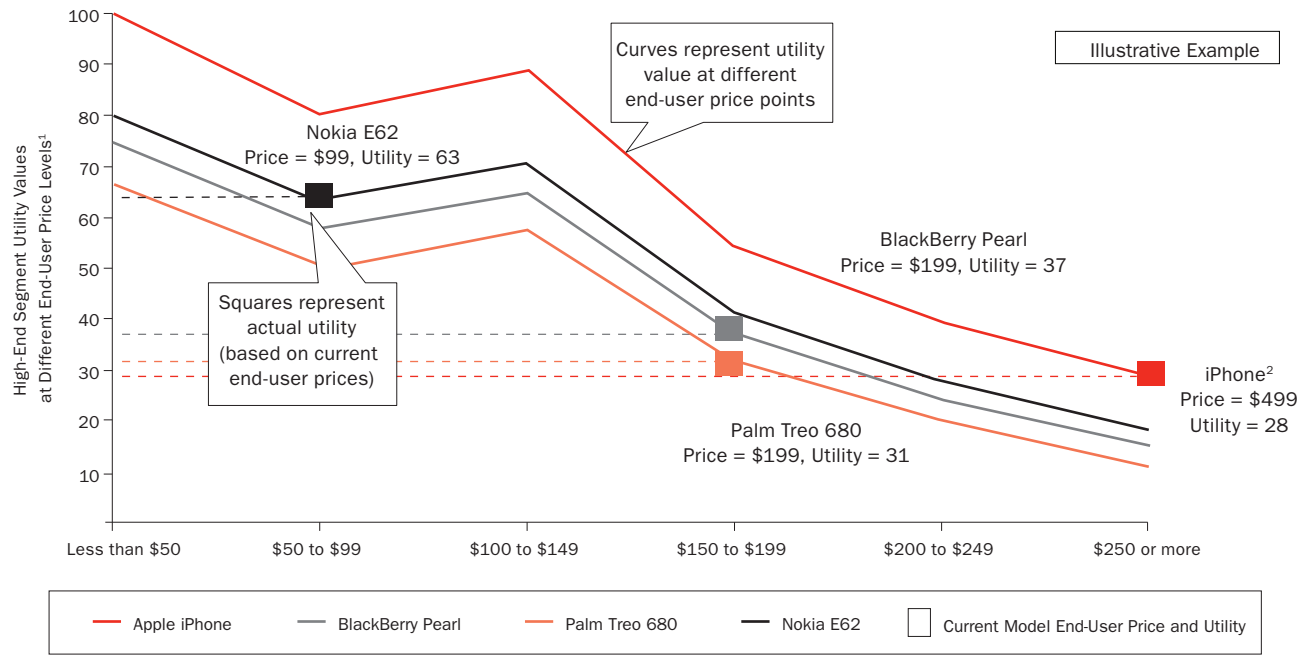
Exhibit 6

Importance of Decision Factors for Mobile Device Purchase (100 = maximum), Different OEM’s Users



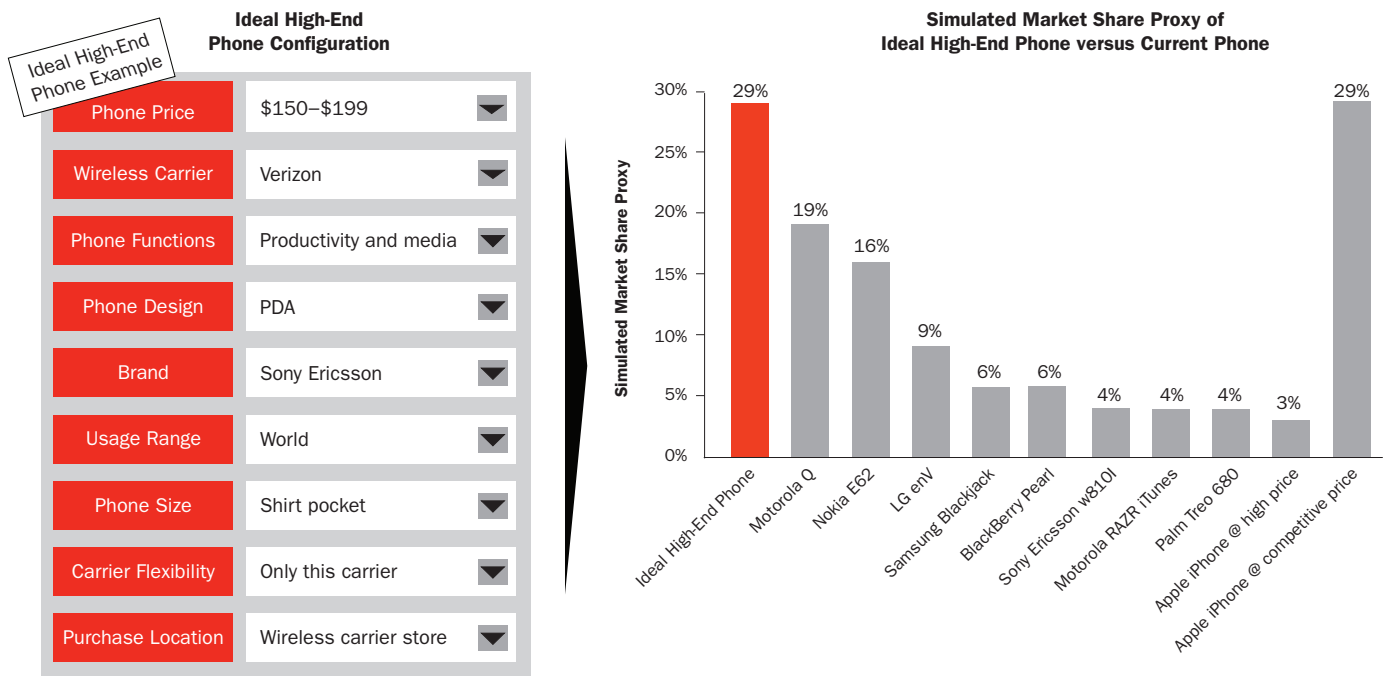
Source: Booz Allen Hamilton Choice Model

Exhibit 7
Utility Values for Apple iPhone versus Other High-End Segment Devices



1. Calculated based on the maximum utility
 2. Data collected before official announcement of iPhone
 Note: Actual phones simulated by mapping the phone configurations to purchasing decision factors in choice model. All prices are end-user prices (incl. subsidies)
 Source: Booz Allen Hamilton Choice Model

Exhibit 8
Simulated Launch of Ideal High-End Phone



Source: Booz Allen Hamilton Choice Model

Conclusion

In our example, we show how device manufacturers, wireless service providers, and electronics retailers can use choice modeling as a tool for operational and strategic tasks in order to understand the value and relationship of price, brand, wireless device, and service providers in a customer's decision process.

We believe that choice modeling is ideally suited to analyze the most complex consumer decision processes and yields valuable insights for demand-driven strategy development by revealing customer value segmentation maps, measuring market share

impact of new product-service combinations, and assessing overall brand equity in the context of identifiable switching barriers. Finally, choice modeling can reveal salient differences between managers' beliefs about customers' needs and wants and customers' actual needs and choices. For managers seeking reliable feedback on how customers view their offerings, choice modeling provides a rigorous way to turn customer-driven feedback into profitable and sustainable strategies for retaining or capturing market share without sacrificing margins.

Resources

- Sali Li, Anoop Madhok, Gerhard Plaschka, and Rohit Verma, "Supplier Switching Inertia and Competitive Asymmetry: A Demand-Side Perspective," *Decision Sciences*, vol. 37, no. 4
- Rohit Verma and Gerhard Plaschka, "Predicting Customer Choices with Confidence," *MIT Sloan Management Review*, vol. 47, no. 1
- Rohit Verma and Gerhard Plaschka, "The Art & Science of Choice Modeling: Reflections, Advances, and Managerial Implications," *Cornell Hotel and Restaurant Administration Quarterly*, vol. 44, no. 6

About the Authors

Gregor Harter is a partner with Booz & Company based in Munich. His work is concentrated in the telecommunications and technology sector in Europe, and his clients include major corporations in the United States and in Asia. He specializes in demand-side improvements along the customer life cycle and is responsible for the firm's service offerings in marketing and sales in Europe. He can be reached at +49-89-54525-554 or gregor.harter@booz.com.

Gerhard R. Plaschka is a senior executive advisor to Booz & Company and associate professor in strategy and venture management in the Kellstadt Graduate School of Business at DePaul University, Chicago. His

primary research interests are demand-side-based strategy issues within highly complex, emerging, and mature industrial product and service markets. He can be reached at +49-89-54525-336 or gerhard.plaschka@booz.com.

Rohit Verma is associate professor of service operations management at the School of Hotel Administration, Cornell University. He is currently on leave from the David Eccles School of Business, University of Utah, where he holds the position of George S. Eccles Professor of Management. He can be reached at +1-607-351-7854 or rv54@cornell.edu.

BOOZ & COMPANY WORLDWIDE OFFICES

Asia

Beijing
Hong Kong
Seoul
Shanghai
Taipei
Tokyo

Australia, New Zealand, and Southeast Asia

Adelaide
Auckland
Bangkok
Brisbane
Canberra
Jakarta
Kuala Lumpur
Melbourne
Sydney

Europe

Amsterdam
Berlin
Copenhagen
Dublin
Düsseldorf
Frankfurt
Helsinki
London
Madrid
Milan
Moscow
Munich
Oslo
Paris
Rome
Stockholm
Stuttgart
Vienna
Warsaw
Zurich

Middle East

Abu Dhabi
Beirut
Cairo
Dubai
Riyadh

North America

Atlanta
Chicago
Cleveland
Dallas
Detroit
Florham Park
Houston
Los Angeles
McLean
Mexico City
New York City
Parsippany
San Francisco

South America

Buenos Aires
Rio de Janeiro
Santiago
São Paulo