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Neglected Outcomes of Customer Satisfaction

Although there is significant evidence that customer satisfaction is an important driver of firm profitability, extant literature has largely neglected two intermediate outcomes of customer satisfaction, namely, a firm's advertising and promotion efficiency and its human capital performance. On the basis of longitudinal analyses of large-scale secondary data from multiple sources, the authors find that customer satisfaction boosts the efficiency of future advertising and promotion investments. This finding can be explained by the possibility that customer satisfaction generates free word-of-mouth advertising and saves subsequent marketing costs. In addition, customer satisfaction has a positive influence on a company's excellence in human capital (employee talent and manager superiority). This finding is highly novel, indicating that human resources managers should have a strong interest in customer satisfaction as well. Finally, the authors investigate the moderating influence of market concentration on both relationships. The uncovered results have important implications for marketers in their dialogue with financial executives and human resources managers.

Many academics would certainly agree that customer satisfaction is a central construct in marketing research. According to Keiningham, Munn, and Evans (2003, p. 37), "both practitioners and academics have accepted the premise that customer satisfaction results in customer behavior patterns that positively affect business results." In this context, Seiders and colleagues (2005, p. 26) state that "marketing literature consistently identifies customer satisfaction as a key antecedent to loyalty and repurchase." Furthermore, Szymanski and Henard (2001, p. 16) argue that "customer satisfaction has come to represent an important cornerstone for customer-oriented business practices across a multitude of companies operating in diverse industries." Finally, Mittal and Kamakura (2001, p. 131) add that "customer satisfaction management has emerged as a strategic imperative for most firms."

Indeed, customer satisfaction has attracted significant research interest for more than two decades. In particular, researchers have examined theoretical and conceptual underpinnings of customer satisfaction (e.g., Fornell et al. 1996; Luo and Bhattacharya 2006; Oliver 1997; Rust et al. 2004). There is a multitude of scientific articles that address potential antecedents of customer satisfaction (e.g., Anderson and Sullivan 1993; Bolton and Lemon 1999; Oliver 1980; Szymanski and Henard 2001). In addition, many studies have investigated various outcomes of customer satisfaction. This is also the focus of our research.

Figure 1 provides an overview of previous empirical work on the outcomes of customer satisfaction. We distinguish four categories: customer-related, employee-related, efficiency-related, and overall performance-related outcomes. The last category is related to general performance outcomes, which are bottom line in nature. Most of the studies that fall into this category investigate financial performance outcomes of customer satisfaction. Overall, there is significant evidence in the marketing literature that customer satisfaction is an important driver of a firm's profitability. For example, Anderson, Fornell, and Lehmann (1994) and Rust, Moorman, and Dickson (2002) report a positive impact of customer satisfaction on financial performance measures, such as return on investment and return on assets. More recently, scholars have found that satisfaction boosts shareholder value by increasing cash flow growth and reducing its volatility (Fornell et al. 2006; Gruca and Rego 2005).

The other three categories of satisfaction outcomes are more specific and provide explanations for the positive impact of customer satisfaction on firm profitability. As Figure 1 shows, the majority of studies investigate customer-related outcomes (including customers' behavioral intentions and behaviors). The most central finding in this context is that satisfaction increases customer loyalty and influences future repurchase intentions and behavior (Fornell et al. 1996; Mittal and Kamakura 2001; Mittal, Ross, and Baldasare 1994; Olsen 2002). Another mechanism through which satisfaction can enhance profitability is related to pricing. Research shows that highly satisfied customers are willing to pay premium prices (Homburg, Koschate, and Hoyer 2005) and are less price sensitive (Stock 2005). Although Figure 1 reveals a large number of studies that examine outcomes of customer satisfaction, it also shows that two categories of outcomes have been neglected (and thus require further research): efficiency-related and employee-related outcomes.

In general, efficiency refers to the conversion ratio of organizational resource inputs to desirable goal outcomes (Bucklin 1978; Luo and Donthu 2006). To the best of our

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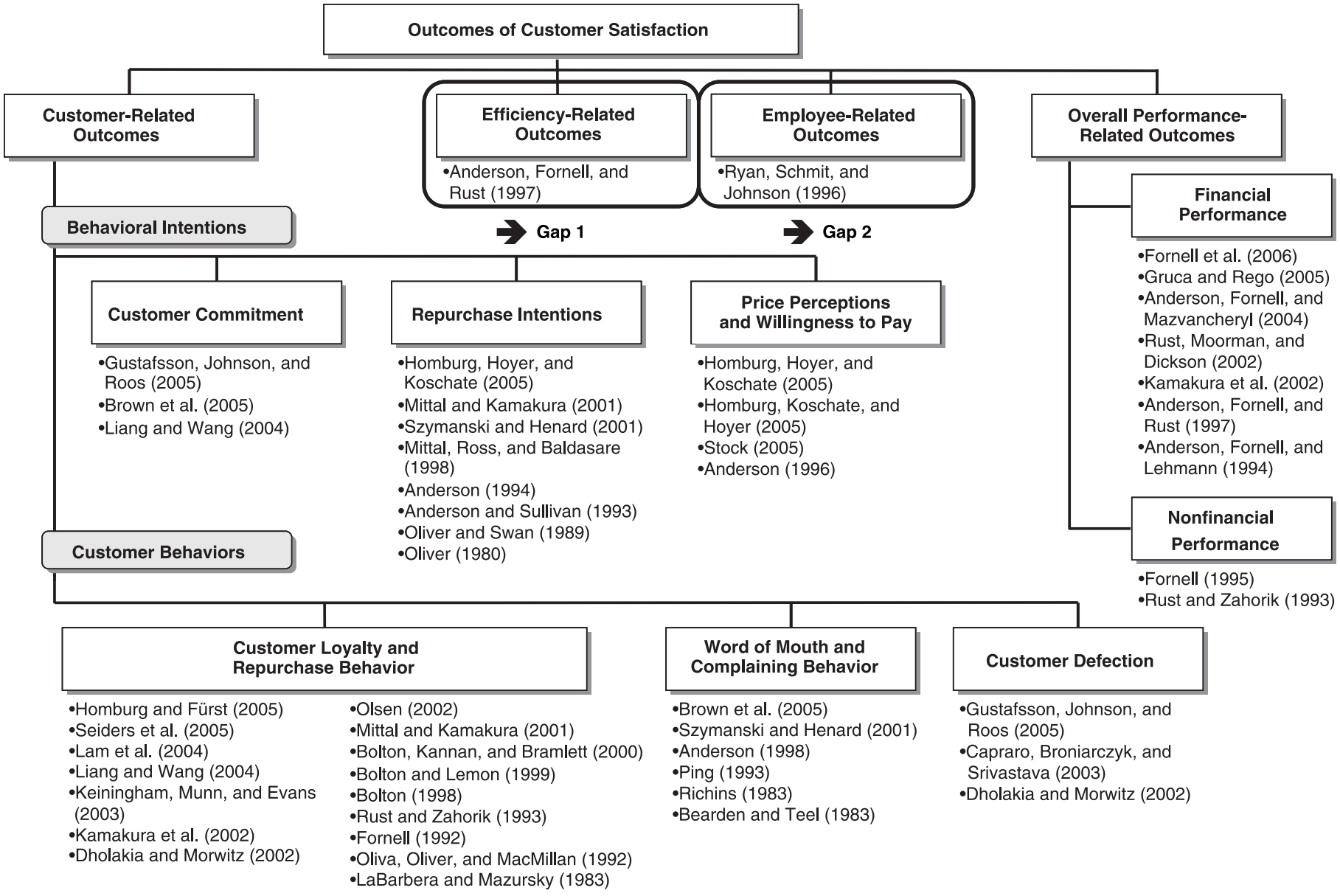
FIGURE 1
Outcomes of Customer Satisfaction: Framework and Empirical Studies



knowledge, only one academic study has examined an efficiency-related outcome of customer satisfaction: Anderson, Fornell, and Rust (1997) show that customer satisfaction positively affects the ratio of sales to employee. Moreover, Mittal and colleagues (2005) and Rust, Moorman, and Dickson (2002) at least consider efficiency issues in their dual-emphasis approach, but they do not explicitly investigate the impact of customer satisfaction on efficiency-related outcomes. Notably, it is plausible that customer-related outcomes of customer satisfaction affect specific facets of productivity in the marketing domain. For example, because customer satisfaction induces customer behaviors such as free word-of-mouth advertising, firms with higher customer satisfaction may be more efficient in future marketing communications investments. Existing studies have not investigated this impact. Because research evolves as a progression, we need to evaluate the influence of customer satisfaction on the performance metric of advertising and promotion efficiency (i.e., the conversion ratio of sales to required advertising and promotion costs).

An approval or rejection of this influence is important to quantify the theory of the marketing productivity chain (Rust, Lemon, and Zeithaml 2004). According to Rust, Lemon, and Zeithaml (2004), marketing variables such as customer satisfaction should first influence some intermediate productivity metrics (i.e., marketing efficiency) before it has a financial impact. Managerially speaking, in their dialogue with chief financial officers (CFOs), marketing managers must show numbers to justify investments to increase customer satisfaction (*BusinessWeek* 2004; Gupta and Lehmann 2005; Rust et al. 2004). The CFO perspective on this issue often is that customer satisfaction costs money. Revealing a positive impact of customer satisfaction on future advertising and promotion efficiency would prove that customer satisfaction also saves subsequent marketing communications spending.

Previous research has also largely neglected employee-related performance outcomes of customer satisfaction. The only exception we are aware of is the work of Ryan, Schmit, and Johnson (1996), which reveals a positive impact of customer satisfaction on employee satisfaction. We argue that in times when customer satisfaction and corresponding surveys are publicly circulated (e.g., Spencer and Albergott 2004; Young 2006), superior levels of customer satisfaction may also have beneficial effects that are not driven by customer behaviors. For example, firms with higher customer satisfaction are more attractive employers and thus can often hire better people (because they signal financial success); as a result, such firms are able to enjoy superior human capital performance (e.g., Dess and Shaw 2001). Another possible explanation for an increase in firm human capital performance is that there is a more positive atmosphere in companies with satisfied and loyal customers because employees enjoy their jobs more (as a result of emotional contagion) and voluntarily work harder (Reichheld and Sasser 1990).

This underresearched issue (whether customer satisfaction enables the firm to increase its human capital performance) is highly relevant for managers. Indeed, human resources theory suggests that being an attractive employer with better human capital is a key success factor for firms (Becker 1964; Hatch and Dyer 2004; Hitt et al. 2001; Huselid 1995). Many organizations strive to become first-choice employers in their industries to acquire and retain "star" employees (e.g., *Fortune* 2006). Notably, if customer satisfaction helps the firm promote human capital excellence, human resources managers should have a strong interest in customer satisfaction as well.

The purpose of our study is to address the two neglected categories of customer satisfaction outcomes identified in Figure 1, namely, efficiency-related outcomes and employee-related outcomes. More specifically, we explore whether customer satisfaction affects a firm's advertising and promotion efficiency and human capital performance. Furthermore, we analyze whether the contextual variable of market concentration moderates these two effects (Anderson, Fornell, and Mazvancheryl 2004).

In addition to closing a gap in the literature, studying these two potential outcomes of customer satisfaction is consistent with the proposed research directions of Oliver (1999), who calls for further investigations of the cost effects of customer satisfaction and its potential effects on employees. From a methodological point of view, the current study has two distinctive features. First, it is based entirely on secondary data merged from different archival sources. Second, it offers a dynamic analysis in a longitudinal design. Before presenting the data and the results, we develop the underlying hypotheses.

Hypotheses Development

Can Customer Satisfaction Affect Future Advertising and Promotion Efficiency?

We first address the suggested effects of customer satisfaction on advertising and promotion efficiency. We define the dependent variable, advertising and promotion efficiency, as the optimized conversion ratio of a firm's marketing costs (advertising and promotion investments) to its sales performance, or the firm's deployment ability to convert marketing communications costs into results (Bucklin 1978; Luo and Donthu 2006; Vorhies and Morgan 2003). It is a measure of a firm's marketing productivity (Rust et al. 2004) and an important marketing dashboard metric.

We expect that customer satisfaction induces behaviors (free advertising, loyalty, willingness to pay) that should help the firm become more efficient in its future communication activities. For example, better customer satisfaction can lead to positive word-of-mouth communication, which is free advertising for the firm (see Brown et al. 2005; Ranaweera and Prabhu 2003; Szymanski and Henard 2001), and free advertising reduces the necessity for the company to conduct expensive communication programs to attract new customers. Thus, for a given sales level, marketing costs would be reduced when there is higher customer satisfaction. Perhaps more obvious is the opposite case in which dissatisfied customers give negative references (Blodgett, Wakefield, and Barnes 1995; Bolfing 1989; Fornell et al. 1996; Richins 1983; Szymanski and Henard 2001), and this possibly occurs even to a greater extent than positive word

of mouth from satisfied customers (Technical Assistance Research Program 1981). Such negative publicity can be mitigated only by significant advertising and promotion investments, thus harming communication efficiency.

In addition, for a given level of marketing communications costs, customer satisfaction can lead to higher sales performance through improved customer loyalty. As Figure 1 shows, there is extensive evidence that customer satisfaction is an important predictor of customer loyalty (Fornell 1992; Gustafsson, Johnson, and Roos 2005; Liang and Wang 2004; Rust and Zahorik 1993). Previous research has suggested that customer satisfaction and the resultant loyal customer base ensure future sales through consequential purchases and an increased share of wallet (Keiningham, Munn, and Evans 2003; Olsen 2002). Furthermore, customer satisfaction can lead to lower advertising and transaction costs because it is cheaper to retain and serve loyal customers than to acquire new customers (Fornell 1992).

Recent empirical research has also shown that satisfied customers are less price sensitive (Stock 2005) and willing to pay a higher price premium (Homburg, Koschate, and Hoyer 2005). By virtue of premium prices and customer loyalty, we believe that a company with satisfied customers can obtain higher revenues from its existing customers and reduce its dependence on costly marketing communications programs, thus improving its advertising and promotion efficiency. This discussion suggests that customer satisfaction generates more future sales at a given level of advertising and promotion costs or saves future communication costs at a given level of sales. Thus:

H_1: Customer satisfaction has a positive influence on a company's future advertising and promotion efficiency.

Can Customer Satisfaction Affect Future Human Capital Performance?

Human capital is derived from various sources, such as a person's education, experience, talents, and attitude toward life and business (Hudson 1993). In the firm context, human capital comprises the skills, abilities, knowledge, and experience of people the company employs (Becker 1964; Hitt et al. 2001). Human resources studies have found that various types of human capital (e.g., general employees' human capital, top executives' human capital) are important for increasing company profitability (Benson, Finegold, and Mohrman 2004; Hauser and Simester 1996). Thus, we refer to a company's human capital performance as its excellence in terms of employee talent and managerial superiority compared with its leading rival firms in the industry (based on large-scale surveys, as we detail subsequently). In other words, a firm's human capital performance indicates the employer's ability to attract and keep good people. Research in strategy and marketing suggests that better employee attitude and commitment determine customer service quality and, through improved service quality, drive customer satisfaction (e.g., Hartline and Ferrell 1996; Heskett et al. 1994; Homburg and Stock 2004; Schlesinger and Zornitsky 1991; Tornow and Wiley 1991). Not conflicting with these studies that examine employee attitude, we argue for an ignored impact direction; that is, customer satisfaction drives the firm's human capital performance over time.

In particular, we expect that a firm's customer satisfaction positively affects its future human capital performance for several reasons (e.g., signaling future profitability and emotional contagion). First, there are some financially oriented arguments for the positive impact of customer satisfaction on human capital performance. Given the positive connection between a firm's customer satisfaction and financial performance (e.g., Anderson, Fornell, and Lehmann 1994; Anderson, Fornell, and Mazvancheryl 2004), firms with high customer satisfaction should be able to provide more attractive future financial rewards to their employees. This would prevent good employees from leaving the company and thus contribute to the firm's future human capital performance. Indeed, by signaling and indicating a company's future profitability growth and financial success (Fornell et al. 2006; Gruca and Rego 2005; Luo and Bhattacharya 2006), customer satisfaction promotes a firm's attractiveness to highly qualified potential employees and executives. This signaling effect is particularly relevant in times when customer satisfaction surveys are increasingly circulated and popularized in the media (see Spencer and Albergott 2004; Young 2006). In addition, superior customer satisfaction signals better chances to develop careers and achieve high future salaries and thus augments the firm's attractiveness as an employer. Therefore, firms with high levels of customer satisfaction are able to choose new employees from a broader set of applicants, which again increases the firm's future human capital performance (e.g., Bretz, Boudrau, and Judge 1994; Gatewood, Gowan, and Lautenschlager 1993; Jurgensen 1978).

Second, we rely on the theoretical concept of emotional contagion (see Hatfield, Caccioppo, and Rapson 1994). In particular, the theory of emotional contagion holds that exposure to a person who expresses positive or negative emotions can produce a corresponding change in the observer's emotional state (Pugh 2001). Thus, firm employees (e.g., service employees, salespeople, sales support personnel) who are confronted with highly satisfied customers will develop a higher level of future job satisfaction than employees of firms with frustrated customers who are not satisfied and actively complain (Bearden and Teel 1983; Ping 1993). Higher employee satisfaction then boosts employee loyalty and weakens the likelihood of employee turnover (Fornell 1992). This emotional contagion effect between customer satisfaction and employee satisfaction holds for both services and goods sectors, as long as there is personal interaction between a firm's employees and its customers (Hatfield, Caccioppo, and Rapson 1994). Indeed, in the business-to-business context, and especially for the pharmaceutical, computer, and other high-tech goods sectors, a lot of personal interaction occurs between company employees and customers (Fornell 1992; Harter, Hayes, and Schmidt 2002). Empirically, Ryan, Schmit, and Johnson (1996) find that customer satisfaction has a positive impact on employee satisfaction over time. Echoing this, Harter, Hayes, and Schmidt's (2002) meta-analysis reveals that employee satisfaction is positively related to employee productivity. Moreover, Reichheld's (1996, p. 12) managerially oriented study explicitly states that "the best employees prefer to work for those companies who achieve [customer sat-

isfaction and] customer loyalty." This directly supports the notion that customer satisfaction helps enhance employee performance. Thus:

H_2: Customer satisfaction has a positive influence on a company's future human capital performance.

The Moderating Role of Market Concentration

Our study also addresses potential moderating effects of market concentration. Market concentration, which can be described as the extent to which a smaller number of supplier firms account for a large proportion of market output, is an important characteristic of market structure that influences several company and market variables. It has been shown that market concentration can significantly affect relationships between customer satisfaction and firm performance outcomes (e.g., Anderson, Fornell, and Mazvancheryl 2004). Indeed, economic theory suggests that there is a close relationship between market concentration and competitive intensity. That is, higher market concentration goes hand in hand with a lower level of competitive intensity (Gatignon, Weitz, and Bansal 1990; Steenkamp et al. 2005).

We believe that customer satisfaction's influence on future advertising and promotion efficiency is more salient in markets with a high concentration than in those with a low concentration. This is because in less-concentrated (and, therefore, more competitive) markets (Gatignon, Weitz, and Bansal 1990; Kim and Lim 1988), even highly satisfied customers are difficult to retain and are more price sensitive, which reduces the likelihood of subsequent purchases and of gaining price premiums (Anderson 1998; Bolton 1998; LaBarbera and Mazursky 1983; Oliver 1999; Seiders et al. 2005). In this case, customer satisfaction is less likely to translate into higher future sales at a given level of advertising and promotion costs. On the contrary, in highly concentrated markets, it is easier for customers to overlook different competitors' offers (Park, Lennon, and Stoel 2005), and in turn, this should lower customers' perceived risk (e.g., the risk of buying a suboptimal product). Given that lowered perceived risk promotes buying intentions and loyalty (Wood and Scheer 1996), we expect that customer satisfaction is more likely to translate into higher future sales at a given level of advertising and promotion cost in highly concentrated markets than in less-concentrated markets. Thus:

H_3: Customer satisfaction has a stronger influence on a company's future advertising and promotion efficiency in markets with a high concentration than in markets with a low concentration.

We also argue that customer satisfaction should have a stronger effect on human capital performance in markets with a low market concentration than in markets with a high concentration because in markets with a low concentration (and intensive competition), there is an increased necessity for firms to communicate customer satisfaction results to the public. Market competition both motivates and rewards companies to publicize their superior satisfaction rankings (to signal their financial health and future perspectives; see Anderson 1998; Schultz 1961). Indeed, the more markets that are competitive, less concentrated, and highly uncertain, the more likely are talented job applicants to regard customer satisfaction publications as signals of a firm's financial strength and overall attractiveness. In other words, in markets with a low concentration as opposed to markets with a high concentration, more experienced applicants' evaluations of a company's promotion and income opportunities might depend on its customer satisfaction figures.

Furthermore, our hypothesis can be supported through arguments that focus on existing employees and managers. Previous research indicates that in more competitive markets, there is a tendency for higher management turnover (Fee and Hadlock 2002). In this context, a high level of customer satisfaction and the resultant financial performance may be particularly relevant barriers to management turnover and promote the loyalty of highly skilled executives. The resultant decreased risk of the loss of talented employees and managers enables customer satisfaction to have a stronger effect on future human capital performance in markets with a low level of market concentration than in markets with a high level of concentration. Thus:

H_4: Customer satisfaction has a stronger influence on a company's future human capital performance in markets with a low concentration than in markets with a high concentration.

Data and Method

We collected a large-scale longitudinal data set from multiple archival sources to test the hypotheses. The data have measures for customer satisfaction, advertising and promotion efficiency, and human capital performance. We used data from the annual American Customer Satisfaction Index (ACSI) to gauge customer satisfaction, Competitive Media Reporting (CMR) and COMPUSTAT to derive a measure of advertising and promotion efficiency based on data envelopment analysis (DEA), and *Fortune*'s America's Most Admired Corporations (AMAC) to measure human capital. Table 1 reports the measures and their sources.

Customer Satisfaction

For customer satisfaction, we used survey data from the ACSI. This index provides a customer-based (not an expert-based) measure of overall satisfaction at the firm level. It is designed to represent the health of the national economy as a whole, and it covers all major economic sectors, such as manufacturing durables and nondurables, transportation, communications, utilities, retail, finance, and insurance, among others. It represents approximately 43% of the U.S. economy (Anderson, Fornell, and Mazvancheryl 2004; Fornell et al. 1996).

In compiling this data, ACSI interviews more than 200 customers on average per firm for approximately 200 large companies. More than 65,000 consumers are identified and interviewed annually. Interviewees are from 48 replicate samples of households with telephone services and Internet samples for e-companies. Each respondent (a real user of the products/services) must pass screening questions related to predefined purchase and consumption periods before participating in the survey. The survey questionnaire has multi-

TABLE 1
Measures and Data Sources

Measure	Operationalization	Data Sources	Rationale for Inclusion in Model
Customer satisfaction	The ACSI by the National Quality Research Center (customer-based, independent, cumulative, firm-level satisfaction measure for approximately 200 of *Fortune*'s largest companies in 20 industries and seven sectors in the United States)	ACSI	Independent variable
Advertising and promotion efficiency	A ratio of output (sales volume and sales growth) to inputs (broadcast advertising investment, print advertising investment, outdoor advertising investment, and sales promotion investment)	COMPUSTAT and CMR	Dependent variable
Human capital of employee talent	Employee talent in work-related skills, knowledge, experience, and human resources among 1000 of the largest firms in the United States (the AMAC annual survey)	AMAC	Dependent variable
Human capital of manager superiority	Senior management quality in work-related skills, knowledge, experience, and human resources among 1000 of the largest firms in the United States (the AMAC annual survey)	AMAC	Dependent variable
Market concentration	Herfindahl concentration index in the market	COMPUSTAT	Moderating variable

ple items for multiple constructs that are used to estimate the latent variable of overall customer satisfaction. The resultant customer satisfaction for an individual firm indicates its served customers' overall evaluation of total consumption experiences. This measure ranges from 0 to 100 (the highest).

The ACSI data set offers a unique and reliable measure of customer satisfaction because it employs identical survey methods, interview procedures, sampling, and estimation methods across firms and years. A comprehensive test of the validity and reliability of this satisfaction measure can be found in the work of Fornell and colleagues (1996). An emerging and growing body of literature has successfully employed this satisfaction database (e.g., Anderson, Fornell, and Mazvancheryl 2004; Fornell et al. 2006; Gruca and Rego 2005; Mithas, Krishnan, and Fornell 2005; Mittal et al. 2005; Morgan and Rego 2006). We were able to collect this survey-based measure of customer satisfaction for 139 companies in 2002 (Time 1) and 2003 (Time 2).

Although the total sample size of the ACSI for the two years is more than 139 companies and comprises approximately 200 firms/brands, we were not able to obtain a larger sample size for the final merged data set for several reasons. The sampled firms in the ACSI have changed over the years, and the ACSI methodology has incorporated more and more companies, from fewer than 130 firms/brands to more than 200 firms/brands. For example, customer satisfaction scores of some companies/brands (e.g., CenterPoint Energy Inc., Pepco Holdings Inc., Verizon Wireless, Kohl's Corporation, Orbitz Inc.) are not measured until 2005. Furthermore, in the ACSI, the same corporation may have multiple brands. For example, General Motors has Cadillac, Buick, Saturn, GMC, Pontiac, and Chevrolet brand-level customer satisfaction scores. Thus, following prior studies (i.e., Anderson, Fornell, and Mazvancheryl 2004, p. 177), we aggregated these multibrands at the firm level. After this step, we merged the ACSI data with other secondary sources, such as the AMAC, CMR, and COMPUSTAT at the firm, not the brand, level for the 278 firm-year unbalanced panel observations (278 = 139 firms × 2 years). To fill in the missing data, we also extensively searched other secondary sources, such as company annual reports, Standard & Poor's industry reports, Moody's reports, and Compact Disclosure. This merged data set includes individual firms in various industries, such as airlines, athletic shoes, automobiles, department and discount stores, hotels, household appliances, personal computers, supermarkets, and utilities. Table 2 reports descriptive statistics and correlations of customer satisfaction and other variables.

Advertising and Promotion Efficiency

We measured advertising and promotion efficiency with the DEA approach. Developed by operations research scholars (Banker, Charnes, and Cooper 1984; Charnes, Cooper, and Rhodes 1978), DEA is a mathematical programming technique that assesses the efficiency of resource utilization. Luo (2004) provides a comprehensive review of DEA applications in consumer research, advertising, retailing, and personal selling, among other areas.

Essentially, DEA measures the relative efficiency of a firm in converting multiple inputs into multiple outputs. The efficiency of a particular company is the conversion ratio of producing the outputs from the necessary inputs compared with best practices of competing firms. In DEA modeling, a firm is efficient (conversion ratio = 100%) if it cannot reduce its investments in any inputs while holding the same levels of outputs (or cannot increase its outputs while hold-

TABLE 2
Descriptive Statistics and Correlations

Variables	M	SD	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
V1: Customer satisfaction (Time 1)	75.24	6.94	1.00											
V2: Human capital of employee talent (Time 1)	5.80	1.21	.16	1.00										
V3: Human capital of manager superiority (Time 1)	6.13	1.27	.17	.85***	1.00									
V4: Advertising and promotion efficiency (Time 1)	.61	.28	.14	.11	.14	1.00								
V5: Human capital of employee talent (Time 2)	6.02	1.14	.22**	.81***	.77***	.12	1.00							
V6: Human capital of manager superiority (Time 2)	6.41	1.20	.20*	.77***	.80***	.14	.81***	1.00						
V7: Advertising and promotion efficiency (Time 2)	.68	.30	.25**	.13	.12	.42***	.12	.10	1.00					
V8: Market concentration (Time 1)	.21	.13	.09	.06	.08	.03	.03	.02	.05	1.00				
V9: Business segments (Time 1)	2.36	1.85	.03	.01	.02	−.03	.00	.01	−.01	−.04	1.00			
V10: Firm size (Time 1)	4.11	.93	.02	−.01	−.00	−.02	.01	−.01	−.00	−.02	.05	1.00		
V11: Operating leverage (Time 1)	.37	.58	−.03	−.04	−.02	−.03	−.01	−.02	.18*	.01	.02	−.03	1.00	
V12: Financial leverage (Time 1)	2.03	7.11	−.04	.01	.02	.04	.17*	.03	.04	−.03	.05	.01	−.02	1.00

*$p < .10$.
**$p < .05$.
***$p < .01$.

ing the same levels of inputs). Otherwise, a firm is not efficient, and the portion of inputs and costs (1 – conversion ratio) is what can be saved while achieving the same level of outputs for the firm.

There are two key advantages of the DEA approach to modeling efficiency over traditional simple ratios (output/input). First, DEA results are based on comparisons with the most efficient firms that operate under similar situations and scales, whereas simple ratios reflect average performing firms and do not account for firm heterogeneity. Second, DEA is a mathematical programming that does not require any subjective specifications in weighting the multiple inputs and multiple outputs, whereas simple ratios require such a subjective assumption (Charnes, Cooper, and Rhodes 1978; Luo and Donthu 2006).

To model advertising and promotion efficiency with DEA, we used four inputs: broadcast advertising investment (BAI), print advertising investment (PAI), outdoor advertising investment (OAI), and sales promotion investment (SPI). These different kinds of spending are the firm's marketing communications mix efforts. We obtained the data on these advertising and promotion inputs from CMR. The output variables in DEA are sales volume (SAL) and sales growth (SGO).[1] We gleaned data on sales volume and growth from COMPUSTAT. Next, we present the DEA model, in which advertising and promotion efficiency is expressed as ψ, a conversion ratio of output to inputs:

$$\psi = \frac{\text{Outputs}}{\text{Inputs}}. \tag{1}$$

We can obtain the advertising and promotion efficiency for firm w by solving the subsequent fractional programming format (Charnes, Cooper, and Rhodes 1978). The objective of this programming model is to maximize this conversion ratio for firm w by fitting the data with different weights for outputs (u1 and u2) and inputs (v1, v2, v3, and v4). The constraint of these weights ensures that the resultant advertising and sales promotion efficiency is optimized for firm w in the estimation:[2]

$$\text{Max } \psi_w = \frac{u1 \times SAL_w + u2 \times SGO_w}{v1 \times BAI_w + v2 \times PAI_w + v3 \times OAI_w + v4 \times SPI_w}, \tag{2}$$

subject to

$$\frac{u1 \times SAL_k + u2 \times SGO_k}{v1 \times BAI_k + v2 \times PAI_k + v3 \times OAI_k + v4 \times SPI_k} \le 1,$$

$$(k = 1, 2, \ldots, n),$$

$$u1, u2, v1, v2, v3, v4 \ge 0.$$

All estimated efficiency (ψ_w) results are either equal to or less than 1 (100%) because firm w is enveloped by the efficient frontier with all firms (including itself) in DEA programming. The most efficient firms (identified as the best practices by DEA) have a value of 1 for the efficiency, and the remaining firms have a value between 0 and 1. The portion ($1 - \psi_w$) represents the inefficient percentage of advertising and sales promotion investments for firm w. In our analyses, the mean of advertising and promotion efficiency was .61 (SD = .28) for Time 1 and .68 (SD = .30) for Time 2 (see Table 2).

Human Capital Performance

To measure human capital performance, objective firm data can be used. For example, company-specific human capital can be measured with firm records on employee enrollment and the types of degrees employees earned as a result of company tuition reimbursement (Benson, Finegold, and Mohrman 2004). In addition, human capital at the top manager level can be assessed by company records on chief executive officer success, tenure, and age (Buchholtz, Ribbens, and Houle 2003). However, company records of this type have inherent limitations: (1) The records may not be exhaustive, and thus it is difficult to check their validity, which leads to a concern of biased findings, and (2) these

[1]We conducted additional analyses with profit and found that the DEA results are robust and stable. Specifically, we reran DEA models with different combinations of outputs across DEA1 (sales, sales growth), DEA2 (sales, sales growth, profit), DEA3 (sales, profit), and DEA4 (sales growth, profit). We defined profit as the net incomes before extraordinary items (Chauvin and Hirschey 1993; Erickson and Jacobson 1992). The correlation results between DEA1 and DEA2 was .86, the correlation between DEA1 and DEA3 was .88, and the correlation between DEA1 and DEA4 was .86. These sensitivity results seem to support the robustness of the DEA results. Thus, we now add a brief new table.

DEA Sensitivity Results for Adverting and Promotion Efficiency

Model Specifications	Correlations	*p* Value
DEA1 (sales, sales growth) vs. DEA2 (sales, sales growth,	.86	$p < .01$
DEA1 (sales, sales growth) vs. DEA3 (sales, profit)	.88	$p < .01$
DEA1 (sales, sales growth) vs. DEA4 (sale growth, profit)	.86	$p < .01$

[2]We also considered the lagged impact of advertising and promotion on sales. Specifically, before DEA analysis, our measure of sales level ($SALES_t$~) already controlled the carryover effects of advertising (i.e., Chauvin and Hirschey 1993; Vakratsas and Ambler 1999) and the impact of other relevant factors, such as research and development and firm size, as well as the industry level factors (i.e., industry concentration). In addition, solving the fractional programming requires some mathematical manipulations. We can derive this with the following linear programming model:

$$\text{Max } \psi_w = q1 \times SALw + q2 \times SGOw,$$

$$\text{subject to } p1 \times BAIw + p2 \times PAIw + p3 \times OAIw + p4 \times SPIw = 1,$$

$$q1 \times SALk + q2 \times SGOk \le p1 \times BAIk + p2 \times PAIk + p3 \times OAIk + p4 \times SPIk,$$

where k = 1, 2, …, n.

company records are neither large scale in terms of the number of firms involved nor comparable across firms because of different booking and housekeeping practices (Davenport and Prusak 1988). Thus, we used the comprehensive longitudinal survey data for measuring human capital from the AMAC.

In particular, the AMAC provides two types of human capital performance: employee talent and manager superiority. For Time 1 and Time 2, the AMAC has data on more than 10,000 senior executives, outside directors, and industry analysts from more than 580 large companies (e.g., Fombrun and Shanley 1990; *Fortune* 2005, p. 68) across 70 major industries. Companies are required to have at least $1.3 billion in revenue to be eligible for the sampling list. For companies on the AMAC list, a maximum of ten top executives and seven directors (outside board members) per company are selected, as well as a pool of industry analysts. The AMAC surveys the respondents' perceptions of a firm's excellence in terms of its employee talent and quality of management compared with that of the major competing companies in the industry. The attributes of human capital performance are defined on the AMAC survey as "the ability to attract and retain talented people" and "quality of management."

The AMAC items of human capital performance are derived from a series of interviews and pilot tests with a large pool of executives and industry analysts. The AMAC compiles the list of these respondents in August and sends out the surveys in October with a follow-up reminder mailing in November. At the latest, all surveys are due by mid-December. The score of these human capital performance measures ranges from 0 to 10 (the highest).

Prior studies (e.g., Fombrun and Shanley 1990; Houston and Johnson 2000; McGuire, Schneeweis, and Branch 1990) have reported evidence of the internal consistency and validity of these data. In particular, McGuire, Schneeweis, and Branch (1990, p. 170) note that it may be "one of the most comprehensive and widely circulated surveys of attributes available. Both the quality and number of respondents are comparable or superior to the 'expert panels' usually gathered for such purposes." However, because the AMAC data have strong halo effects with firm financial performance, we parceled out this bias by using the approach (e.g., Roberts and Dowling 2002) for both employee talent and manager superiority. Specifically, we regressed human capital measures (employee talent and managerial superiority) against firm financial performance (return on assets) in the prior four years and saved the residual of this regression as the final measure of human capital. Because this residual is independent from financial performance, the reverse causality bias and halo effects in measuring human capital are parceled out.

Market Concentration and Controls

We measured market concentration intensity using the Herfindahl concentration index. We derived this measure on the basis of the lagged sales for all the companies with the North American Industry Classification System four-digit codes for each firm-year observation (Anderson, Fornell, and Mazvancheryl 2004; Rao, Agarwal, and Dahlhoff 2004). We obtained data for all control variables from the COMPUSTAT database. In particular, we controlled for firm size, which is the log of the number of employees. Operating leverage is the ratio of fixed assets to total assets. Financial leverage refers to the ratio of book debt to total assets (Rao, Agarwal, and Dahlhoff 2004). Finally, business segment is the number of segments in which the firm operates in the marketplace (Rao, Agarwal, and Dahlhoff 2004).

Analyses and Results

Analyzing the data requires estimation techniques that can accommodate the unique distribution of advertising and promotion efficiency results. In addition, such techniques should consider the correlated error terms in a series of regression equations that involve two types of human capital performance.

Advertising and Promotion Efficiency Results

Because DEA-based advertising and promotion efficiency results are censored with an upper bound of 1 and a lower bound of 0, traditional ordinary least squares cannot parcel out this sample censoring bias. As a result, we employ the two-limit Tobit model (Heckman 1979). Datar and colleagues (1997) apply this type of Tobit modeling in their investigation of time-based new product development. Let $y_{t2,i}^*$ denote the latent advertising and promotion efficiency of firm i at Time 2, $X_{t1,i}$ denote a vector of explanatory variables at Time 1, and β denote a vector of coefficients. Then, the advertising and promotion efficiency of firm i is given by

$$\begin{aligned}(3)\quad y_{t2,i}^* &= X_{t1,i}\beta + \varepsilon_i = \beta_0 + \beta_1 \text{CustomerSatisfaction}_{t1,i} \\ &+ \beta_2 \text{MarketConcentration}_{t1,i} \\ &+ \beta_3 \text{CustomerSatisfaction}_{t1,i} \times \text{MarketConcentration}_{t1,i} \\ &+ \beta_4 \text{BusinessSegments}_{t1,i} + \beta_5 \text{FirmSize}_{t1,i} \\ &+ \beta_6 \text{OperationLeverage}_{t1,i} + \beta_7 \text{FinancialLeverage}_{t1,i} \\ &+ \beta_8 y_{t1,i} + \varepsilon_i,\end{aligned}$$

where ε_i denotes the normally distributed residuals with a zero mean and a σ^2 variance. However, because the dependent variable of advertising and promotion efficiency ranges from 0 to 1, we control for this sample censoring and specify the observed advertising and promotion efficiency (y_i):

$$\begin{aligned}(4)\quad & y_{t2,i} = 0 \quad \text{if } y_{t2,i}^* \le 0 \text{ (lower bound)}, \\ & y_{t2,i} = y_{t2,i}^* \quad \text{if } 0 < y_{t2,i}^* < 1, \text{ and} \\ & y_{t2,i} = 1 \quad \text{if } y_{t2,i}^* \ge 1 \text{ (upper bound)}.\end{aligned}$$

The log-likelihood function is specified as

$$\begin{aligned}(5)\quad l(\beta, \sigma) &= \sum_{i=1}^{N} \log f\left[(y_{t2,i} - x'_{t1,i}\beta)/\sigma\right] \times 1(\underline{c}_i < y_{t2,i} < \overline{c}_i) \\ &- \log\left\{F\left[(\overline{c}_i - x'_{t1,i}\beta)/\sigma\right] - F\left[(\underline{c}_i - x'_{t1,i}\beta)/\sigma\right]\right\}, \ (\underline{c}_i = 0, \ \overline{c}_i = 1).\end{aligned}$$

The impact of customer satisfaction on advertising and promotion efficiency. In H_1, we predict that there is a positive impact of customer satisfaction on future advertising and promotion efficiency. As Table 3 reports, the Tobit modeling results indicate that customer satisfaction at Time 1 is positively and significantly related to advertising and promotion efficiency at Time 2 (b = .29, $p < .05$). Therefore, the data support H_1.

The moderating role of market concentration. In H_3, we expect that the positive impact of customer satisfaction on advertising and promotion efficiency is expanded under conditions of high market concentration. To test this, we mean-centered customer satisfaction and market concentration before generating the interaction term (Aiken and West 1991). The Tobit results suggest that the interaction between customer satisfaction and market concentration has a positive and marginally significant influence on advertising and promotion efficiency at Time 2 (b = .21, $p < .05$). Because the highest variance inflation factor was 2.80, the threat of multicollinearity bias was not severe. We plot the data to facilitate the interpretation of these moderating effects. Figure 2 illustrates the impact of customer satisfaction on advertising and promotion efficiency for low versus high market concentration (see Aiken and West 1991, pp. 12–14). Figure 2 shows that the positive influence of higher customer satisfaction at Time 1 on advertising and promotion efficiency at Time 2 is more salient in markets with a high concentration than in markets with a low concentration. Thus, the data support H_3.

Human Capital Performance Results

To test the impact of customer satisfaction on two dimensions of human capital performance, we specify a series of regression equations. Let $y1_{t2,i}$ denote the human capital of employee talent and $y2_{t2,i}$ denote the human capital of manager superiority at Time 2:

$$
\begin{aligned}
(6)\quad y1_{t2,i} &= X_i\gamma + \varepsilon 1_i = \gamma_0 + \gamma_1 \text{CustomerSatisfaction}_{t1,i} \\
&\quad + \gamma_2 \text{MarketConcentration}_{t1,i} \\
&\quad + \gamma_3 \text{CustomerSatisfaction}_{t1,i} \times \text{MarketConcentration}_{t1,i} \\
&\quad + \gamma_4 \text{BusinessSegments}_{t1,i} + \gamma_5 \text{FirmSize}_{t1,i} \\
&\quad + \gamma_6 \text{OperationLeverage}_{t1,i} + \gamma_7 \text{FinancialLeverage}_{t1,i} \\
&\quad + \gamma_8 y1_{t1,i} + \varepsilon 1_i, \text{ and} \\
y2_{t2,i} &= X_i\delta + \varepsilon 2_i = \delta_0 + \delta_1 \text{CustomerSatisfaction}_{t1,i} \\
&\quad + \delta_2 \text{MarketConcentration}_{t1,i} \\
&\quad + \delta_3 \text{CustomerSatisfaction}_{t1,i} \times \text{MarketConcentration}_{t1,i} \\
&\quad + \delta_4 \text{BusinessSegments}_{t1,i} + \delta_5 \text{FirmSize}_{t1,i} \\
&\quad + \delta_6 \text{OperationLeverage}_{t1,i} + \delta_7 \text{FinancialLeverage}_{t1,i} \\
&\quad + \delta_8 y2_{t1,i} + \varepsilon 2_i.
\end{aligned}
$$

Because the error terms (ε1, ε2) can be correlated and the dependent variables of the two dimensions of human capital are also correlated, we employed the seemingly unrelated regression (SUR) estimation technique (Zellner 1962). In this situation, SUR will produce more robust coefficients than the traditional ordinary least squares technique.

The impact of customer satisfaction on human capital performance. In H_2, we predict that there is a positive impact of customer satisfaction on future human capital performance. As Table 4 reports, the SUR modeling results indicate that customer satisfaction at Time 1 has a positive, significant influence on human capital performance in terms of both employee talent and manager superiority at Time 2 (b = .33, $p < .01$, and b = .27, $p < .05$, respectively). Thus, the data strongly support H_2.

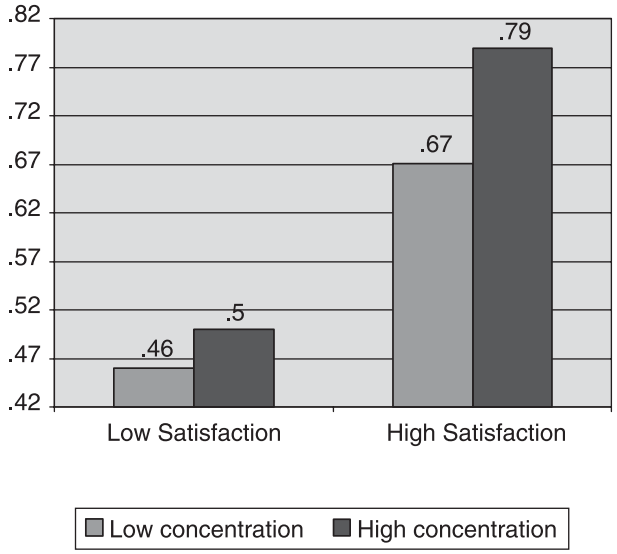
The moderating role of market concentration. In H_4, we expect that the positive impact of customer satisfaction on

TABLE 3
Impact of Customer Satisfaction on Future Advertising and Promotion Efficiency: Tobit Results

	Advertising and Promotion Efficiency (Time 2)				
Independent Variables (Time 1)	**Prediction**	**Estimate**	***p* Value**	**Unobserved Heterogeneity**	**Support for Hypotheses**
Customer satisfaction	H_1 +	.29	.02 (one-tailed)	.05 (n.s.)	H_1 supported
Market concentration		.05	.46	–.01 (n.s.)	
Customer satisfaction × market concentration	H_3 +	.21	.03 (one-tailed)	.02 (n.s.)	H_3 supported
Business segments		–.07	.38	–.02 (n.s.)	
Firm size		.05	.41	.03 (n.s.)	
Operating leverage		.18	.05 (one-tailed)	.06 (n.s.)	
Financial leverage		.09	.35	.01 (n.s.)	
Advertising and promotion efficiency		.45	.00	.09 ($p < .05$)	

Notes: Because advertising and promotion efficiency results are truncated values with censored distribution based on linear programming modeling, we used Tobit regression to test the hypotheses. We estimated random unobserved heterogeneity models to test the robustness of the results. Schwartz Bayesian information criterion = 472.50, and Akaike's information criterion = 463.77. The reported results in the "Unobserved Heterogeneity" column are the difference between random coefficient model (RCM) coefficients and non-RCM coefficients. The results of n.s. mean that there is no significant cross-modeling (RCM or not) variation in the database.

FIGURE 2
The Moderating Role of Market Concentration on the Impact of Customer Satisfaction (Time 1) on Future Advertising and Promotion Efficiency (Time 2)



human capital performance is reduced under conditions of high market concentration. The results suggest that the interaction between customer satisfaction and market concentration has a negative, significant influence on human capital in terms of employee talent at Time 2 (b = –.21, $p <$ .05) and on human capital in terms of manager superiority (b = –.18, $p < .10$). Thus, the data support H_4.

Additional Data Analysis

We specified several alternative models and tested competing explanations of the results. First, we examined the reverse-causality concern by conducting Granger (1969) causality tests (see also Chintagunta and Haldar 1998; Hidalgo 2005).[3] In this context, we computed the following Wald F tests: The F statistics account for 7.38 ($p < .01$) of the influence of customer satisfaction on advertising and promotion efficiency, 6.73 ($p < .01$) of the impact of customer satisfaction on human capital performance in terms of employee talent, and 6.01 ($p < .01$) of the influence of customer satisfaction on human capital performance in terms of manager superiority. This means that customer satisfaction Granger causes advertising and promotion efficiency, employee talent, and manager superiority. Moreover, the F statistics account for 1.50 ($p > .05$) of the influence of advertising and promotion efficiency on customer satisfaction, .77 ($p > .05$) of the impact of human capital performance on customer satisfaction in terms of employee talent, and .92 ($p > .05$) of the influence of human capital performance on customer satisfaction in terms of manager superiority. This means that advertising and promotion efficiency, employee talent, and manager superiority do not Granger cause customer satisfaction in this sample. Overall, these Granger causality test results seem to support our theoretical framework on the neglected outcomes of customer satisfaction.

Second, we estimated rival models with the terms of customer satisfaction squared and cubed (i.e., for competing explanations in terms of nonlinear impact). We failed to find these higher-order terms significant in either Tobit or SUR estimations ($p > .10$), but the first-order term of customer satisfaction and the interaction term between customer satisfaction and market concentration remained significant ($p < .05$).

Third, we employed random coefficient models (RCMs) to test the results' robustness. As we report in the "Unobserved Heterogeneity" columns in Table 3 and Table 4, none of the estimated RCM results are significantly ($p >$ .05) different from non-RCM coefficients. This means that there is no significant cross-modeling (RCM or not) variation. In this sense, our findings are stable and robust.

Fourth, the analysis of time-series cross-sectional data can suffer from both autocorrelation and heteroskedasticity bias (thus varying and heterogeneous estimators). As a result, we conducted more sensitivity analyses with general method of moments (GMM) estimation. The GMM estimation approach does not require full density and can accommodate possible autocorrelation bias and generate het-

[3]The model for testing the Granger causality between customer satisfaction and advertising and promotion efficiency is specified as follows:

$$\begin{aligned}\text{AdvertisingPromotionEfficiency}_t = {} & \\ & \pi_1\text{AdvertisingPromotionEfficiency}_{t-1} \\ & + \chi_1\text{CustomerSatisfaction}_t + \chi_2\text{CustomerSatisfaction}_{t-1} \\ & + \upsilon_t,\end{aligned}$$

$$\begin{aligned}\text{CustomerSatisfaction}_t = {} & \phi_1\text{AdvertisingPromotionEfficiency}_t \\ & + \phi_2\text{AdvertisingPromotionEfficiency}_{t-1} \\ & + \omega_1\text{CustomerSatisfaction}_{t-1} + \tau_t.\end{aligned}$$

In these equations, if all the coefficients are significant, advertising and promotion efficiency and customer satisfaction mutually lead to (Granger cause) each other. If only the coefficients of χ_j are significant, customer satisfaction Granger causes advertising and promotion efficiency. If only the coefficients of ϕ_j are significant, advertising and promotion efficiency Granger causes customer satisfaction. A Wald F test determines the significance of the equations. This test statistics is specified as follows:

$$F = \frac{(SSR1 - SSR2)/q}{SSR2/(n - s)},$$

where SSR1 is defined as the sum of squared residuals in the restricted equation (in which χ_j and ϕ_j are restricted to zero) and SSR2 is the sum of squared residuals in the unrestricted equation. In addition, q = the number of restrictions, n = the number of observations, and s = the number of independent variables in the unrestricted equation. The model for testing the Granger causality between customer satisfaction and human capital performance in terms of employee talent and manager superiority requires replacing advertising and promotion efficiency with human capital performance variables.

TABLE 4
Impact of Customer Satisfaction on Future Human Capital Performance: SUR Results

	Human Capital of Employee Talent (Time 2)				Human Capital of Manager Superiority (Time 2)			
Independent Variables (Time 1)	**Prediction**	**Estimate**	***p* Value**	**Unobserved Heterogeneity**	**Estimate**	***p* Value**	**Unobserved Heterogeneity**	**Support for Hypotheses**
Customer satisfaction	H_2 +	.33	.01 (one-tailed)	.05 (n.s.)	.27	.02 (one-tailed)	.03 (n.s.)	H_2 supported
Market concentration		.06	.70	.04 (n.s.)	.05	.80	.01 (n.s.)	
Customer satisfaction × market concentration	H_4 –	–.21	.04 (one-tailed)	–.01 (n.s.)	–.18	.05 (one-tailed)	–.04 (n.s.)	H_4 supported
Business segments		.02	.94	.03 (n.s.)	.01	.97	.04 (n.s.)	
Firm size		.03	.85	.01 (n.s.)	.02	.91	.01 (n.s.)	
Operating leverage		.12	.22	.02 (n.s.)	.07	.72	.02 (n.s.)	
Financial leverage		.23	.03 (one-tailed)	.04 (n.s.)	.08	.63	.02 (n.s.)	
Human capital of employee talent		.51	.00	.08 ($p < .05$)				
Human capital of manager superiority					.62	.00	.06 (n.s.)	

Notes: Because the error terms can be correlated and the dependent variables of the two dimensions of human capital performance are also correlated, we employed the SUR estimation technique to test the hypotheses. The reported results in the "Unobserved Heterogeneity" columns are the difference between random coefficient model (RCM) coefficients and non-RCM coefficients. The results of n.s. mean that there is no significant cross-modeling (RCM or not) variation in the database.

eroskedasticity consistent results (Hansen 1982; Prabhu, Chandy, and Ellis 2005).[4] The GMM results also show that our conclusion is robust; that is, customer satisfaction leads to greater advertising and promotion efficiency and stronger human capital performance.

Fifth, because DEA mathematical programming is nonparametric in nature and is sensitive to extreme data values and measure errors (Charnes, Cooper, and Rhodes 1978; Luo 2004; Luo and Donthu 2001), it is important to test the robustness of DEA-based advertising and promotion efficiency results. Thus, we repeated the DEA analyses with other combinations of variables (i.e., two outputs and three inputs, one output and four inputs, one output and three inputs). The resultant advertising and promotion efficiency results are significantly correlated (smallest r = .89, $p < .01$), attesting to the robustness of the DEA results.

Finally, we explored profitability implications. The results show that advertising and promotion efficiency has a significant impact on Tobin's q (b = .37, $p < .01$).[5] In addition, human capital performance in terms of employee talent has a significant impact on Tobin's q (b = .31, $p < .01$), and human capital performance in terms of manager superiority has a marginal significant impact on Tobin's q (b = .17, $p < .10$ [one-tailed]). We also find that customer satisfaction has a significant impact on Tobin's q (b = .36, $p < .01$). This result is consistent with extant studies (Anderson, Fornell, and Mazvancheryl 2004; Fornell et al. 2006; Gruca and Rego 2005).

Discussion

Our study was a result of the further research opportunities provided in the extant academic literature of the performance outcomes of customer satisfaction. After the association between customer satisfaction investments and financial performance is established, it is important to examine the direct linkages through which a firm's financial success is created. We explored two outcomes of customer satisfaction that have not been investigated so far. On the basis of longitudinal analyses with a matched secondary data set from multiple sources, we showed that customer satisfaction not only increases a firm's future advertising and promotion efficiency but enhances its subsequent human capital performance as well.

Managerial Implications

Our study offers some helpful managerial implications. The results of our study suggest that firms with higher levels of customer satisfaction should use this performance metric to attract and retain high-quality employees and managers because such personnel are the fundamentals of a company's human capital excellence (Schultz 1961). Although the use of a customer satisfaction index in personnel recruiting is not yet common in business, this index can be powerful (*Fortune* 2006; Young 2006). The finding of an expanded, positive influence of customer satisfaction on employee talent in less-concentrated markets suggests that firms should (1) proactively publicize their superior satisfaction ratings and (2) extensively use this metric in their human resources recruiting, compensation, and retention programs, especially in less-concentrated markets in which there is fierce competition. Indeed, because customer satisfaction leads to human capital excellence, human resources managers have a good reason to pay attention to the firm's customer satisfaction index.

Furthermore, we suggest that companies should carefully monitor their marketing communications efficiency and relate these analyses to customer satisfaction benchmarks. If a firm with superior customer satisfaction values is not more efficient in terms of marketing communications than its competitors, the firm's communication management has the potential for efficiency improvement. This implication is especially important in industries in which firms spend a considerable percentage of their revenues on marketing communications. Thus, this implication would be more relevant for consumer goods firms than for firms in business-to-business marketing.

With regard to our empirical findings, marketing managers could raise the question whether spending on customer satisfaction is more effective than spending on advertising. From our analyses, we were not able to provide a specific answer to this question, because we had no information about the costs of increasing customer satisfaction. If these costs are extremely high for a firm, the achieved increase in advertising and promotion efficiency may not be able to compensate for these costs. However, if costs of increasing customer satisfaction are fairly low, it may make sense to shift budgets from advertising to customer satisfaction activities. Consequently, we suggest that firms should conduct cost–benefit analyses with their individual data to determine an appropriate marketing budget allocation. In this context, it is also important to mention that our findings show that expenditure on customer satisfaction would lead to saved future advertising money. Because expenditure on advertising is important for current sales, customer/brand equity, and market share (i.e., Mizik and Jacobson 2003), this may limit the possibility to shift expenditures from advertising to customer satisfaction improvement.

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[4]In particular, in the GMM approach, the White's heteroskedasticity and autocorrelation consistent covariance matrix Ω_{HAC} is

$$\Omega_{HAC} = \Gamma(0) + \left[\sum_{j=1}^{T-1} k(j, q)\Gamma'(j) + \Gamma'(j)\right]$$

and

$$\Gamma(j) = \frac{1}{T-K}\left(\sum_{t=j+1}^{T} Z_{t-j}'u_t u_{t-j}'Z_t\right),$$

where u is the vector of White errors and Z_t is a $k \times p$ matrix. For a technical discussion of the GMM approach, see Hansen (1982), and for nontechnical prior applications of the GMM in marketing, see Krishnan, Bass, and Kumar (2000), Kim, Allenby, and Rossi (2002), and Prabhu, Chandy, and Ellis (2005).

[5]Tobin's q is defined by following prior literature. Particularly, Rao, Agarwal, and Dahlhoff (2004) provide a detailed function for deriving Tobin's q: q = (share price × number of common stock outstanding + liquidating value of the firm's preferred stock + short-term liabilities – short-term assets + book value of long-term debt)/book value of total assets.

In addition, the results of the study should be valuable for marketing managers in their dialogue with CFOs. Because there is a strong push for marketing accountability in the corporate world (Fornell et al. 2006; Luo and Donthu 2006; Rust, Lemon, and Zeithaml 2004), our finding that customer satisfaction increases advertising and promotion efficiency provides a strong argument. Specifically, customer satisfaction can also help save future marketing money. Thus, marketers should approach top executives and seriously question relentless cost cutting on programs that aim to increase customer satisfaction and loyalty. Indeed, better customer satisfaction may enable the firm to consume fewer resources in the future while achieving better efficiency; that is, improving customer satisfaction helps generate more future sales at a given level of advertising and promotion costs or saves future marketing communications costs at a given level of sales.

Finally, a constant challenge for managers who want to improve marketing accountability is the lack of a scientific measure of efficiency. Our study meets this challenge and informs managers of how DEA can be applied to pulse and improve advertising efficiency. This technique is especially important in consumer goods industries in which firms spend a considerable percentage of their revenues on marketing communications. For example, by using DEA, package goods companies can carefully monitor their marketing communications efficiency and relate these analyses to customer satisfaction benchmarks. Because DEA efficiency results are benchmarked against competitors' best practices rather than against average performers in traditional regression-based approaches, DEA offers a rigorous and scientific method for managers to furnish the marketing metrics dashboard. Indeed, firms can easily employ DEA to measure and boost the efficiencies of marketing activities, such as product development, branding, customer experience management, price promotion, personal selling, and channel governance (Horsky and Nelson 1996; Luo and Donthu 2001, 2006; Murthi, Srinivasan, and Kalyanaram 1996).

Research Issues

We believe that this study contributes to a better understanding of beneficial consequences of customer satisfaction for firms. Previous research has largely focused on effectiveness outcomes, such as customer loyalty, customer retention, and price perceptions (e.g., Anderson and Sullivan 1993; Mittal and Kamakura 2001). To the best of our knowledge, this study is the first to show that customer satisfaction significantly affects efficiency outcomes of advertising and promotion investments. It seems that a high level of customer satisfaction may allow firms to allocate future marketing communications costs more efficiently and productively. Because advertising and promotion efficiency is, by definition, directly linked to a company's profitability, it constitutes a critical marketing metric for future research efforts that address the marketing productivity chain (Rust, Lemon, and Zeithaml 2004). Our finding of the impact of customer satisfaction on communication efficiency helps alleviate the criticism of marketing's lack of accountability because by saving future marketing costs, customer equity building with higher satisfaction and loyalty generates more cash flow and shareholder value (Fornell et al. 2006; Gruca and Rego 2005).

Another key finding of our study is that improving customer satisfaction enables firms to build superior human capital on both the employee and the management level. This result is highly novel and refreshing because previous satisfaction research has focused on customer-related rather than employee-related outcomes. It seems that customer satisfaction may signal that the company has good prospects. In this sense and on a more general level, our work suggests that marketing and strategy research should explore the interface between customer satisfaction and human resources management in greater detail. Further research might extend our efforts and examine a multitude of other interlinked concepts from the two disciplines—for example, relating customer satisfaction to (1) chief executive officer succession, top management compensation, and turnover rate and (2) personnel selection, employee training, and motivation.

Overall, our work contributes to the important literature on customer satisfaction and its intermediate consequences. We call for more research efforts along these lines so that important outcomes (e.g., a firm's future advertising and promotion efficiency and human capital excellence) of customer satisfaction will not be neglected any longer.

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