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MSI

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Many businesses are making significant investments in the collection and storage of customer information in the hope of improved customer relationships, and ultimately business growth. However, research is needed to understand whether and how managing customer information in a particular strategic marketing context provides a sustainable competitive advantage.

In this paper, authors Zahay and Griffin empirically examine, in a B2B services context, the relationship between a business unit's strategy, its ability to manage customer information, and achieving competitive advantage.

In a study of 209 business service firms, they find that the positioning strategies of low cost and differentiation and marketing strategies of personalization and customization are related to higher customer information systems development (defined as the ability to get, store, move, and use information throughout the business unit).

Customer information systems (CIS) development in turn is associated with higher levels of customer-based performance, as defined by higher retention rates, a greater share of wallet, and greater customer lifetime value and return on investment for the business unit. Customer-based performance in turn is associated with increased business growth. However, strategy selection—and particularly differentiation—has a greater impact on customer-based performance than CIS management abilities.

In other words, whereas a good strategy makes up for deficiencies in CIS, a strong CIS without a clear strategy may not lead to a performance advantage. This finding is counter to suggestions made in the popular press that database development and data mining should be the primary focus of marketing efforts. Rather, CIS learning processes must be put into perspective as managers evaluate where to spend their crucial resources.

The results suggest that managers adopt a clear positioning strategy and decide if personalization and customization make sense as marketing strategies for the company, since these specific marketing decisions are not associated with performance at a customer level but instead are associated with the development of a CIS. The true benefit of the CIS may be in helping a company measure customer-

based performance. With the ability to measure, managers can begin to grow and improve their processes and their organizations. Focusing on data quality is a good place to start, as customer data quality was found to be the most important aspect of the CIS.

By focusing more on the "big" picture, that is, positioning and delivering value in a general way as well as developing customer information management capabilities, managers can make the most of the customer information systems that they have currently and develop other learning processes as needed.

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Introduction

Advances in information technology have helped move the management of all market relationships, and specifically customer relationships, "to the center of the strategy dialogue" (Day 1999) where they have attracted attention from practitioners and academics alike. The Internet and customer database management capabilities have facilitated the development of marketing concepts such as interactive marketing, relationship marketing, database marketing, and customer relationship management (CRM) (Kalakota and Robinson 1999; Deighton 1996; Hoffman and Novak 1996; Berry 1995; Glazer 1991). These marketing concepts—and CRM in particular—encourage storing large amounts of data about customers, which can then be integrated with real-time Internet feeds and enterprise-wide information systems. For this paper, CRM refers to the process of segmenting customers and tailoring relevant marketing communications and product offerings to them to create value for the firm (Day 2000; Kalakota and Robinson 1999; Parasuraman and Grewal 2000). Since CRM involves developing a "learning relationship" to engage customers in an interactive dialogue for the benefit of both parties, the CRM process relies on efficient and effective customer database management for its success (Massey, Montoya-Weiss, and Holcolm 2001; Peppers, Rogers, and Dorf 1999).

Despite this trend toward acquiring and storing more and more information about customers, evidence of competitive advantage from these activities, as measured by superior performance, is documented only anecdotally on a case-by-case basis. American Airlines SAABRE (Hopper 1990) became its own viable business entity. USAA is a CRM leader in the insurance industry (Venkatraman, Henderson, and Oldach 1993), and Ritz Carlton became one of the few service companies to receive a Malcolm Baldrige Quality Award (Zeithaml and Bitner 1996), in part based on the data-driven portion of their CRM capabilities. However, not all companies are able to develop and implement a strategy to manage customer information effectively and profitably. At Quaker Oats and Citicorp, among others, failed database marketing projects (Hughes 1994) have soaked up management time and proved quite costly. Success rates for CRM implementations have been low (Rigby 2001).

Research on customer information and its management is in the formative stages (Parasuraman and Grewal 2000). While one working paper found a positive relationship between customer information and performance (Srinivasan and Lilien 1999), most empirical studies to date have focused primarily on predicting whether firms would adopt database marketing (Merrilees and Miller 1996; Fletcher, Wright, and Desai 1996). Even sources that claim to investigate strategy and customer information management focus primarily on tactical issues of information management rather than strategic issues (Jackson and Wang 1995; Hughes 1994; Peppers and Rogers 1997; Siebel and House 1999).

In light of the cost, difficulty, and time involved in implementing database and software systems for CRM, research is needed to understand whether and how managing customer information in a particular strategic marketing context provides a sustainable competitive advantage. In other words, are investments in customer information systems that support CRM worth it? Should managers spend time, effort, and money investing in customer-information-based IT solutions versus other investments they might make? This problem is both interesting and challenging, as it requires integrating theory from several bodies of literature in addition to marketing: information technology, strategy, organizational learning, and communications. The general research questions examined here are:

1. To what extent and by what means do customer information management capabilities contribute to competitive advantage for business-to-business services firms?

2. What roles do a business unit's strategic choices play in creating advantage?

3. Do customer information management capabilities vary with strategic choices?

The model that is tested empirically is presented in Figure 1. Theory suggests that both increases in emphasis on strategic excellence (achieving low cost and differentiation simultaneously) and on the marketing tactics of personalization and customization are associated with increases in the CIS to support these efforts. Strategic excellence and CIS in turn are associated directly with achieving customer-based performance, which in turn is associated with business growth. The next section presents the literature review and formally develops the hypotheses to be tested. The following sections present the methods and analysis, results, and implications. A glossary of terms used throughout this report may be found in Appendix 1.

Figure 1. Hypothesized Model

*Summed mean of low cost and differentiation
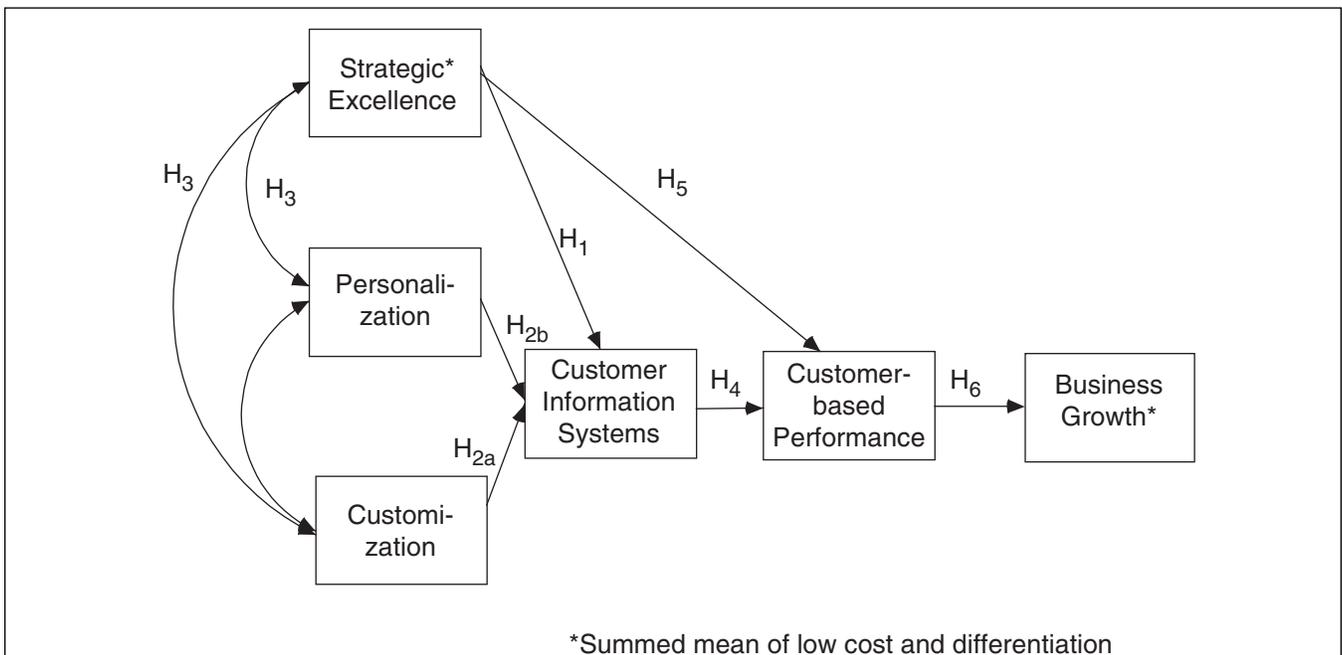
Conceptual Framework and Research Hypotheses

Competitive Advantage and Customer Information Management

Competitive advantage is achieved through combining resources and capabilities that create value for customers and profits for the firm (DeCastro and Chrisman 1995; Ansoff 1965). Firms achieve competitive advantage through heterogeneous, specific, and difficult-to-imitate resources that include intangible assets such as customer information (Mahoney 1995; Barney 1991; Prahalad and Hamel 1990; Itami and Roehl 1987; Penrose 1959). However, it is not just a firm's assets, but how they are used, that provides competitive advantage. For example, research shows that it is not the IT system itself, but how the system is used in conjunction with complementary human resources, that provides competitive advantage (Powell and Dent-Micaleff 1997).

In fact, it has been suggested that the firm's ability to learn may be the only true source of long-term competitive advantage (Sinkula, Baker, and Noordewier 1997; Slater and Narver 1995). Learning processes themselves are difficult to develop, but the specificity and intangibility of these associated assets makes them more difficult for others to imitate, ultimately creating advantage for those with effective learning processes.

Customer information systems (CIS) are a set of capabilities related to learning processes for gaining customer understanding (Zahay 2000). Learning organization theory identifies four behaviors associated with developing knowledge systems, as described below and in Figure 2 (Sinkula, Baker, and Noordewier 1997; Pentland 1995; Slater and Narver 1995; Day 1994; Holzner and Marx 1979):

❐ *Generation (get or acquire):* processes and systems to collect customer information

❐ *Memory (store):* processes and systems to store customer information for future use

❐ *Dissemination (move):* processes and systems for diffusing customer information horizontally and vertically throughout the organization

❐ *Interpretation (use):* processes that give customer information one or more commonly understood (shared) meanings that are used in that organization

In the supply chain context, these information-processing capabilities have been studied and shown to be related to overall organizational learning (Hult et al. 2000). Here, the CIS captures the overall sophistication of customer information and the associated management processes and systems at the firm, and it is used as a way to understand how well the firm learns about its customers.

Figure 2. Managing Customer Information

Competitive Advantage

Managerial Focus

4. Use

3. Move

2. Store

1. Get

4. Shareability

3. Dissemination

2. Addressability

1. Acquisition, Specificity and Quality

Learning Activities

4. Interpretation

3. Dissemination

2. Memory

1. Generation

Customer Information System Constructs
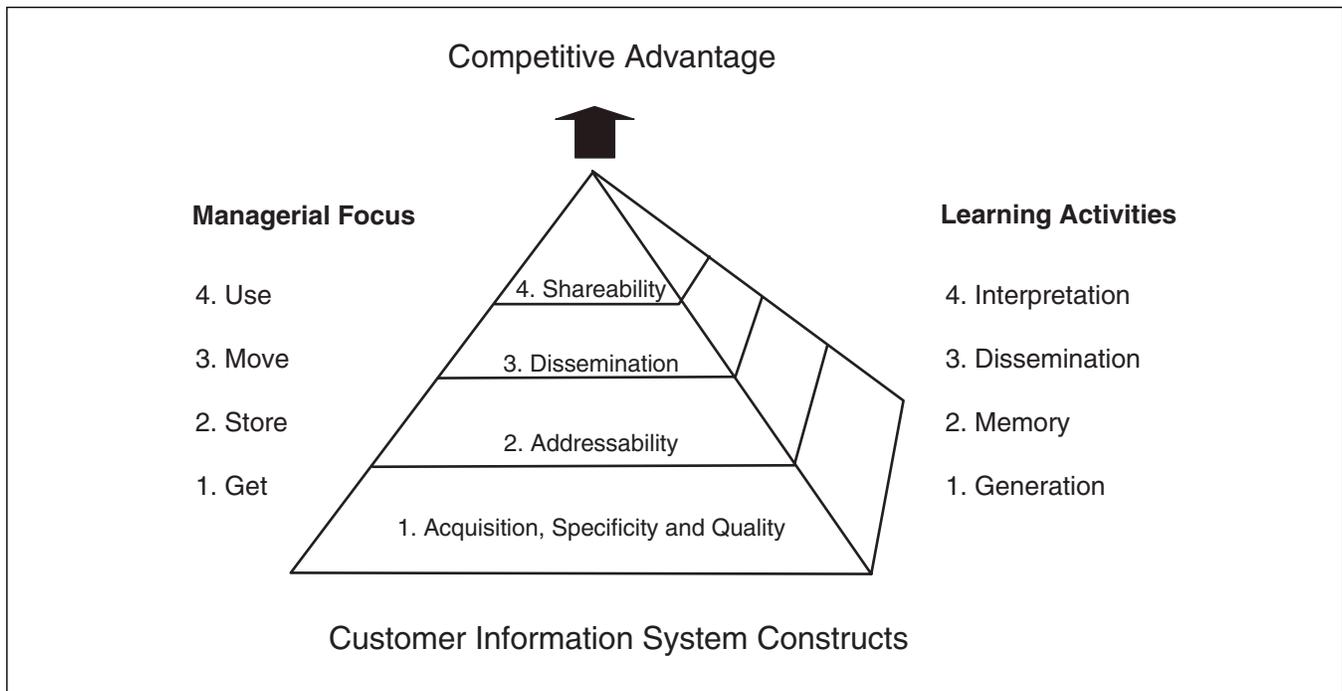
CIS and Strategy

To examine the link between marketing decisions such as CIS and strategic choice requires understanding marketing's responsibilities within the broader strategy dialogue. The strategic dimension closest to the marketing function is positioning, or how the business unit delivers value to customers and wishes its customers to think of its products and services. Positioning decisions are basic to the operation of any business (Porter 1980, 1985; Rumelt 1991). The two fundamental ways to increase profits are to position the firm to lower costs or increase revenues. Low-cost companies minimize costs and pass lower costs on to their customers in the form of lower prices. Differentiators position themselves to have something unique to offer (product, service component, geographic location) for which they charge a price premium. While most companies choose to be either a low-cost or differentiated firm (Porter 1980, 1985), excellent companies try to deliver value by being both low cost and differentiated, a "both" or "strategically excellent" (SE) strategy (Treacy and Wiersema 1993). Finally, some companies never make a clear positioning choice and are "stuck in the middle" (SIM), failing to reap the benefits (or profits) of either strategy.

The Porter model, although developed in the 1980s, is still relevant both to research and to practice today (Campbell-Hunt 2000). In addition, an initial qualitative study in this research indicated that the Porter typology reflects how the managers in the two industries in the sample think and speak about their strategic choices in communicating these choices both inside and outside their organizations. Finally, one notable example of generic positioning at work can be found in

the retail sector. The low-cost strategically positioned Wal-Mart ("Low Prices Everyday") and Target ("Expect More, Pay Less"), positioned as a "both" low-cost and differentiated retailer, have challenged the "stuck-in-the-middle" Kmart, with the result of Kmart's declaring bankruptcy.

We expect to see variations in CIS development according to strategic category. For example, the value chain for differentiators emphasizes sales and service functions. A CIS for differentiators should help them understand customer needs in more detail and allow them to provide and track individualized marketing programs to individual customers. The value chain for low-cost firms focuses more on the operational aspects of the value chain, such as inventory management and production control. Low-cost firms, focusing more on these efficiencies, would be expected to target their marketing programs and outcomes more at an aggregate level than at an individual level, and would be expected to have a less well-developed CIS than differentiators for similar levels of performance. Strategically excellent (SE) firms need information management capabilities to analyze both individual needs and aggregate information. We therefore expect that SE firms would be higher in CIS development than either differentiators (DF) or low cost (LC). SIM firms, with no clear positioning strategy, are less likely than other firms to have developed a coherent customer information management system.

> H_1: CIS development for strategically excellent firms is greater than for differentiators, which in turn is greater than for low-cost firms, which in turn is greater than for firms stuck in the middle ($CIS_{SE} > CIS_{DF} > CIS_{LC} > CIS_{SIM}$).

Personalization, Customization, and CIS

Customization and personalization are strategic marketing decisions distinct from the basic positioning decision (Bonoma and Crittenden 1988). These decisions will be distinguished and discussed in relationship with CIS.

Personalization, or the ability to individualize customer communications, includes both responding individually to customer-initiated communications and providing customers with only the information about the firm and its products that they desire. Broadly speaking, personalization is a specialized flow of interactive communication between parties (Alba et al. 1997; Hoffman and Novak 1996). George Day refers to personalization as interactive marketing, or "the use of information from the customer rather than about the customer" (Day 1999). Another operationalization of interactive marketing is "(1) the ability to address an individual, (2) gather and remember a response of an individual, and (3) address that individual once more in a way that takes into account his or her unique response" (Deighton 1996, 1997).

While small firm commercial relationships have always been highly personalized, most large firms have viewed personalization as costing more than the resulting increased profits. However, the technologies underlying sophisticated databases and the Internet fundamentally change the economics of personalization, and thus its potential importance to marketing. Even with today's technology, personalization

is still often carried out on the segment level, with groups of customers receiving the same communication with the difference being the personalized name and address. Consumer researchers in particular have investigated the dynamics associated with soliciting intimate information from consumers via computers (Moon 2000), but the links between personalization and performance have not been well investigated.

While personalization involves individualized marketing communications, customization is developing products and services tailored to a particular customer based on information obtained from the customer (Day 1999; Peppers and Rogers 1997; Deighton 1996; Pickholz 1994; Pine 1993). Customizing products requires specific information about each customer's needs and preferences. The general ability to customize is not embodied in the customer information systems alone, but relates to the ability to access and use multilevel, sophisticated customer information systems that span multiple functions within the organization.

We expect that undertaking a marketing strategy to customize products or personalize communications is related to CIS development, since the CIS is where information about the customer used to develop these actions is stored and managed. However, we also expect only some strategies to rely on personalization and customization as marketing decisions. For example, strategically excellent and differentiation strategies, which deliver value by a unique position in the marketplace relying on a unique understanding of the customer, would be more likely to employ personalization and customization. Low-cost strategies are more likely to focus on cost-cutting processes and less on individual customer needs. These relationships can be summarized as:

H_{2a}: CIS development increases as business unit customization increases.

H_{2b}: CIS development increases as business unit personalization increases.

H_3: Differentiators have higher levels of customization and personalization than do firms following low-cost strategies.

Relating CIS and Strategy to Performance

CIS implementation is a tactical marketing decision, the purpose of which is to allow the firm to develop and maintain better customer relationships. Determining how to measure the success of these relationships has proved problematic. Services marketing has focused on the more tactical measures of customer satisfaction and, to some extent, loyalty (Reichheld and Sasser 1990). Managing customer information effectively also should lead to improved customer-based performance outcomes such as increased customer retention (Reichheld and Teal 1996; Reichheld and Sasser 1990; Sheth and Parvatiyar 1995; Sheth and Sisodia 1995; Wang and Spiegel 1994), lifetime customer value (Blattberg and Deighton 1991; Dwyer, Schurr, and Oh 1987; Berger and Nasr 1998), and share of wallet for a particular customer (Deighton 1996; Wyner 1999; Rust, Zeithaml, and Lemon 2000). Recent research suggests that these measures should be considered as a whole, since, in a noncontractual setting, the mere length of time a customer has remained with the firm does not ensure business growth (Reinartz and Kumar

2000). Therefore, customer-based performance as created for this research takes into account a number of related concepts that provide a full picture of the positive tactical marketing outcomes of managing customer relationships effectively.

However, a business unit's strategic choices should also impact performance. Thus, customer-based performance levels should also be associated with marketing positioning strategic decisions. Although Porter suggests that low cost and differentiation are each viable marketing strategies, implementing the "both" strategy (strategic excellence) should lead to superior performance overall as both cost efficiencies and price premiums are achieved (Treacy and Wiersema 1993).

> H_4: Customer-based performance increases with higher CIS development.

> H_5: Customer-based performance increases as business units move toward strategic excellence ($CP_{SE} > CP_{DF} = CP_{LC} > CP_{SIM}$).

Performance can be analyzed at strategic as well as tactical levels in the firm. Business growth metrics, such as profit and sales growth, measure overall strategic performance. These measures capture outcomes resulting from the set of tactical decisions made across all the functions of the firm, of which marketing is only one. As the balanced scorecard research suggests, there are interim steps to profitability, which themselves can be managed (Kaplan and Norton 2001; Rigby 2001). Thus, it is not likely that CIS management by itself will lead to increased business growth. For these tactical decisions, the interim step between CIS and business growth is customer-based performance. Therefore:

> H_6: Business growth increases with increases in customer-based performance.

The theoretical model represented by these relationships is illustrated in Figure 1. Brief descriptions of each construct and their sources from the literature are summarized in Table 1. Initial strategic marketing decisions are generic positions at the business-unit level, while customization and personalization are specific marketing strategies that support business-unit strategy. These strategies lead to CIS development, which, together with position, relates to customer-based performance. Customer-based performance in turn is related to business growth. We predict no direct relationship between CIS, personalization or customization, and business growth.

Table 1. Sources of Electronic Marketing, Strategy and Performance Constructs

Construct	Brief Description	Literature Source(s)

CIS:
Generation
   Acquisition
 	
   Quality
 	
   Specificity
 	
Memory
   Addressability
 	
Dissemination
 	
Interpretation
   Shareability
	Get:
	How: sources of customer information
	How good: accuracy, timeliness, consistency, relevance
	What: person- or time-specific
	
	Store: Locating customer uniquely in time and space
	
	Move: Transport information across the firm
	
	Use: Ability to process and share an interpretation or "picture" of a customer
		Direct and interactive marketing literature
		Sampler (1998), Blattberg and Deighton (1991)
		
		Wand and Wang (1996)
		
		Kohli, Jaworski, and Kumar (1993)
		
		Slater and Narver (1995)

Customization	Information used to create unique products	Glazer (1991), Pine (1993), Milne and Boza (1998)
Personalization	Information used to create communications unique to each customer or segment	Blattberg and Deighton (1991), Deighton (1996)
Positioning: Low Cost vs. Differentiation	Generic positioning strategies as defined by Porter	Porter (1985), Zahra and Covin (1993), Kohli and Jaworski (1990)
Customer-based Performance	Retention, lifetime customer value, share of wallet, ROI	Reichheld and Teal (1996), Deighton (1996), Rust, Zeithaml, and Lemon (2000)
Business Growth	Increases in sales and net income, self-reports	Porter (1985), DeCastro and Chrisman (1995)

Methodology

Data for this research came from a large-sample telephone survey (209 respondents). Hypotheses were tested using structural equation modeling and various other statistical tests.

Survey Development

Managers responsible for business-to-business product and market decisions in the software and insurance industries were used in all phases of scale and survey development. First, 30 managers were interviewed to understand how business units manage customer information and with what success. This phase resulted in concepts that were operationalized into constructs and developed into specific survey items (see Appendix 2) and, as discussed above, also contributed to the choice of the Porter typology for categorizing strategic choices. An exhaustive literature review identified potential items to augment items coded from the interviews. Where possible, existing scales were used. Table 1 summarizes the conceptual origins of the constructs and scales.

The initial survey was pretested for item clarification with three marketing managers in the target industries. A modified instrument was then paper-and-pencil pretested by 47 managers (Sudman 1976). The pretest results were analyzed by exploratory factor analysis (principal components method, varimax rotation), supporting scale validity and reliability, and allowed items that did not load onto factors to be eliminated.

Survey Administration

A marketing research company contacted firms from the sample to prescreen for the person in the division with the most knowledge of customer information management. Interview requests were then mailed to that person. Within one week, the research firm scheduled telephone appointments. A copy of the survey was mailed or faxed to respondents so they could see the scales and questions during the interview. One interviewer administered the survey by telephone to 209 marketing executives in the software (109) and insurance (100) industries.

Sampling, Response Rate, and Sample

Respondents were selected from stratified random samples of business-to-business property and casualty insurers (SIC Code 6331, NAICS Code 524126) and software companies (SIC Code 7372, NAICS Code 51121) from Dun & Bradstreet and *Ward's Business Directory of U.S. Private and Public Companies* (1999a, b). These two industries were chosen because they were business-to-business services firms that should benefit from managing customer information. By choosing one mature and one growing industry, the robustness of the model could be tested.

The response rate to the survey was 48 percent on a company basis (209 of 433 companies) and 31 percent on a per-contact basis (209 of 684 mailed contacts),

with nearly identical results by industry. This high participation rate is attributable to following accepted data collection methodology and to using a rigorous database management process. During scale development and construct testing the full sample (209) was used in the analysis. For testing the hypothesized relationships between strategy, CIS development, and performance, including the SEM, three surveys were eliminated from the final analysis as outliers for a final sample size of 206. Outliers had greater than three standard deviations from the CIS to customer-based performance relationship.

The average respondent age was 42 with 16 years of business experience. Insurance executives were slightly older than software executives and had worked longer, but had lower levels of education (Table 2). Firms were nearly identical in their number of customers, but the software firms were younger, with lower sales and fewer employees. There were no differences between those who responded and those who did not based on year of firm start, total employees, or sales ($p < .05$). This result was the same by industry and for the pooled data.

Table 2. Respondent and Firm Profiles

Respondents	Insurance	Software	All
Respondent age**	45 (8.5)[a]	39 (8.4)	42 (9.0)
Years worked**	20 (8.0)	13 (6.9)	16 (8.2)
% Graduate school**	31.2%	59.6%	46.0%
Firms			
Sales, millions**	$501	$97	
Employees**	1,381	542	
Year started**	1961	1989	
[a]Numbers in parentheses are standard deviations. **Differences between industries in means significant at $p < .01$.			

Construct and Variable Development

All variables contained less than 5 percent missing information. Variables were recoded to eliminate missing data, which confirmatory factor analysis (CFA) modeling programs cannot accommodate with ease. Recoding with the number 1 for blanks allowed utilizing the full sample while avoiding problems of biasing the correlation matrix upward, which might occur by replacing blank responses with means. (A score of 1 in most cases meant that the business unit did not engage in a certain activity or possess a particular capability, thus producing a downward bias in the analysis, if any.)

Final constructs were developed through correlation analysis and exploratory and confirmatory factor analysis (see Appendix 3 for detailed methods and statistics) following the method of McDonald (1999), whereby exploratory methods are uti-

lized first and then CFA is used to further refine constructs and provide additional tests of convergent and discriminant validity.

The final CIS measure was a summed model with eight separate subconstructs (Figure 3 and Appendix 3). The EFA and CFA process simplified the CIS concept to a 30-item scale of CIS capabilities. Importantly for practice, this analysis supported creating a single CIS score that can be used to distinguish across business units in terms of customer information management (Zahay and Griffin 2001). This 30-item CIS scale (Appendix 2) provides a picture of the customer information capabilities of a business unit, which then can be compared to the capabilities of other business units within the company or other similar organizations.

Figure 3. Final CIS Construct

Shareability | Dissemination | Addressability | Specificity | Acquisition | Quality

Shareability R & D & Opns. — .34 (.12)
Knowledge–Share of Wallet — .45 (.29)
Info within Unit — .49 (.24)
Database Capabilities — .52 (.27)
Person Specific-Sales — .57 (.32)
Person Specific-Marketing — .56 (.31)
Time Specific — .47 (.22)
Quality — .63 (.40)

CIS

Path weight listed underneath variable name, with squared multiple correlation in parentheses.

Fit Statistics:
RMR = .043, RMSEA = .044
GFI = .967, AGFI = .941
CFI = .965
χ^2 (df) = 27.987 (20)
p = .110
α = .70

The strategic excellence variable used in testing hypotheses 5 and 7 was an average of the differentiation and low-cost variables, indicating a progression toward the "both" strategy. Dividing the sample at the means (LC = 4.64 and DF = 5.01) resulted in four strategic groups of at least 40 each for comparison testing from the full sample of 209 (Figure 4). Means were superior to the neutral 4.00 in the sample because of the tendency of respondents in answering questions of this type to inflate their answers (Sudman and Schwartz 1996).

Figure 4. Generic Competitive Strategies by Mean Break
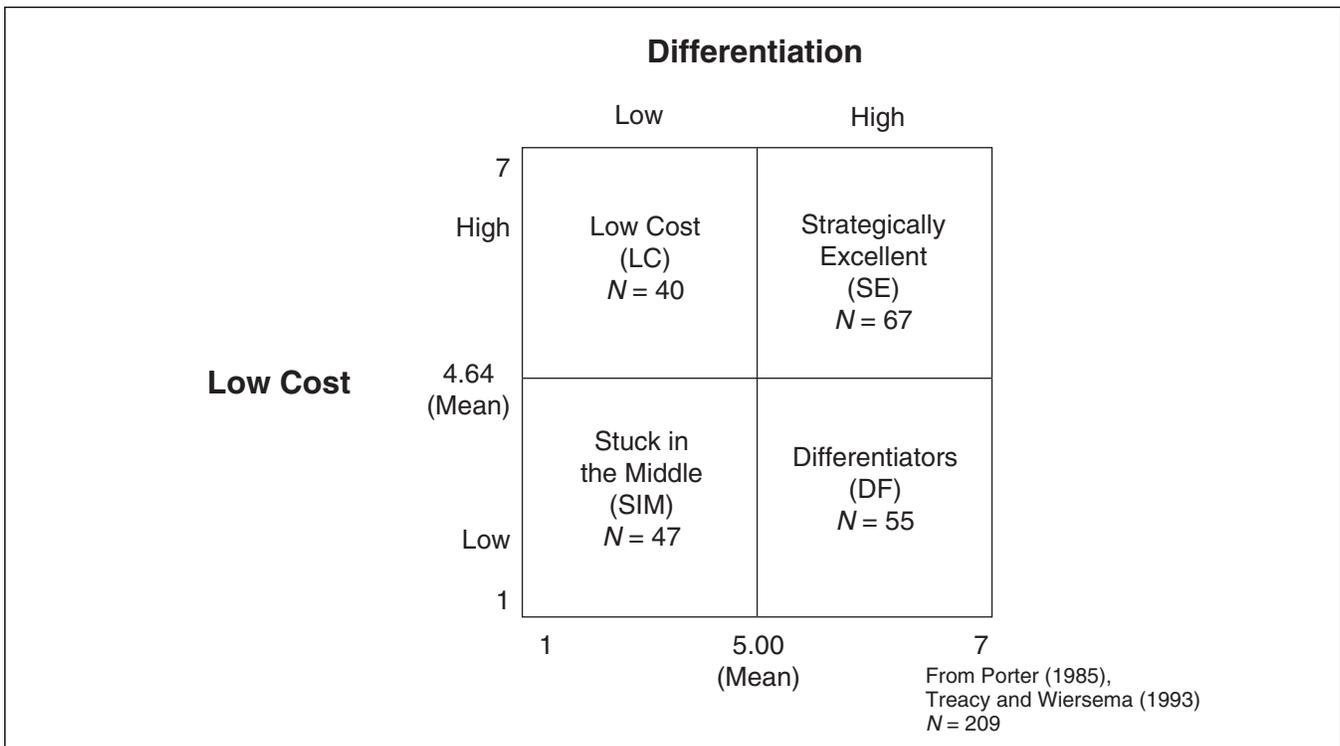
The sample also was divided into strategic categories using cluster analysis for testing hypotheses 1 and 5, in order to follow the traditional analytic methods in strategy research (Campbell-Hunt 2000). While several different cluster procedures were explored as recommended by Ketchen and Shook (1996), the K-means procedure for four cluster groups produced the best result in terms of group size equivalency and minimizing chaining effects.

The K-means clusters, shown in Figure 5, reveal a set of strategic categories similar to those of the Porter typology. One group is clearly strategically excellent (DF = 5.87, LC = 5.24), one is clearly stuck in the middle (DF = 3.48, LC = 4.10), and one is clearly a differentiator (DF = 5.38, LC = 3.60). However, these results indicate that there is no true low-cost strategic group in the data. Rather, the fourth group is almost exactly on the mean of both differentiation (5.05) and low cost (4.63). Low cost is the hardest strategy to maintain, because it requires the company to be the single lowest-cost leader in a particular market. Given the nature of service industries, where individuals and companies typically purchase on dimensions other than low cost, it is not surprising that a true lowest-cost group was difficult to identify using clustering.

Cronbach's α was computed to test scale reliability for all scales. All construct items met the criterion of $\alpha > .6$ for exploratory research and most items are well above .70 (Nunnally 1967, 1978; Hair, Anderson, Tathan, and Black 1998; Hair 1979). The exceptions were the final customization scale ($\alpha = .66$), which was retained because the scale had been developed and used in prior research (Milne and Boza 1998), and the low-cost ($\alpha = .60$) and differentiation ($\alpha = .66$) scales.

Descriptive statistics for all final constructs used in hypothesis testing and the SEM model are reported in Tables 3 and 4.

Figure 5. Cluster Means of Strategic Categories
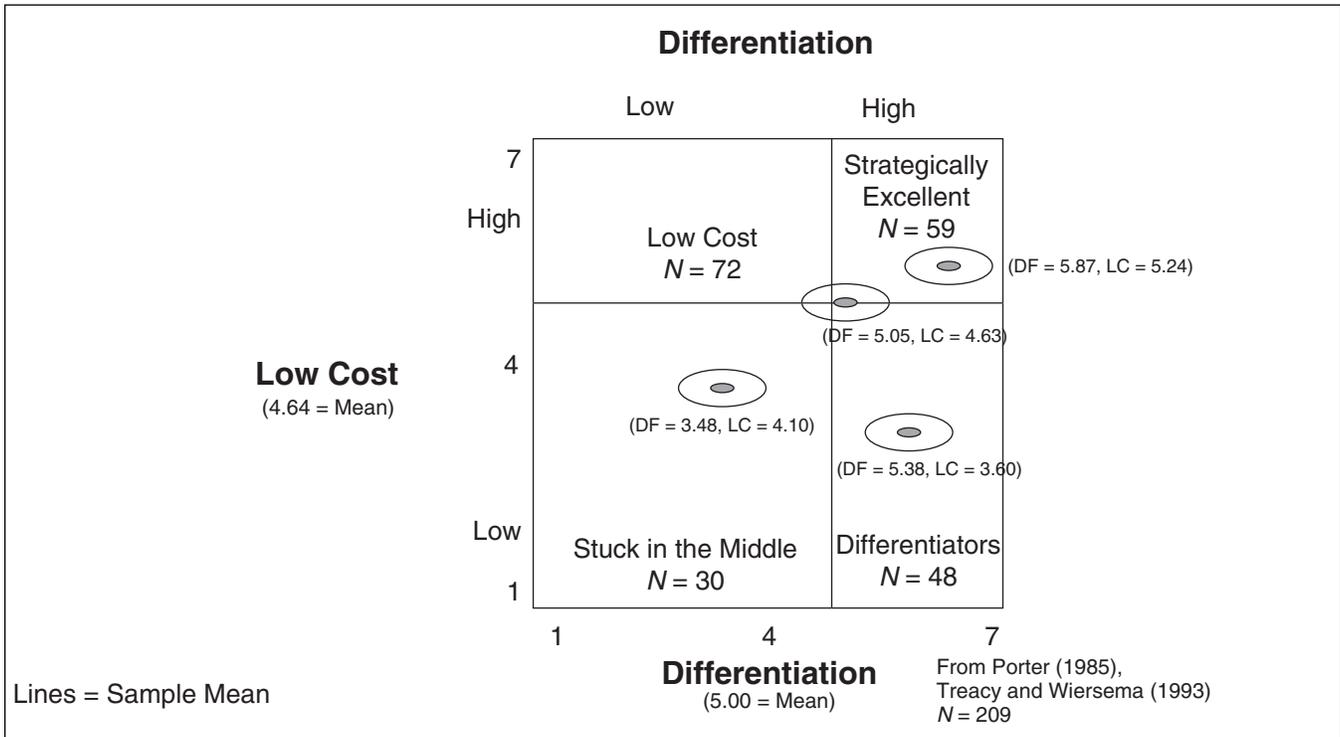
A log transformation of the business growth variable aided in the interpretation of the results by making the values similar to those in the rest of the study. Examining correlations between the variables (Table 4) suggested that relationships between the variables were strong enough to warrant further testing, but were not so high (> .60) as to indicate that regression analysis or a structural equation model would be invalid because of problems with establishing discriminant validity.

Table 3. CIS Subconstruct Descriptive Statistics

	Quality	Sales Specificity	Marketing Specificity History	Time Spec. Purchase	Database	Dissem- ination	R & D Ops Share	Knowl'dge– Share of Wallet
Information Quality	3.51 (.76)							
Person Specificity— Sales	.31**	3.86 (.84)						
Person Specificity— Marketing	.30**	.43**	3.14 (1.04)					
Time-Specific Purchase History	.28**	.24**	.29**	4.10 (1.04)				
Addressability, Database Capabilities	.37**	.35**	.28**	.26**	3.70 (.97)			
Dissemination	.39**	.25**	.29**	.15*	.16*	3.43 (.81)		
Shareability—R&D and Operations	.22**	.12	.19**	.20**	.14*	.23**	2.90 (1.24)	
Knowledge—Share of Wallet	.32**	.20**	.19**	.27**	.22**	.25**	.17*	2.67 (1.45)
Cronbach α	.87	.80	.80	.79	.80	.67	.81	.92

N = 209; Correlations: 2-tailed significance; **bold** correlations are significant; * = *p* < .05 level, ** = *p* < .01 level
Numbers on the diagonal are means and (σ). All variable ranges are 1–5, where 5 is highest level.

Table 4. Variable Correlations and Descriptive Statistics, *N* = 209

	CIS	Business Growth	CB Perf.	Persona- lization	Customi- zation	Low Cost	Differenti- ation	SE
CIS[a]	3.41 (.60)							
Business Growth[b]	.05	4.00 (.48)						
Customer-based Performance[c]	.22**	.25**	5.00 (1.00)					
Personalization[a]	.36**	.08	.05	3.20 (1.02)				
Customization[a]	.27**	.05	−.002	.18*	3.52 (.86)			
Low Cost[c]	.27**	.09	.21**	.22**	.17**	4.64 (.91)		
Differentiation[c]	.16*	.04	.42**	.02	.04	.14	5.00 (.92)	
Strategic Excellence[c]	.28**	.09	.42**	.16*	.14*	.75**	.76**	4.82 (.70)
Cronbach α	.70	.79	.74	.75	.66	.60	.66	na

Correlations: 2-tailed significance; **bold** correlations are significant; * = *p* < .05 level, ** = *p* < .01 level
Numbers on the diagonal are means (σ).
In all cases, higher numbers are higher levels of the variables.
[a] The range is 1–5 for CIS, personalization, and customization.
[b] The range for business growth is 0–6.38.
[c] For customer-based performance and all strategy variables (LC, DF, and SE), the range is 1–7.
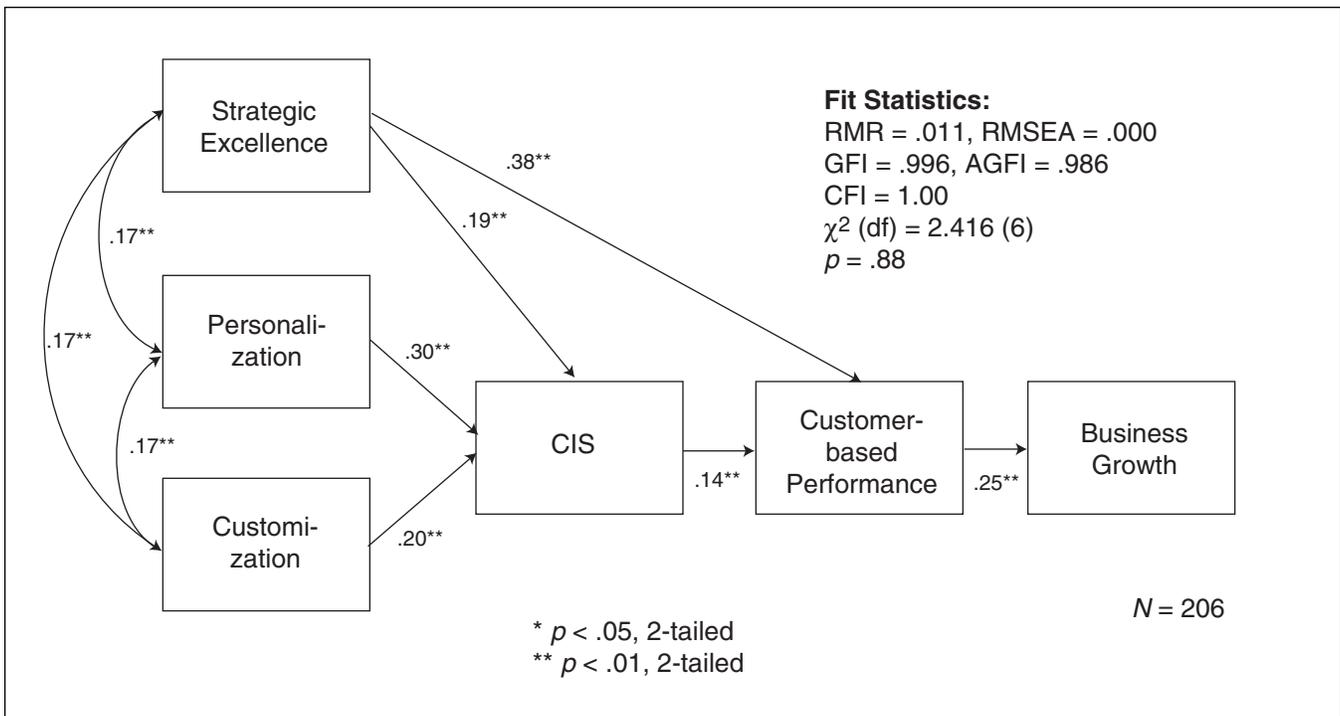
Results

Testing the Hypotheses

Prior to testing the structural equation model, relationships between specific pairs of variables were examined via correlation analysis, which supported the view of our initial model (Figure 1). It is important to note that the purpose of this model was not to test all the variables that might be related to customer-based performance, but to explore specifically the relationships between strategy, customer information management, and performance. In this model, personalization and customization are seen as marketing decisions that by themselves do not necessarily lead to performance. In these results, personalization and customization were not significantly correlated with either customer-based performance or business growth. CIS and business growth also were not correlated, again supporting our model in general and the view that CIS builds customer relationships which in turn are related to business growth (Table 4).

Based on the correlations between variables reported in Table 4, the model relationships posited (H_{2a}, H_{2b}, H_4, H_5, and H_6) all were supported. These hypotheses can be summarized as follows:

❏ Increases in personalization and customization are associated with higher CIS development.

❏ Higher CIS development is associated with increased customer-based performance.

❏ As firms move toward "strategically excellent" positioning strategies, customer-based performance increases.

❏ As customer-based performance increases, business growth increases.

The results of the structural equation model, which tests not only individual relationships between variables but also the relationships among them as a group, also support the relationships as hypothesized. The model was fit using variables that were an average of the responses to all questions for each variable (McDonald 1997). Figure 6 provides fit statistics and standardized regression weights for each path. Each path loading was significant, at $p < .05$. Overall, the fit statistics of the model were good, and within guidelines for marketing research using SEM, especially considering the exploratory nature of this research (Bagozzi and Yi 1988; Baumgartner and Homberg 2000; Steenkamp and Baumgartner 2000).[1] As with any structural equation model, identification issues are a concern. In this particular model the orthogonality assumption is implied by the presence of only directed paths (arrows pointing in one direction) that lead back to the antecedent variables (McDonald 1997). The model also meets the order rules condition for nonrecursive models, that each equation of the model should contain no more path coefficients than the number of antecedent variables.

Figure 6. Stategy and CIS Model

Fit Statistics:
RMR = .011, RMSEA = .000
GFI = .996, AGFI = .986
CFI = 1.00
χ^2 (df) = 2.416 (6)
$p = .88$

* $p < .05$, 2-tailed
** $p < .01$, 2-tailed

$N = 206$

Several alternative models were tested, but none produced superior fit statistics or a superior theoretical contribution (Zahay 2000). Specifically, the alternate hypotheses that personalization and customization might be related directly to customer-based performance were considered, especially since these marketing decisions are receiving so much attention in the popular press, where they are anecdotally related to performance. Customization and personalization are not correlated with performance (Table 4), and consequently the alternate model was not supported.

A final model was fit (Figure 7) to understand further the relationships for the specific components of strategic positioning choice. This second model was tested because using SE, as the average score of low cost and differentiation, does not capture in detail what we need to understand about the strategic-position/CIS-development interaction. Since a business unit with a differentiation level of 6 and a low cost of 1 mathematically has the identical strategic excellence score (7) as a business unit with the opposite response, further analysis is necessary to identify the differences attributable to each strategy individually. The model in Figure 7 illustrates how low-cost and differentiation decisions independently relate to CIS and performance. It too had good fit statistics, and all paths except one were significant at $p < .05$ (differentiation to CIS, $p < .10$).

The empirical models support the theory-driven hypotheses that personalization and customization are marketing strategy choices that lead to CIS development, but not directly to profitability, that customer-based performance is associated more strongly with strategy than with CIS and that there is no direct link between CIS development and business growth. These models also illustrate that differenti-

ation is not necessarily associated with personalization and customization, a result that will be commented on below.

Figure 7. Relationship Between Generic Positioning Choices, CIS, and Performance

Fit Statistics:
RMR = .010, RMSEA = .000
GFI = .996, AGFI = .983
CFI = 1.00
χ^2 (df) = 3.182 (7)
p = .868

* Significant at $p < .05$, 2-tailed
**Significant at $p < .01$, 2-tailed
+ Significant at $p < .10$, 2-tailed

$N = 206$
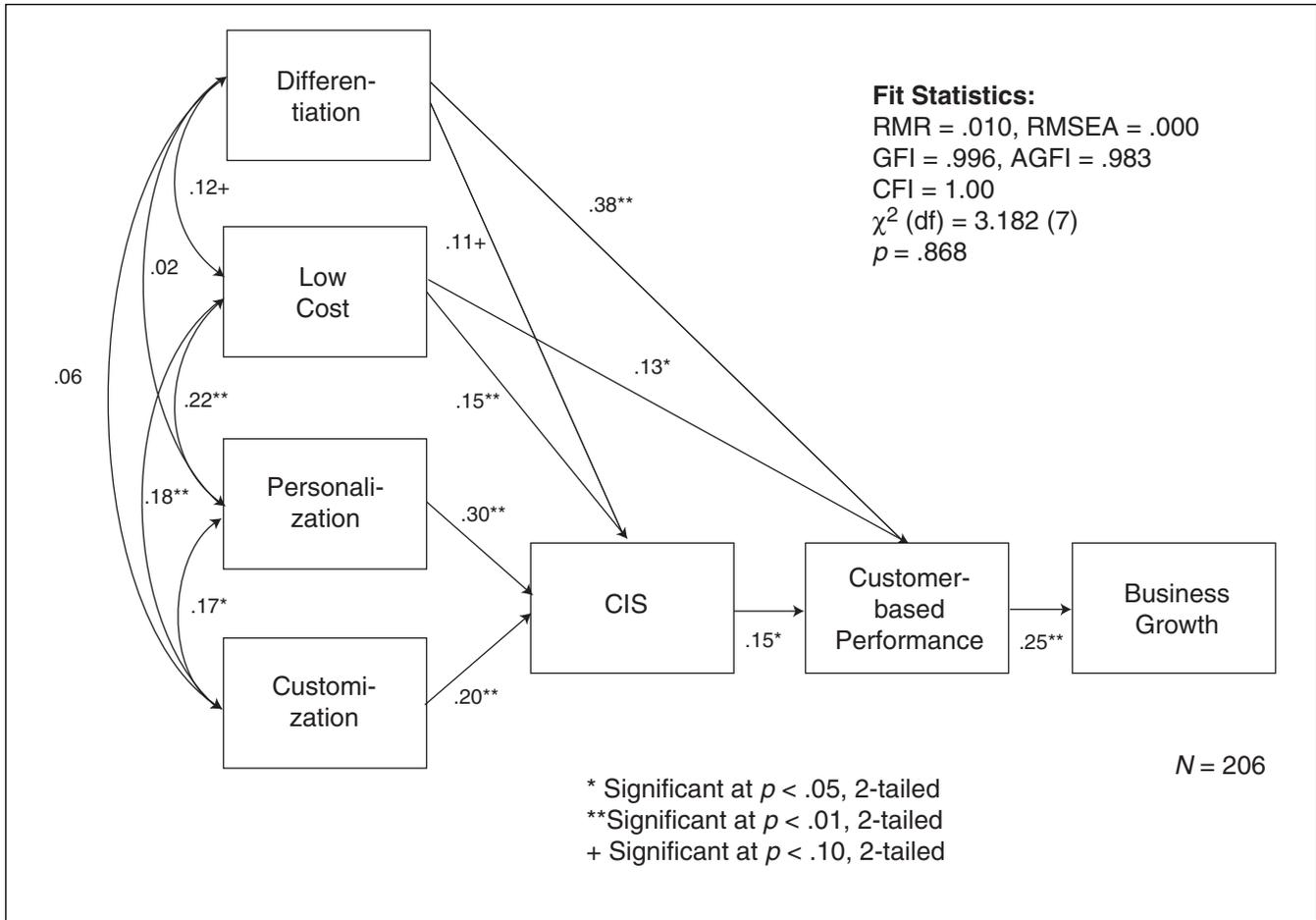
Strategy Selection and CIS Relationships

Hypotheses 1 and 3 address the overall relationship between strategy selection and CIS development. Relationships tested between the variables are in Table 5a (strategic categories created by splitting the data at the mean) and 5b (cluster-derived strategic categories).

Hypothesis 1, the proposition that CIS development differs by strategy ($CIS_{SE} > CIS_{DF} > CIS_{LC} > CIS_{SIM}$), is only partially supported (tables 5a and 5b, column 2). Although business units with different strategies do vary in terms of CIS development, the differences are not large. SE firms may be a bit more developed in CIS, while SIM firms may be a bit less developed.

Hypothesis 3, which predicted that customization and personalization would be greater for differentiators than for low-cost firms, was not supported (tables 5a and 5b, columns 3 and 4). Customization and personalization are equally high for strategically excellent and low-cost firms. Both marketing strategies are statistically higher for SE firms than for differentiators and in addition are correlated not with differentiation, but with a low-cost position (Table 4). These marketing strategies do not seem to be associated with positioning a firm as a differentiator.

Table 5a. Comparing Means by Strategic Category, Mean Break, *N* = 209

	CIS	Customization	Personalization	Customer-based Perf.	Business Growth
Strategic Excellence (*N* = 67)	**3.61**	**3.71**	**3.45**	**5.29**	4.07
Low Cost (*N* = 40)	3.46	3.49	3.41	4.98	4.01
Differentiators (*N* = 55)	3.31	3.33	2.94	5.18	3.93
SIM (*N* = 47)	3.22	3.48	3.00	4.25	3.89
Overall Mean	3.41	3.52	3.21	4.97	3.98
ANOVA: F Statistic (df) *p*	5.18 (205) .002	2.096 (206) .102	3.862 (206) .010	13.181 (206) .000	1.652 (206) .179
Post-hoc Scheffé	**SE** > SIM** **SE** > DF*	**SE** > DF*	**SE** > DF*	**SE, LC, DF** > SIM**	
Significance level, *.05 level, **.01 level; **bold** is significantly different from any one other category					

Table 5b. Comparing Means by Strategic Category (by Cluster Grouping), *N* = 209

	CIS	Customization	Personalization	Customer-based Perf.	Business Growth
Strategic Excellence (*N* = 59)	**3.60**	**3.76**	3.36	**5.39**	4.00
Low Cost (*N* = 72)	3.44	3.49	3.30	**4.92**	4.01
Differentiators (*N* = 48)	3.29	3.22	2.93	**5.03**	3.89
SIM (*N* = 30)	3.19	3.56	3.13	4.14	3.94
Overall Mean	3.41	3.52	3.20	4.97	3.98
ANOVA: F Statistic (df) *p*	4.23 (206) .006	3.576 (206) .015	1.887 (206) .133	12.15 (206) .000	1.074 (206) .361
Post-hoc Scheffé	**SE** > SIM*	**SE** > DF*		**SE** > LC*, SIM** **LC, DF** > SIM**	
Significance level, *.05 level, **.01 level;, **bold** is significantly different from any one other category					

CIS Subconstructs and Performance Associations

As indicated above, the final CIS measure was simpler than originally conceptualized, consisting of a summed model with eight separate subconstructs (Figure 5 and Appendix 3). The final structure had more items and subconstructs coming from lower levels of the customer information management pyramid (Figure 2) than from upper levels. Indeed, four of eight subconstructs come from generation, the lowest level of the pyramid.

The highest loading CIS subconstruct is quality (.63). The importance of data quality (accurate, consistent, up-to-date) in CIS development is not surprising, since good quality data are necessary for enabling interactions.

Understanding three kinds of customer information specificity are necessary in measuring CIS. Time-specific purchase history focuses on the ability to access quite practical information about the customer that is time-related, such as first purchase date, contract renewal data, purchase history, and date of last purchase. Nearly identical factor loadings for marketing- and sales-specific information indicate that, even though information from both teams is necessary for CIS development, sales and marketing executives are sometimes at odds with each other. A good CIS contains information obtained from both the sales and marketing functions.

Functional aspects of information generation seem consistently important in discriminating across CIS capabilities. In dissemination, the ability to spread knowledge within the marketing unit (customer documents, important information on major customers) accounts for variability in the data and helps distinguish among business units. In addressability, it is the practical capabilities of the database itself that account for variability in CIS in the data (basic and extended contact information for customers and prospects).

Shareability's two subconstructs are sharing with R&D and operations and knowledge-share of wallet (having data on share of wallet and the business unit's percentage of a total customer's business) (Rust, Zeithaml, and Lemon 2000). The weakest loading was shareability with R&D, which with a loading of .34 is close to the .30 cutoff. This result supports previous suggestions of the difficulty of measuring information interpretation (Hurley and Hult 1998).

Analyzing CIS subconstructs separately by strategy category, using the mean break categories from Figure 4 and Table 5a, reveals several significant relationships between specific elements of the CIS subconstructs and the dependent variables of customer-based performance and business growth. In the low-cost category, sales specificity (ρ = .287, p = .05) is positively correlated with business growth (all significance levels reported in this section are two-tailed).

However, there are negative correlations between business growth and knowledge-share of wallet for business units in the strategic excellence (ρ = −.254, p = .038) and differentiation (ρ = c.413, p = .008) categories. It appears that these firms' investments in the system sophistication required for making customer information shareable have not as yet reaped them appropriate rewards. Also possible is

that these shareability investments are too costly overall to result in improved business growth.

A regression of the CIS subconstructs on customer-based performance results in quality as the only significant variable ($p < .01$). Further, partial correlation coefficients show that, controlling for the effect of strategic category, higher levels of quality ($\rho = .152$, $p = .028$), sales specificity ($\rho = .119$, $p = .085$) and addressability ($\rho = .130$, $p = .060$) are associated with higher levels of customer-based performance. For the strategic excellence category, significant correlations exist between customer-based performance and sales specificity ($\rho = .316$, $p = .009$) and customer-based performance is positively related to business growth.

The quality effect is most important for both the stuck-in-the-middle and the low-cost firm. The only significant correlations between the specific elements of the CIS subconstructs and customer-based performance in the stuck-in-the-middle category are between quality ($\rho = .337$, $p = .021$) and addressability ($\rho = .330$, $p = .023$). For low-cost category there is a significant correlation with customer-based performance and quality ($\rho = .314$, $p = .048$). The rest of the effect occurs in the sample.

Summary of the Findings

Although CIS contributes to customer-based performance overall, firms need to think about why they are implementing a CIS system and define carefully what their expectations are from such a system and which parts they may wish to emphasize. It makes sense in a business-to-business environment in particular that firms that take the time to capture the elusive information that only salespeople know would be able to translate that information into performance. Data quality is often overlooked in the implementation of customer information systems, but can be critical to performance as well (Nelson, Janowski, and Frey 2001).

In addition, in a regression with customer-based performance as the dependent variable and subtracting the mean from each variable per Cohen and Cohen (1983), there is a significant negative interaction effect between CIS and the differentiation positioning ($p < .05$, $\beta = -.141$). These results suggest that, although differentiation positioning is important for services marketers, choosing that strategy may actually involve collecting and using their customer information in a way that is not consistent with the overall CIS capability. CIS may be a measure more suited to the operational efficiencies of the low-cost or strategically excellent position, and which can assist the SIM firm in improving performance.

On the other hand, the overriding importance of strategy selection in creating competitive advantage is evident in these data. As suggested by Porter (1985), not having a positioning strategy (being "stuck in the middle") is not likely to allow firms to achieve competitive advantage. Also as suggested by Porter (1985), we could find no difference in performance between differentiators and low-cost firms. Overall, achieving strategic excellence is associated with higher customer-based performance, which in turn is associated with increased business growth.

The hypothesized relationships in this research and the results of hypothesis testing are summarized in Table 6.

Table 6. Summary of Hypothesis Testing

Hypothesis	Results	Evidence
Hypothesis 1: $CIS_{SE} > CIS_{DF} > CIS_{LC} > CIS_{SIM}$	Partially supported	Tables 5a, 5b Figures 6, 7
Hypothesis 2a: CIS development increases as business unit customization increases.	Supported	Table 4
Hypothesis 2b: CIS development increases as business unit personalization increases.	Supported	Table 4
Hypothesis 3: Differentiators have higher levels of customization and personalization than do firms following low-cost strategies.	Not supported	Table 5a, 5b Figures 6, 7
Hypothesis 4: Customer-based performance increases with higher CIS development.	Supported	Table 4 Figures 6, 7
Hypothesis 5: Customer-based performance increases as business units move toward strategic excellence.	Supported	Table 4, Figures 6, 7
Hypothesis 6: Business growth increases with increases in customer-based performance.	Supported	Table 4, Figures 6, 7

Discussion

While value creation is important for organizations (Wilson 1995), the specific mechanisms by which value is created are not well understood (Anderson 1995). This research suggests that customer value is created in these business-to-business service markets, in part, through positioning strategy selection and customer information management, but that strategy's importance far outweighs the learning activities of the CIS. This finding is counter to claims for customer information management made in the popular press (that primary marketing efforts must be put into database development and data mining), but helps us understand the value-creation mechanisms in business-to-business services markets. These results put learning into perspective. This research also supports the view that personalization and customization in and of themselves do not create the value that results in performance advantage, but rather are independent marketing decisions that also are associated with CIS development.

CIS development overall is associated with customer-based performance. Strategically excellent firms appear to undertake CIS development on their path to achieving excellence. However, while the data partially support the hypothesis that CIS development for the strategically excellent firms (SE) was higher than the differentiators (DF) and stuck-in-the-middle (SIM) firms, low-cost firms and differentiators had equivalent levels of CIS development. While specifics of the CIS content and structure may differ between the two strategic groups, there was no overall superiority in terms of CIS development for the DF group.

Overall, the business units in this sample were average in their CIS implementation levels, and were not emphasizing higher level CIS capabilities such as dissemination and shareability, perhaps caused in part by the difficulties encountered in implementing CRM systems. There is now anecdotal evidence that the bloom is off the CRM rose as companies realize the difficulties involved in full-scale CRM and implementing one-to-one marketing throughout their organization (Rigby 2001). Alternatively, there could be a time lag between CIS implementation and performance benefits that was not captured by this cross-sectional analysis.

However, implementing an effective strategy helps the business unit achieve a marketing competitive advantage as measured by customer-based performance. Why would the positioning decision be the more important decision for customer-based performance? Whether to be low cost or differentiated is the primary decision that must be made before the business unit can move forward in its decision making on tactical issues. In addition, positioning is a decision that has far-reaching operational implications throughout the organization and thus directly affects the value chain (Anderson 1995). The decision to follow the effective "both" strategy could be considered a surrogate for "strategic excellence" in general (Treacy and Wiersema 1993). In most cases, this choice requires a knowledge of the customer and capabilities for coordinating information throughout the business unit. Interestingly, most of the performance benefit of the strategically excellent position

comes from the differentiation decision. Figure 7 shows that the path weight for differentiation is almost three times that of low cost in terms of relationship to customer-based performance, and the strategically excellent do not exhibit higher customer-based performance than the differentiators (tables 5a and 5b).

These data support the finding that a differentiation positioning is a significant help in achieving customer-based performance and is a more compelling contributor to customer-based performance than the data-driven aspects of CRM as measured by the CIS variable and its sub-components. A second important finding of this research is that customer-based performance variables, as hypothesized, are the missing link between both positioning strategy and CIS and business growth. This mediation occurs perhaps because of the role understanding and knowledge of the customer plays in the organization as well as the overall strategic excellence of the business unit. Thus, the relationship between the strategy variables and customer information systems becomes clear as strategic excellence, particularly differentiation, works in accordance with the management of customer information to create competitive advantage in business-to-business services markets.

However, working in conjunction with the strategic positioning decision, and correlated with that choice, the decisions to engage in personalization and customization also are associated with developing more sophisticated customer information systems. This decision to be customized and personalized appears to occur first, and then these actions are associated with a deeper and more sophisticated customer system as measured by the CIS variable.

Limitations and Future Research

Several limitations should be kept in mind with regard to this research. With only two industries and 206 observations in the final model, additional empirical testing is needed to further support the relationships suggested here, and to test whether generalizations can be made from them. Given the exploratory nature of the work, other industries should be studied to refine further the measures and scales. Measuring strategic choice might be difficult to capture across other industry types.

Finally, in spite of research that indicates that self-reports of managerial performance, if the managers are at the right level in the organization, are highly consistent with actual performance (Dess and Robinson 1984; Robinson and Pearce 1988), the self-reports used here mean that the research cannot be triangulated by an outside source. A more robust study with outside business growth measures would be a natural extension of this work.

This model, although providing a start to understanding the complex relationships between strategy, information, and performance, also indicates a need for future research to understand these variables and their relationships. Studying the formation of marketing strategy decisions and CIS development over time would provide valuable managerial insight. Research is already underway to produce a detailed set of case studies of some of the respondents to this survey as well as other companies noted for managing customer information well. Other value-

adding business disciplines in addition to strategy selection and CIS contribute to customer-based performance and could be investigated and incorporated for better understanding of competitive advantage in the marketing context. One future effort in this area will focus on the relationship between the customer information systems capabilities in the organization and new product development, which relies upon customer input for success. Another promising stream of research is the role of data quality in the development and success of CRM systems.

Managerial Implications

Marketing database and interactive technologies such as the Internet that facilitate the collection and storage of customer information represent significant investments for business marketers. These investments are made in the hope of improving relationships with customers and ultimately growing the business. This research suggests that the CIS learning processes must not be ignored, since CIS is associated with customer-based performance, but must be put into perspective as managers evaluate where to spend their crucial resources. Additionally, managers should develop a sound positioning strategy and decide if personalization and customization make sense as marketing strategies for the company, since these specific marketing decisions are not associated with customer-based performance but instead are associated with the CIS. The true benefit of the CIS is not just in terms of customer-based performance but in helping a company be able to measure customer-based performance as defined by higher retention rates, a greater share of wallet, and greater customer lifetime value and return on investment for the business unit. Perhaps one value of the CIS will be the ability to provide the crucial metrics for evaluating customer-based performance. In other words, these learning processes lead to the ability to measure what previously could not be measured. With the ability to measure, managers can begin to grow and improve their processes and their organizations. Focusing on data quality in the CIS is a good place to start.

The good news for managers is that all of these elements are to some degree under their control. Strategy selection and the development of the CIS can all be affected by managerial decisions. By focusing more on the big picture, positioning and delivering value in a general way, and developing customer information management capabilities, managers can make the most of the customer information systems that they have currently and develop other learning processes as needed.

Many business units are at the very beginning of the process of developing a sophisticated CIS. While these systems may be seen as "table stakes" to achieving performance, managers also should consider the type and quality of available information used in their organizations before they promote the broad adoption of a specific CRM system or database structure. While it appears CIS development goes hand in hand with customer-based performance, good CIS alone, without a good strategy, will not lead to superior performance. The exception to this rule is the SIM group, which did achieve customer-based performance benefits from CIS development in the absence of a defined strategy. For the stuck-in-the-middle group, seeking to achieve superior performance and also to develop a CIS, the task is simple: Pick a strategy and concentrate on good quality customer data and an organized place to put that data.

Appendix 1. Glossary of Terms

Addressability

The CIS subconstruct associated with the ability to locate a customer in time and space for the purpose of addressing them in future communications.

Adjusted goodness of fit index (AGFI)

A measure of the fit of the combined measurement and structural model, adjusted for degrees of freedom. This number should be greater than .90 for good model fit.

Business growth

Self-reports of increases in sales and net income as used in our survey.

Confirmatory factor analysis (CFA)

A data analysis technique used here for analyzing survey items to validate underlying empirical structures. In this technique the relationship between items and constructs has been hypothesized in advance and response data are used to "confirm" the structures empirically through a form of factor analysis.

Comparative fit index (CFI)

This is a normed measure of data fit to the hypothesized structural model and should be as close to 1.0 as possible.

Customer information systems (CIS)

The set of learning activities by which companies get, store, move, and use customer information throughout the firm. These activities include having high quality processes related to collecting and storing this information (such as information specific to sales and marketing, information on the timing of purchase activities, information about how to address the customer individually, etc.), as well as processes for disseminating and sharing this customer information throughout the organization.

Customer relationship management (CRM)

The process of segmenting customers and tailoring relevant marketing communications and product offerings to them to create value for the firm, and treating different customers differently, generally based on their revenue or profit potential.

Customer-based performance

How well the respondents rated their company on ROI, share of customers' wallet, customer retention rate, and lifetime customer value compared to its competitors.

Customization

Information used to create unique products.

Differentiation (DIF)

Basic positioning strategy in which value is delivered to the customer through creating a distinguishing feature for which the customer is willing to pay higher prices.

Exploratory factor analysis (EFA)

A data analysis technique, here used for "exploring" relationships between survey items and forming multi-item measurements based on the underlying empirical structure of the data, independent of hypothesized structures.

Goodness of fit index (GFI)

A measure of the fit of the combined measurement and structural model, unadjusted for degrees of freedom. This number should be greater than .90 for good model fit.

Knowledge of share of wallet

The CIS subconstruct associated with the ability of an organization to get information easily about their products' share of their customers' wallets. This is a measure of knowledge of product penetration for each customer.

Low-cost positioning (LC)

Being the low-cost leader in a product market, offering value to the customer through operational efficiency and resulting lower prices.

Person specificity—marketing

The CIS subconstruct associated with information that the marketing team would have about a customer, like the response to various marketing offers.

Person specificity—sales

The CIS subconstruct associated with information that the sales team would have about a customer, such as names of key contacts.

Personalization

Information used to create communications unique to each customer or segment.

Positioning

The basic ("generic") competitive strategy by which a company makes money through increasing revenues or decreasing costs; can be low cost (operational efficiency), differentiation (along some dimension valued by customer), both (strategically excellent), or stuck in the middle (SIM), as suggested by Michael Porter.

Quality (dimensions of)

The CIS subconstruct associated with the accuracy, timeliness, consistency, and relevance of customer information.

Resource-based view (RBV)

Strategic concept asserting that assets and their management are one, if not the primary, source of competitive advantage and that learning activities, CIS in particular, are difficult-to-imitate, intangible sources of advantage.

RMSEA

The Steiger-Lind root mean square error of approximation measures the square root of an estimate of the population discrepancy divided by the number of degrees of freedom for testing the model. It should be as close to zero as possible for a good fit of the SEM.

Root mean residuals (RMR)

This goodness of fit test assesses the correlations between the residual variance of the model items. RMR should be less than .05 for a good fit of SEM.

Share of wallet

The CIS subconstruct associated with the percentage of available customer business a company has. Example: in a two-car garage with one mid-size General Motors car and one mid-size Ford, GM and Ford each has about a 50 percent share of wallet.

Shareability—R&D and operations

The CIS subconstruct associated with the ability for employees in R&D and operations to access, add to, and modify customer information.

Strategically excellent (SE)

Following both low-cost and differentiation positioning strategies simultaneously. Also called the "both" strategy.

Structural equation model (SEM)

These models provide an empirical means to quantify the relationships between variables, in this case groups of survey responses, in a complex model with many possible pathways from the set of root antecedents, through a set of potentially mediating variables and to the final dependent variables.

Stuck in the middle (SIM)

Firms following neither a low-cost nor a differentiation strategy. One might think of them as having no strategic positioning in the minds of customers.

Time-specific purchase history

The CIS subconstruct associated with information about the timing of the purchase, such as first purchase date.

Appendix 2. Final Survey

Low-cost positioning
(1 = Much lower, 4 = The same, 7 = Much higher): Rate the extent to which your business unit focuses on the following in comparison to your major competitors.

a. Level of capacity utilization

b. Level of operating efficiency

c. Low overhead cost

d. Emphasis on finding ways to reduce cost of production

Differentiation positioning
(1 = Much lower, 4 = The same, 7 = Much higher): Rate the extent to which your unit focuses on the following in comparison to your major competitors.

a. Uniqueness of your products

b. Targeting clearly identified segment or segments

c. Offering products suitable for high price segments

d. Offering specialty products

Personalization
(1 = Never, 3 = 50% of the time, 5 = 100% of the time)

a. What percent of the time does your unit send different offers/information to different market segments?

b. What percent of the time can your unit track the response rate of offers by program?

c. What percent of the time can your unit track the response rate of offers by segment?

d. What percent of the time can your unit track the response rate of offers by specific customers?

Customization
(1 = Not at all, 3 = To a moderate extent, 5 = To a large extent)

a. Products offered to the market depend on customer transaction information (a customer transaction is an exchange of either goods or information with the customer)

b. The marketing effort of products depends on customer transaction information

c. Products are customized based on customer transaction information

Business growth
Over the past two years, what percent changes have you observed for your business unit?

a. Sales
   −30% −25% −20% −15% −10% −5% 0% +5% +10% +15% +20% +25% +30%

b. Net income
   −30% −25% −20% −15% −10% −5% 0% +5% +10% +15% +20% +25% +30%

Customer-based performance
(1 = Low, 4 = The same, 7 = High): Answer for your unit versus its competition.

a. How successful do you think your unit has been in retaining customers over the last two years?

b. Compared to competitors, how well do you think your unit sells to current customers?

c. How would you characterize the lifetime value of your unit's customers? (Lifetime value is the total value to the firm of one customer over time.)

d. How would you characterize your unit's ROI?

CIS Subconstructs

Person specificity—sales
(1 = Never, 3 = 50% of the time, 5 = 100% of the time): For current customers, what percent of the time do those in your unit have the following information?

a. Contact

b. Type of contact

c. Response to contact

d. Names of others involved in the purchase

Person specificity—marketing
(1 = Never, 3 = 50% of the time, 5 = 100% of the time): For current customers, what percent of the time do those in your unit have the following information?

a. Marketing offers made

b. Marketing offers responded to

c. Method of contact

d. Timing of response to various marketing offers

Time-specific purchase history
(1 = Never, 3 = 50% of the time, 5 = 100% of the time):
For current customers, what percent of the time do those in your unit have the following information?

a. First purchase date

b. Next planned purchase date

c. Last purchase date

d. Purchase history

Quality
(1 = Never, 3 = 50% of the time, 5 = 100% of the time)

a. When people in your unit access customer information, they find it is accurate.

b. When people in your unit access customer information, they find it is consistent from one source or stored place to another.

c. When people in your unit access customer information, they find it has been updated in a timely fashion.

d. Overall, the data quality in your unit is (1 = poor, 3 = moderate, 5 = excellent).

Addressability
For the next few questions, answer in a percentage to the best of your knowledge.

a. For what percent of current customers do you have what you would call basic contact information at your fingers or available quickly on demand? (%)

b. For what percent of prospective customers you plan to contact in the next three months do you have what you would call basic contact information at your fingers or available quickly on demand? (%)

c. For what percent of those customers who have not purchased in the last year do you have what you would call basic contact information at your fingers or available quickly on demand? (%)

d. For what percent of those customers who have not purchased in the last year do you have what you would call extended contact information at your fingers or available quickly on demand? (%)

Dissemination
(1 = Not at all, 3 = To a moderate extent, 5 = To a large extent):
Again, please answer for your business unit.

a. Our business unit periodically circulates documents (e.g., reports, newsletters, news clippings) that provide information on our customers.

b. When something important happens to a major customer of ours, the whole business unit knows about it within a short period.

c. Data on customer purchase patterns are disseminated at all levels in this business unit on a regular basis.

d. Marketing personnel regularly exchange customer information with other departments.

Shareability—R&D and operations
What percent of employees in the following departments who routinely interface with customers can easily access customer information (it takes less than 15 minutes to locate the information needed)?

a. R&D (NPD)   (%)

b. Operations/Production   (%)

What percent of employees in the following departments who routinely interface with customers can easily (as above) modify, add to, or clarify stored customer information?

a. R&D (NPD)   (%)

b. Operations/production   (%)

Knowledge—share of wallet
For what percentage of current customers can employees in your business unit easily determine the following:

a. Customer penetration of your unit (% of customer/wallet)   (%)

b. Customer penetration of your company (% of customer/wallet)   (%)

Appendix 3. Construct Development Details and Statistics

The exploratory factor analysis (EFA) used principal components analysis with varimax rotation and a cutoff of .5 for individual item factor loadings (Hair 1979; Nunnally 1978) and 1 for factor eigenvalues. The confirmatory factor analyses (CFA) was guided by EFA results. Thurstone single-factor models using maximum likelihood methods were fit to the constructs, using AMOS 4.1 (from SPSS) and double-checking the results in PROC CALIS in SAS 6.12. Items not contributing to overall fit were identified through examining the residual matrices. Where constructs with fewer than four items could not be analyzed by CFA (insufficient degrees of freedom), inter-item correlations of greater than .6 were required.

The CIS scale, which was newly conceptualized in this research (see Figure 2), was tested separately. Separate EFA analyses were conducted for each part of the CIS subconstruct, i.e, acquisition, specificity, quality, addressability, dissemination, and shareability. Because of the complexity of the initial analytical framework, it was not expected that every subconstruct of CIS from the EFA would pass the additional rigor of the CFA analysis. Indeed, not all CIS subconstructs had good CFA fit statistics, due primarily to a lack of degrees of freedom in fitting these small models (Table A3.1). CIS subconstructs were retained in the measure based on their contribution to the overall model fit. Table A3.2 presents a post-hoc principal components analysis, which illustrates the method by which items were retained for the final survey. Importantly, the CIS construct itself had good overall fit statistics (RMR = .043, RMSEA = .044, GFI = .967, AGFI = .941, CFI = .965, χ^2 (df) = 27.987 (20), p = .110).

Of the non-CIS constructs, where CFA was applicable (items greater than 2), the constructs exhibited good fit statistics from the CFA. The four-item customization exhibited the weakest set of CFA fit statistics; when the item contributing to the poor fit was removed, only three items remained, too few to report CFA statistics (Table A3.3).

Table A3.1. CFA Results: CIS Subconstructs and Items

	# Items	RMR	RMSEA	GFI	AGFI	CFI	χ^2 (df)	p	α
Information Quality	4	.007	.000	.998	.989	1.00	.91 (2)	.63	.87
Person Specificity—Sales	4	.030	.110	.985	.923	.982	7.03 (2)	.03	.80
Person Specificity— Marketing	4	.025	.000	.997	.987	1.00	1.10 (2)	.57	.80
Time-Specific Purchase History	4	.102	.243	.937	.685	.908	26.46 (2)	.00	.79
Database Capabilities	4	27.04	.097	.986	.931	.988	5.90 (2)	.05	.80
Dissemination	4	.012	.000	.999	.995	1.00	.45 (2)	.81	.02
Sharing with R&D and Operations	4	105.67	.352	.909	.547	.838	53.64 (2)	.00	.81
Knowledge—Share of Wallet (ρ = .86, p < .05)	2	na	na	na	na	na	na	na	.92

Overall CIS Fit Statistics: α = .70; RMR = .043; RMSEA = .044; GFI = .967; AGFI = .941, CFI = .965, χ^2 (df) = 27.987 (20); p = .110

Table A3.2. Summary PCA Table CIS Subconstructs

	Information Quality	Database Capabilities	Shareability –R&D/ Ops.	Person Specificity— Sales	Person Specificity— Marketing	Time-Spec. Purchase History	Dissemi- nation	Shared Penetration Underst'ding
Accuracy	**.792**	.097	.037	.042	.139	.097	.140	.075
Consistency	**.786**	.170	.180	.112	.090	.005	.124	.109
Up-to-date	**.788**	.091	−.001	.110	.050	.127	.150	.058
Overall quality	**.823**	.146	.083	.114	.103	.141	.123	.107
First purchase date	.186	.087	.143	.090	.057	**.756**	−.074	.015
Contract renewal date	.008	.054	.008	−.002	.096	**.708**	.000	.132
Purchase history	.150	.162	.090	.165	.055	**.720**	.180	.150
Last purchase date	.052	.056	.043	.042	.164	**.835**	.029	−.019
Have contact name	.035	.153	.096	**.829**	−.013	.120	.023	−.002
Have contact type	.125	.032	−.022	**.862**	.102	.031	.076	−.058
Have response to contact	.166	.142	−.001	**.731**	.263	−.023	.127	.112
Names of others in purchase	.006	.167	.046	**.586**	.282	.180	.053	.144
Marketing offers made	.103	.117	.039	.226	**.804**	.126	.068	.068
Offers responded to	.060	.067	.080	.137	**.843**	.075	.056	.002
Method of contact	.032	.284	.062	.240	**.606**	.060	.194	−.098
Response time to offers	.176	−.045	.075	−.021	**.702**	.151	.046	.160
Basic contact info avail.	.356	**.610**	.104	.065	.025	.244	.060	.047
Basic info, no purchase last yr	−.076	**.886**	.000	.089	.050	.142	.014	.041
Extend info, no purchase last yr.	.163	**.828**	.060	.125	.070	.047	−.059	.107
Basic info, contact in 3 months	.049	**.666**	.025	.151	.136	−.039	.111	.028
Circulate customer documents	.122	−.016	.051	−.037	.073	.085	**.775**	−.164
Spread imp. info on major custs.	.075	.169	.113	.141	.034	−.017	**.656**	.112
Cust. purch. patterns	.253	.007	.102	.064	.233	.082	**.557**	.199
Exchange cust. info across units	.115	−.027	.045	.080	.030	−.026	**.709**	.116
Know all products purchased	.172	.078	.056	.052	.124	.119	.084	**.913**
Know share of wallet	.140	.116	.089	.061	.024	.147	.115	**.907**
R&D access	.108	.082	**.770**	.062	.047	.087	.093	−.006
Operations access	.174	.079	**.795**	−.001	−.004	.088	.151	.098
R&D modify	.000	.085	**.747**	−.004	.204	.042	.008	−.048
Operations modify	−.001	−.087	**.826**	.046	−.011	.040	.044	.115
Eigenvalue	**7.004**	**2.516**	**2.164**	**2.116**	**1.946**	**1.539**	**1.512**	**1.352**
% variance explained	**23.3 %**	**8.4%**	**7.2%**	**7.0%**	**6.5%**	**5.1%**	**5.0%**	**4.5%**
Cumulative	**23.3%**	**31.7%**	**38.9%**	**45.9%**	**52.4%**	**57.5%**	**62.5%**	**67.5%**
α	**.87**	**.80**	**.81**	**.80**	**.80**	**.79**	**.67**	**.92**

Factor weightings in **bold** indicate items loaded on same factor.

Table A3.3. CFA Summary: Strategy and Performance Variables

	# Items	RMR	RMSEA	GFI	AGFI	CFI	χ^2 (df)	*p*-value
Low-cost Strategy (α = .60)	4	.036	.000	.996	.950	.837	1.78 (2)	.41
Differentiation Strategy (α = .66)	4	.027	.000	.997	.987	1.00	1.11 (2)	.58
Customer-Based Performance (α = .74)	4	.009	.000	1.00	.998	1.00	.15 (2)	.93
Business Growth α = .79 (ρ = .652, *p* < .01)	2	na	na	na	na	na	na	na
Customization (α = .66)	3	na	na	na	na	na	na	na
Personalization (α = .75)	4	.031	.000	.996	.982	1.00	1.15 (2)	.48

Note

1. The model *p*-value is greater than .05 (.878) (χ^2 (6) = 2.416), indicating significance at < .001. Both the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI), which measure the fit of the combined measurement and structural model to data (unadjusted and adjusted for degrees of freedom), were greater than .90 (.966 and .986 respectively) (Bollen 1989; Baumgartner and Homberg 2000). The root mean residual (RMR), which assesses the correlations between the residual variance of the model items, and should be less than .05 for a close fit, is .011. (Jöreskog and Sorbom 1993; Bagozzi and Yi 1988). The Steiger-Lind root mean square error of approximation (RMSEA) (Browne and Cudek 1993), a noncentrality measure of the square root of an estimate of the population discrepancy divided by the degrees of freedom that should be as close to zero as possible, is .000. CFI, a normed comparative fit index that should be as close to 1 as possible, was 1.00 (Bentler 1990).

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