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Price-Based Global Market Segmentation for Services

In business-to-business marketing, managers are often tasked with developing effective global pricing strategies for customers characterized by different cultures and different utilities for product attributes. The challenges of formulating international pricing schedules are especially evident in global markets for service offerings, where intensive customer contact, extensive customization requirements, and reliance on extrinsic cues for service quality make pricing particularly problematic. The purpose of this article is to develop and test a model of the antecedents of business customers' price elasticities of demand for services in an international setting. The article begins with a synthesis of the services, pricing, and global marketing literature streams and then identifies factors that account for differences in business customers' price elasticities for service offerings across customers in Asia Pacific, Europe, and North America. The findings indicate that price elasticities depend on service quality, service type, and level of service support and that horizontal segments do exist, which provides support for pricing strategies transcending national borders. The article concludes with a discussion of the managerial implications of these results for effective segmentation of global markets for services.

International services are defined as "deeds, performances, and efforts conducted across national boundaries in critical contact with foreign cultures" (Clark, Rajaratnam, and Smith 1996, p. 15). They constitute a sector of the global economy that is growing exponentially relative to the industrial goods sector (Knight 1999). Organizations are taking an interest in the international marketing of services because of low cost factors and the ability to compete in nearby country markets (Bradley 1995); however, international services pose special challenges for marketing managers (Patterson and Cicic 1995) as a result of the intangibility of services, the extent of customization, and differences in preferences across cultures. Research on international service offerings has focused on entry-mode choices (e.g., Erramilli 1990, 1992), technology growth (e.g., Fisk 2001), geographic roles (e.g., Kassem 1989), service influences on national competitive advantage (e.g., Porter 1990), and strategic differences across services (e.g., Nicolaud 1989). Yet the marketing literature has not investigated several key components of service strategy, particularly in the international domain.

Kinnear (1999) has called for research on the extent of horizontal market segments that transcend national borders. This issue has become particularly pressing as international competition has intensified and regional unification (e.g., the European Union, the North American Free Trade Agreement) has been realized. Price sensitivity is a critical market-segmentation variable, and services involve enhanced contact between members of buying and selling organizations, in which price perceptions often differ significantly across market segments (Erramilli 1992). Consequently, a focus on horizontal segmentation implies that particular attention should be devoted to price-based market segmentation for services. Strategies for segmentation and pricing for services, whether in a domestic or an international context, differ from the strategies for goods for several reasons. First, services are highly perishable, and human resource constraints often restrict short-run capacity, which makes demand-management issues and pricing strategies important in smoothing demand (Kraus 2000). Second, the intangibility of services compared with goods may lead to greater emphasis on extrinsic cues rather than on the intrinsic attributes or quality of the service itself (Kraus 2000, p. 192; Zeithaml 1988). Third, the degree of customization and consumer involvement in service offerings enables services and price to be tailored jointly to suit customer preferences (Lovelock 1996). Therefore, Kinnear's observations identify an important managerial question, How should organizations price services to reach horizontal segments, that is, market segments that transcend national borders?

There is a dearth of research regarding the pricing of services (as opposed to goods) in global markets (see Table 1). Tellis (1986) provides a conceptual framework for how pricing strategies vary depending on store, category, brand, consumer, and competitive factors. Several studies have investigated the determinants of price elasticities (e.g., Bolton 1989; Hoch et al. 1995; Shankar and Krishnamurthi 1996). However, with few exceptions (e.g., Wittink 1977), most pricing research has focused on goods sold in a limited number of markets. In their review, Rust and Metters (1996) identify three types of mathematical models of services—customer behavior, service quality impact, and normative service models—but price has typically played a minor role

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TABLE 1
Comparison of Present Study with Previous Related Research

Problem Studied	Exemplar Studies	Service Domain?	Comparative/ International?	Consumers/ Business Customers	Study Type or Segmentation Measure
Meta-analysis of econometric studies of price elasticity	Tellis (1988)	No	No	Not applicable	Meta-analysis
Determinants of price sensitivity for nondurables	Bolton (1989); Huber, Holbrook, and Kahn (1986); Mulhern, Williams, and Leone (1998); Shankar and Krishnamurthi (1996)	No	No	Consumers	Across brands or stores
Segmentation of relevant markets	Elrod and Terry (1982)	No	No	Family units	Differential pricing as a segmentation variable
Optimal pricing policies for services	Segal (1991)	Yes	No	Businesses	Fee structures to service customers
The effects of specific attributes (including price) on evaluations of services or purchases of services	Anderson (1996); Bolton and Lemon (1999)	Yes	No	Consumers	The effects of price on service perceptions across multiple environments
Control issues in service firms' market-entry strategies	Erramilli and Rao (1993)	Yes	Yes	Consumers and business customers	Mode of entry, no segmentation analysis
Segmentation based on consumer–product relations	Hofstede, Steenkamp, and Wedel (1999)	No	Yes	Consumers	Product characteristics
Determinants of business customers' price sensitivity for services	Present study	Yes	Yes	Support services for businesses	Price elasticity across service contracts for international business customers

in these models. Recent exceptions are Bolton and Lemon's (1999) model of service usage as a function of price and models of optimal pricing plans involving a flat access fee, usage fee, or two-part tariff (Danaher 2002; Essegaier, Gupta, and Zhang 2002; Shugan and Xie 2000).

Equally important, although studies have investigated preferences for service offerings in consumer settings (e.g., Verma, Thompson, and Louviere 1999), there is almost no research on the antecedents of customer purchase behavior for services. Instead, most empirical work has studied the links between service quality dimensions and behavioral intentions (e.g., Mittal, Kumar, and Tsiros 1999; Zeithaml, Berry, and Parasuraman 1996). Little is known about how service quality or relationship properties operate within and across business-to-business relationships (Wathne, Biong, and Heide 2001; Weitz and Jap 1995). Thus, our study extends prior research by identifying price-based, horizontal market segments for services, on the basis of business customers' underlying preferences for service quality, across seven national markets.

This study investigates two main research questions that are critical to the development of pricing strategies for international service offerings. (1) What are the determinants of business customers' price elasticities of demand for service contracts? Specifically, our study seeks to answer the following questions. Under what circumstances will business customers pay a premium for customized services? In other words, will they pay a premium price for higher levels of

service and for reliable service delivery? How do business customers' price elasticities differ across market segments within national borders? What are the relative magnitudes of the effects of these different factors? (2) What factors account for differences in business customers' price elasticities of demand for service offerings across national borders? How do these differences reflect distinct segments in the global services market? In other words, are cross-border differences in price elasticities of demand for service due to differences in customer or market segment characteristics, the competitive environment, companies' service offerings, or national culture/preferences?

The answers to these questions will help marketing managers understand the extent to which the prices of service offerings must be customized or standardized within and across national borders. This article reviews the literature on customization of services and the targeting of horizontal segments and develops specific hypotheses about how individual business customers' price elasticities of demand for an international service offering vary within and across national borders. We test our hypotheses by estimating an econometric model with an extensive data set that describes business customers' purchases of service contracts from a major multinational firm operating in Asia Pacific, Europe, and North America.

Prior Research on Segmentation in Global Service Markets

A successful strategy for global marketing depends on a firm's ability to segment its markets so that uniform sets of marketing decisions can be applied to specific groups that exist horizontally, that is, across nations or cultures (Sethi 1971). Researchers historically have segmented international markets by using numerical taxonomy methods to classify segments within countries. Helsen, Jedidi, and DeSarbo (1993) provide evidence of "macro-segments," or segments that exist across borders, in a new product diffusion context. Subsequently, using means–end chain theory applied to consumer survey data (Gutman 1982), Hofstede, Steenkamp, and Wedel (1999) develop and apply a methodology to identify cross-national segments by identifying relationships between the consumer and the product at the segment level. We believe that business customers in international markets can be grouped into horizontal market segments on the basis of their underlying preferences for service quality. However, our study explores the existence of horizontal segments for an existing service based on price elasticities rather than (self-reported) survey data describing consumption patterns, attitudinal, personality, and sociodemographic variables. The remainder of this section integrates three diverse streams of literature—service strategy, global strategy, and pricing—to provide a conceptual framework for the development of our model (see Figure 1).

Segmentation of Global Markets for Services

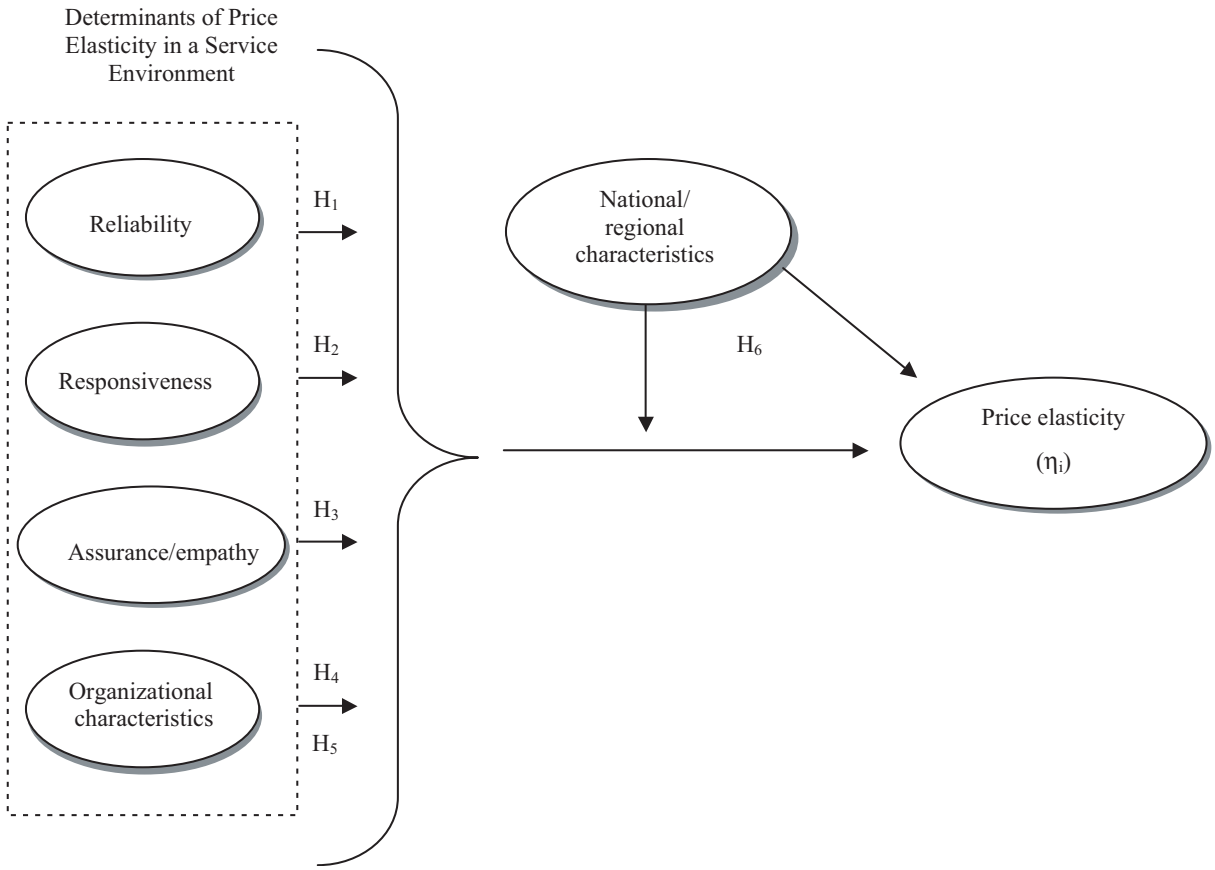
Consumer psychology, behavioral decision theory, and neoclassical economics indicate that different customers place different values on the same product. Consequently, a major challenge for international marketers is to identify global market segments and reach targeted segments with products (i.e., goods or services) that meet the common needs of these customers (Hassan and Katsanis 1994). Product configurations must be developed and marketed with the specific preferences of the target segment in mind (Hofstede, Steenkamp, and Wedel 1999). For two reasons, this goal is particularly crucial to organizations competing in multiple national markets. First, they face diverse customer segments for which standardization of marketing decision variables is often impossible (e.g., Szymanski, Bharadwaj, and Varadarajan 1993). Second, market segmentation can reduce operational costs (by eliminating redundant efforts) and effectively allocate a firm's resources to target markets (Berrigan and Finkbeiner 1992).

Most prior research has focused on the identification of customer characteristics relevant to the segmentation of markets for tangible goods rather than for services. For example, Jain (1989) argues that industrial and high-technology products are more likely candidates for standardization across multiple segments and that a trend toward homogenized use patterns exists for high-technology products. In contrast, services, including postpurchase services attached to tangible goods, are more likely candidates for customization for specific segments because disparate service expectations exist across national and cultural boundaries, enhanced personal interaction frequently occurs in service settings, and service-use patterns frequently differ across countries (Stauss and Mang 1999). In the absence of customization, service quality "gaps" may be created as a result of discrepancies between the performance of the service providers of one nation and expectations of the service recipients of another.

The Role of Price Elasticities in Segment Identification

The goal of market segmentation is to identify individual customers who desire similar benefits and exhibit similar behaviors and thereby form (relatively) homogeneous segments such that there is heterogeneity across segments (Wedel and Kamakura 1999). Identification of market segments is often influenced by customers' response to price, as Hofstede, Wedel, and Steenkamp (2002) illustrate in their international segmentation study. Segmentation strategies are effective when they extract higher prices from those buyers that are willing to pay more to have the service tailored to meet their needs (e.g., Kraus 2000). Customization of a service offering may be warranted when customers are less price sensitive (i.e., willing to pay premium prices for customized services). According to Hofstede, Wedel, and Steenkamp (2002, p. 174), in global markets, "groups of consumers in different countries often have more in common with one another than with other consumers in the same country." Consequently, the degree of customization for a particular market segment (horizontal or otherwise) requires managers to understand how service attributes explain differences in price elasticities of demand for individual customers. Price elasticities are useful for identifying service segments because repeat purchases, rather than trial purchases, dominate sales of existing services. In their repeat purchases, customers trade off the expected benefits of the service (which they have previously experienced) for

Figure 1
Factors Influencing Business Customers' Price Elasticities for International Service Offerings



the price. Therefore, price elasticities should be particularly useful for market segmentation.

Service Quality Dimensions as Segmentation Variables

There has been extensive modeling of the determinants of consumer price elasticities for frequently purchased goods in domestic markets (e.g., Bolton 1989; Hoch et al. 1995; Narasimhan, Neslin, and Sen 1996; Shankar and Krishnamurthi 1996). Because attributes of goods are fixed over time, these studies typically describe how price elasticities for various brand/store combinations differ because of variables such as retailer promotional activities and consumer characteristics. In contrast, little is known about the determinants of price elasticities for business-to-business services in domestic or international markets. Instead, research in services marketing has focused on cross-sectional studies of the switching behavior of consumers and business customers (e.g., Ganesh, Arnold, and Reynolds 2000; Heide and Weiss 1995; Keaveney 1995). In contrast, this article studies business customers' price elasticities for a single company's services.

Our model describes how price elasticities differ across customer segments as a result of the customization of service quality dimensions (e.g., reliability) and the organizational characteristics of the customer (e.g., access to information about service prices). We focus on service quality dimensions because, after marketing activities have acquired the customer, variation in the intrinsic attributes of services influences repeat purchase behavior and price elasticities. This article distinguishes between three types of market segmentation variables: horizontal segmentation variables that (1) apply to all customers (worldwide) or (2) operate across national borders within a region and (3) vertical segmentation variables that operate only within national borders. By *region*, we mean a group of nations in geographic proximity (e.g., Asia Pacific, Europe, North America) that shares certain geographic, economic, political, or cultural characteristics. Consequently, we explicitly distinguish between horizontal segmentation variables that operate across regions (i.e., worldwide) and variables that operate across (some) national borders within a region. This distinction is both necessary and important because service organizations may choose to standardize certain aspects of service operations (e.g., response or distribution centers) at the global or regional level. To make this distinction, in the remainder of the article, we use the terms "global" to refer to horizontal segmentation across regions and "regional" to

refer to horizontal segmentation across countries within a region. As an aside, we separately control for the main effects of culture.

A Model of Customers' Price Elasticities for Service Offerings

This section develops hypotheses regarding price elasticities for international service offerings and incorporates them in a model of the determinants of price elasticities of individual business customers. We predict that price-based, horizontal market segments exist for service, where the segmentation variables are customers' responses to service quality dimensions and organizational characteristics. Then, we consider whether vertical market segments also exist as a result of the moderating effects of national or regional variables.

Horizontal Market Segmentation

The emergence of a global marketplace—fueled by regional unification; standardization of investment and production strategies; and increasing flows of information, labor, and technology across borders—is especially conducive to the emergence of customer groups with common preferences that transcend national borders (Day and Montgomery 1999; Levitt 1983). Consequently, researchers have claimed that some (but not all) service attributes can be standardized across national borders for delivery to horizontal market segments (e.g., Patterson and Cicic 1995). For example, a cross-national segment of business customers might value responsiveness, which could be delivered by providing response centers open 24 hours a day and seven days a week. However, there is no empirical evidence on this issue.

In contrast, recent international market-segmentation studies have provided empirical support for the existence of horizontal market segments for consumer products (e.g., Yavas, Verhage, and Green 1992). Hofstede, Steenkamp, and Wedel (1999) have argued that means–end theory provides a conceptual basis for linking the product and the consumer in international markets. The key idea underlying means–end theory is that product attributes yield benefits on consumption, which in turn yields customer satisfaction or value (Gutman 1982). On the basis of this notion, Hofstede, Steenkamp, and Wedel develop a methodology to identify cross-national segments using hierarchical relations between the consumer and the product; they show that horizontal market segments exist for yogurt sold in 11 countries in the European Union. In subsequent research, they argue that "countries as segments" strategies may no longer be valid, and they demonstrate that store-image attribute importance weights display variation, with spatial concentration and contiguity of segments, across 7 countries in the European Union (Hofstede, Wedel, and Steenkamp 2002).

We believe that price-based, horizontal (i.e., cross-national) segments exist that reflect business customers' underlying preferences for services. Our primary reason is that, consistent with means–end theory, prior research has shown that service attributes yield (higher-level) benefits, such as service quality and value, which in turn yield customer satisfaction and repatronage intentions (Anderson and Sullivan 1993; Bolton 1989; Boulding et al. 1993; Zeithaml, Berry, and Parasuraman 1996). The following paragraphs provide an in-depth discussion of our rationale for the existence of price-based, horizontal segments that reflect business customers' underlying preferences for dimensions of service quality and their organizational characteristics.

Dimensions of Service Quality

Recent empirical research suggests that service organizations that adopt a revenue expansion emphasis in which customization plays a key role perform better than firms that try to emphasize both revenue expansion and cost reduction (Rust, Moorman, and Dickson 2002). An understanding of the value of revenue-expanding strategies to the service organization depends on understanding the demand curve (Szymanski, Bharadwaj, and Varadarajan 1993), where demand depends on a means–end chain that links service attributes with service quality and value (Zeithaml 1988). Although there has been intensive research regarding service quality (Fisk, Brown, and Bitner 1993), marketers have been unable to discover dimensions of service quality that are universally applicable to all customers and markets.[1] However, higher levels of service quality (on various dimensions) are associated with consumer reports of higher loyalty levels in many settings (see De Wulf, Odekerken-Schröder, and Iacobucci 2001; Zeithaml, Berry, and Parasuraman 1996). In this article, we explore how dimensions of service quality—identified by qualitative and quantitative research with customers conducted by the company that cooperated in this study—influence price elasticity. Following Parasuraman, Zeithaml, and Berry (1988), we label three dimensions: responsiveness, reliability, and assurance and empathy. We do not study tangibles because they are globally standardized for the company in our study, and such extrinsic cues regarding quality are less important than intrinsic cues when customers have substantial experience with a service and are making a decision about whether to repurchase it.

Responsiveness. Responsiveness can be defined as the willingness to help customers and provide prompt service (see Parasuraman, Zeithaml, and Berry 1988). Customers are more likely to repurchase goods and services from a responsive firm than from a less responsive firm (e.g., Gilly and Gelb 1982). There are high levels of perceived risk in new service encounters (Schlesinger and Hallowell 1993), which are likely heightened in cross-national contexts.

[1]There are (at least) three different streams of research regarding the dimensions of service quality. First, research based on the Nordic school distinguishes between different service processes (see Gronroos 1983). Second, following Juran (1988), researchers have distinguished between design quality, or elements of the service that the customer expects to receive based on benefits promised or stated in the service contract, and experience quality, or the customer's actual experience with each of the elements of the product or service (see Anderson, Fornell, and Rust 1997). Third, Parasuraman, Zeithaml, and Berry (1985, 1988) identify five underlying dimensions of service quality—reliability, responsiveness, assurance, empathy, and tangibles—and develop an instrument, SERVQUAL, to measure them.

Responsiveness reduces the perceived risk of continuing to purchase from an existing service provider, thereby increasing switching costs so that customers will be less sensitive to price increases (i.e., more price inelastic).

Responsiveness is typically represented by the speed with which firms react to service requests from customers; however, responsiveness has multiple aspects. In an international environment, response time can be hours or days, depending on the location of the customer relative to the service provider and the nature of the service. Simple services may be easily executed, whereas complex services may require extensive time and effort to implement. The speed of employee responses to service requests may be limited by geography, whereas the speed of electronic responses to service requests may be accelerated through the use of remote technology. Given that the greatest source of dissatisfaction for customers in technology-based service encounters is technology failure (Meuter et al. 2000), customers place greater emphasis on a firm's ability to respond to technology-driven problems (Bitner, Brown, and Meuter 2000; Lovelock 1999). As a result, we believe that customers are less price sensitive for highly responsive service, where responsive service encompasses initial response time and resolution time as well as the nature of the service request.

H_1: A horizontal market segment exists such that customers who receive more responsive service are less price sensitive than customers who receive less responsive service.

Reliability. Reliability, or the ability to perform the promised service dependably and accurately, is typically the most important service quality dimension to customers (Anderson, Fornell, and Rust 1997; Berry, Parasuraman, and Zeithaml 1994). Reliability is particularly critical for services, because (unlike goods) services are typically characterized by heterogeneity (due to differences between employees delivering the service, customers, and context) and simultaneous production and consumption (Berry and Parasuraman 1991). When we say that customers prefer more reliable service, we mean that they prefer lower variability in service attributes over time. For example, response times ranging from two to four days are preferred over (less reliable) response times ranging from one to five days, even when the average response time is the same. In addition, a service representative who is consistently courteous is preferred over a service representative who is intermittently courteous, even if the two representatives are (on average) equally courteous. Research suggests that customers sometimes prefer a lower level of quality that is more certain (i.e., more reliable or consistent over time) to a higher level of quality that is less certain (Rust et al. 1999).

Customers' predictive expectations develop from their service experiences, and inconsistent service increases the possibility of unfavorable disconfirmation and dissatisfaction (Anderson and Sullivan 1993). Unfavorable disconfirmation damages customer retention levels for services at greater rates than favorable disconfirmation benefits them (e.g., Bolton 1989; Bolton and Lemon 1999). Consequently, we predict that customers are more tolerant of price changes (more price insensitive) and less apt to defect to alternative suppliers when they experience highly reliable service.

H_2: A horizontal market segment exists such that customers who receive more reliable service over time are less price sensitive than customers who receive less reliable service.

Assurance and empathy. Services are intangible; therefore, service quality may be difficult to observe directly, and customers may consider employee behavior a surrogate for service quality (Wolkins 1993). Consistent with this notion, Parasuraman, Zeithaml, and Berry (1988) have identified assurance (i.e., the knowledge and courtesy of employees and their ability to convey trust and confidence) and empathy (i.e., caring, individualized attention the firm provides to its customers) as dimensions of service quality. Employees convey trust and confidence when they make a special effort or commit the company's resources to handling a business customer's service request. They provide caring, individualized attention through frequent visits and direct contact with the customer about service issues.

Empathy is also represented by having operating hours that are convenient to the customer's schedule, exhibiting flexibility in the delivery of services, and considering the customer's other business constraints. In global operations, providing assurance and empathy places an economic burden on the service organization (e.g., when employees make long trips to provide on-site service) and thereby acts as a pledge from the organization to the customer (Anderson and Weitz 1992). Customers perceive the employee's efforts to provide assurance and empathy, recognize that these efforts signal high-quality future service, and (consequently) are more willing to repurchase from the service organization and pay premium prices (Berry, Parasuraman, and Zeithaml 1994).

H_3: A horizontal market segment exists such that customers who receive more assurance or empathy from service representatives over time are less price sensitive than customers who receive less assurance.

In our study context, assurance and empathy reflect employee efforts and tend to operate similarly. Consequently, our empirical work explores a single prediction regarding employee efforts to provide assurance. However, we believe that in other industry contexts, the distinction between these two constructs is meaningful.

Organizational Characteristics

Customers are often imperfectly informed about their alternatives in the marketplace because of the large number of product offerings, the many dimensions on which offerings can be evaluated, and the complexity of those dimensions (Tellis and Wernerfelt 1987). The use of information technology reduces complexity and improves marketing effectiveness (Bloom, Milne, and Adler 1994), but information is often expensive to collect and difficult to use. In particular, global firms suffer from a condition of adverse asymmetry in information costs, and disproportionate costs are associated with collecting, synthesizing, and communicating data (Mariotti and Piscitello 1995). We believe that business customers who purchase many services are likely to be more

knowledgeable about alternative service offerings and (consequently) more price sensitive than business customers who purchase few services. We also believe that business customers who consider service purchases critical to the success of their core business operations are more price insensitive than business customers who do not view services as critical, because switching service providers or eliminating service purchases may have a negative effect on business performance (ceteris paribus).

H_4: A horizontal market segment exists such that customers who purchase few services in a given industry are less price sensitive than customers who purchase many services.

H_5: A horizontal market segment exists such that customers who consider service offerings highly critical to their business performance are less price sensitive than customers who view the service offerings to be less critical.

Vertical Segmentation

Cultural factors tend to exert greater influence on customer preferences and evaluations of services than do tangible goods (Mattila 1999) and thereby influence customer repatronage behavior (Kim and Chung 1997; Maignan, Ferrell, and Hult 1999). There are several reasons that cultural differences cause managers from different countries or regions to weigh differentially factors influencing their judgments and decisions about service and thereby to exhibit differences in price sensitivity. First, managerial decision making in a multinational environment is influenced by the cultural distance between the countries representing exchange partners (Kogut and Singh 1988), where cultural distance is the degree to which the cultural norms in one country are different from those in another country. Second, relationships with customers from collectivist societies result in stronger, more intimate, and (thus) more loyal relationships than do relationships with customers from individualistic societies, such as Germany. This loyalty may translate into more price insensitivity on the part of customers from collectivist markets.

Third, cultural differences influence behavioral norms and work-related values (e.g., Markoczy 2000), and these differences reflect disparity in the levels of both commitment to exchange partners and perceived satisfaction with exchange relationships. Fourth, given that customers from different cultures have diverse behavioral norms, they evaluate services differently and have different expectations about optimal and adequate encounters. For example, response centers open 24 hours a day and seven days a week may be more important in some countries or regions than in others, or an organization's characteristics (e.g., perceptions of the business environment, such as the criticality of the service to successful business performance) may be more important in some countries or regions than in others. Taken together, these arguments suggest that national or regional variables moderate the effects of some (or all) service quality dimensions and organizational characteristics on price sensitivity.

H_6: Vertical market segments exist such that the effects of dimensions of service quality and organizational characteristics on price sensitivity are moderated by national and regional variables.

Markets may be vertically segmented for some service dimensions (H_6) and horizontally segmented for others (H_1–H_5). We investigate this issue in the empirical portion of this article.

Covariates

Classic economic theory predicts that customers' price elasticities will depend on the point on the demand curve at which they are calculated. This prediction stems from the definition of price elasticity as dynamic in nature and is confirmed in other studies (e.g., Hoch et al. 1995). Thus, we treat price as a covariate. Cross-cultural differences within markets have often been argued to affect buyers' perceived value of services (Dahringer 1991). These cross-cultural disparities are typically captured with Hofstede's (1980) cultural dimensions. As described in the next section, we therefore control for the main effects of cultural distance by employing Kogut and Singh's (1988) measure of cultural distance between markets. Last, we include dummy variables representing geographic markets in the initial models, because the direct effects of these variables must be determined before any test for interaction effects of regional or national differences can take place.

The Study Context, Data Set, and Measures

Study Context

The study context is the purchase of system support services by large business customers. System support services are continuously provided services that enable or facilitate the functioning of manufacturing equipment, high-technology equipment, software, and other systems. Some examples include support services for telecommunications, computing, and other information technology; repair and maintenance services for engineering, medical, and/or other equipment; and support services for financial, health, or energy management software systems. In this study, the data set describes a stratified random sample of customers who purchased computing system support services from a company operating in many national markets. We draw the sample from three regions in which this company provides services: Asia Pacific (Japan, Korea, and Singapore), Europe (Germany and the United Kingdom), and North America (Canada and the United States).

Customers purchase service contracts for systems of computer hardware and software. The service contracts are purchased independently from the systems (which have been purchased earlier). The contracts cover both hardware and software support; that is, the two related offerings are bundled (Stremersch and Tellis 2002). The contracts are fixed-price contracts, and therefore customers are not billed on the basis of service-usage levels. Customers purchase a separate contract for each system; they buy multiple contracts if they own multiple systems, and the contracts may act as substitutes and/or complements for other products. There are roughly eight major competitors in any given market. Customers can (and do) purchase system support contracts from many different service organizations, and thus

switching costs are low compared with other industries. Customers may also decide to purchase different levels of support for different systems. In this study, we focus on two system support contracts (i.e., two different products) that promise different levels of support. Low-support contracts provide primarily reactive responses to customer requests about core hardware and software problems. High-support contracts provide reactive responses, escalation procedures, and proactive consulting in addition to actions that maintain and enhance system effectiveness. Both offerings have specific, contractually defined, targeted or guaranteed performance levels, such as "24–7 support with a guaranteed response within two hours." The low-support-contract terms and conditions are a subset of the high-support-contract terms and conditions. For example, low-support contracts promise resolution of certain issues within six hours, whereas high-support contracts promise resolution of the same issues within four hours. The duration of system support contracts ranges from three months to one year.

The Data Set

Each customer has (potentially) a separate price elasticity of demand for low- and high-support services. The data set describes purchases of system support contracts during 1998 and 1999 for 184 business customers in Asia Pacific, 216 in Europe, and 341 in North America. Because not all customers purchase contracts at both support levels, the resultant data set contains 508 price elasticities for low-support offerings and 445 price elasticities for high-support offerings. There are only six high-support contracts held by Canadian customers, so these observations are pooled with U.S. customers in our statistical analyses of high-support price elasticities.

The data set contains a description of each customer's interorganizational relationship, including its purchase history, over a three-year period. It combines information from three primary sources: (1) a master file that describes the characteristics of each customer account, (2) annual billing data for all contracts held by the customer, and (3) internal company records of monthly service operations data for all contracts and customers. Customers' organizational characteristics are recorded in the master file, including the number of low-support and high-support offerings each customer held, which is an estimate of customers' total support budget and their report of how critical system support is to their business operations. The billing data are used to calculate each customer's price elasticities for low- and high-support service contracts. The time-series data describing the system support experiences of the customers, obtained from monthly operations reports during 1997 and 1999 (at the contract level), are used to derive objective measures of service customization (reliability, responsiveness, and assurance) for each system support offering level.

The customer's report of how critical system support is to its business operations was originally obtained in a telephone interview with the customer organization's decision maker, who was asked the following question: "Which of the following best describes the impact of four hours unscheduled system downtime on all business at your location? Would you say that the impact is extremely critical (5) ... not at all critical (1)." With the exception of this measure, we do not use perceptual measures of model constructs, and therefore it is unnecessary to conduct tests for cross-cultural measurement equivalency.

Measurement of Price Elasticities of Demand for Individual Business Customers

Effective measurement of price elasticities can be a complex task in any context (Boatwright, McCulloch, and Rossi 1999). Prior research has typically measured price elasticities for groups of customers by deriving them from aggregate demand functions (e.g., Bolton 1989). A notable exception is Elrod and Winer's (1982) study of market-segmentation issues, which measures price elasticities of individual families. Because our study focuses on market-segmentation issues, we also measure the price elasticities of individual customers. We do not derive our price elasticity estimates from individual customer demand functions, because there is insufficient time-series data to estimate these functions. Nor do we derive our individual customers' price elasticity estimates from aggregate demand functions (e.g., by allowing heterogeneity in the demand function parameters), because this approach requires knowledge of the ways price interacts with other antecedents of customer demand for services. We obtain a separate elasticity for each support-contract type (low or high) by calculating the "arc elasticity" on the basis of customers' repeat purchases at the end of 1999 compared with purchases at the end of 1998. (A one-year period corresponds to most customers' budget cycles and to the maximum contract duration.) By calculating the price elasticity of demand for repeat purchases, we are able to hold fixed (for our consideration) a customer's total number of systems, which thereby eliminates factors that might influence the demand for systems and (consequently) the demand for system support. When a customer decides not to repurchase a contract for a given system, the company may have decided to purchase a system support contract from another supplier, to provide support internally, or to do without support. Such decisions are (naturally) related, but they are made in increments of one contract. Thus, we calculate our measure of price elasticity of demand for low-support contracts for a given customer as the percentage change in the number of low-support contracts purchased by the customer, divided by the percentage change in price paid for low-support contracts by the customer. Similarly, we calculate our measure of price elasticity of demand for high-support contracts for a given customer as the percentage change in the number of high-support contracts purchased by the given customer, divided by the percentage change in price paid for high-support contracts by the customer. These measures are described in Tables 2 and 3. Note that we make a separate calculation for each contract (low or high) for each customer.

Tables 2 and 3 show descriptive statistics for customers holding low-support contracts and high-support contracts, respectively, displayed by country. The two groups of customers overlap in each country but have different characteristics. In Table 2, the average price elasticity for low-support offerings across 104 customers in Germany is –.30, whereas

TABLE 2
Average Price Elasticities by Country: Low-Support Offerings

	Asia Pacific			Europe		North America	
Variable	**Japan**	**Korea**	**Singapore**	**Germany**	**United Kingdom**	**Canada**	**United States**
Price elasticity	–.02 (.48)	.67 (.98)	–.01 (.49)	–.30 (1.46)	–.20 (.85)	–.03 (.14)	.02 (.37)
Average number of contracts per customer used to calculate elasticity estimate	3.74 (4.22)	6.10 (5.53)	8.26 (20.24)	14.25 (21.04)	10.41 (18.63)	10.40 (10.09)	8.36 (22.99)
Criticality	4.00 (1.23)	4.41 (.93)	3.60 (1.26)	4.37 (.98)	4.16 (1.38)	3.92 (.94)	4.02 (.88)
Average number of high-support contracts held	1.27 (2.81)	6.04 (6.81)	4.87 (10.23)	4.61 (7.36)	4.11 (8.30)	.31 (1.04)	.96 (1.21)
Sample size (number of customers)	68	36	39	104	62	38	161

Notes: The table shows average price elasticities across customers, with standard deviations in parentheses. Price elasticities are measured such that a negative value implies (relative) price sensitivity and a positive value implies (relative) price insensitivity. The table also shows descriptive statistics for selected other variables, such as number of contracts held. The customer's self-report of criticality is measured on a five-point scale, where 5 = highly critical systems.

the average price elasticity for low-support offerings across 36 customers in Korea is .67, which implies that German customers are more price sensitive than are Korean customers. Table 2 shows that 104 German customers, who hold (on average) 14.25 low-support contracts, also hold 4.61 high-support contracts. They report an average level of criticality of 4.37, measured on a five-point scale, where 5 = highly critical systems. In Table 3, the average price elasticity for the 53 customers in Germany who hold high-support contracts is –.76. This smaller group of customers holds (on average) 3.38 high-support contracts and 11.71 low-support contracts and reports a high level of criticality of 4.55. Overall, the price elasticity estimates for low- and high-support contracts are similar to elasticity estimates reported in prior research (see Tellis 1988).

The central limit theorem predicts that our measures of price elasticity for an individual customer will be more precise when the customer holds many service contracts.[2] We recognize the imprecision in price elasticity measures for customers who hold low numbers of contracts by discarding price elasticity estimates that fall outside the range of –11 to 3.5. This cutoff rule discards 6% of the low-support contracts and 10% of the high-support contracts. In our study, customers typically hold about ten low-support contracts and five high-support contracts. Consequently, our rule discards a greater percentage of observations for high-support contracts because customers hold fewer high-support contracts. We also recognize imprecision in the price elasticity estimates by weighting the data when we estimate our model. By discarding outliers that are less precise and by using a weighted least squares (WLS) estimation procedure, we increase the statistical efficiency of the estimates of our model parameters. We do not change the substantive results reported in this article.

[2]This feature is made evident by considering an extreme case in which a customer begins by holding a single contract and then does not repurchase it because of a price increase of 5%, for example. The resultant elasticity measure is –100/5 = –20. If the same customer held ten contracts and repurchased five after a price increase of 5%, the resultant price elasticity measure is –50/5 = –10. We know that the second price elasticity estimate is more precise because it is based on a larger sample (ten contracts) than the first price elasticity estimate (one contract).

Measurement of Predictor Variables

Identification of service quality dimensions. Before this study, the cooperating company conducted qualitative and quantitative research with customers in Asia Pacific, Europe, and North America. First, a market research consultancy (that specializes in primary research for high-technology products and services) conducted 88 face-to-face interviews with managers from customer organizations, with the objective of identifying the relevant dimensions of service quality. The interviews focused on the customers' perceptions of exemplary service and service gaps. Although the company is a best-in-class service provider, the majority of respondents identified reliability (i.e., consistently meeting the terms and conditions of the service contracts) as the dimension of service quality that was most important to them. Responsiveness (i.e., willingness to help and provide prompt service) and assurance (i.e., the knowledge and courtesy of employees and their ability to convey

TABLE 3
Average Price Elasticities by Country: High-Support Offerings

	Asia Pacific			Europe		North America	
Variable	**Japan**	**Korea**	**Singapore**	**Germany**	**United Kingdom**	**Canada**	**United States**
Elasticity	.12 (.56)	.12 (.80)	–.03 (.54)	–.76 (2.52)	–1.04 (2.69)		.00 (.43)
Average number of contracts per customer used to calculate elasticity estimate	2.53 (3.29)	5.51 (6.18)	4.65 (9.62)	3.38 (4.02)	6.97 (9.45)		1.19 (.95)
Criticality	4.05 (1.15)	4.39 (1.09)	3.73 (1.32)	4.55 (.85)	4.59 (1.07)		4.05 (.83)
Average number of low-support contracts held	2.75 (4.83)	3.60 (5.47)	6.52 (19.27)	11.71 (15.50)	14.84 (20.84)		4.16 (20.16)
Sample size (number of customers)	38	77	44	53	34	N.A.	193

Notes: N.A. = not applicable. The table shows average price elasticities across customers, with standard deviations in parentheses. Price elasticities are measured such that a negative value implies (relative) price sensitivity and a positive value implies (relative) price insensitivity. The table also shows descriptive statistics for selected other variables, such as number of contracts held. The customer's self-report of criticality is measured on a five-point scale, where 5 = highly critical systems.

trust and confidence) were the two other dimensions of service quality that customers identified.[3]

Second, the cooperating company conducted a customer satisfaction and loyalty survey that measured both abstract and specific (i.e., actionable) perceptual measures of the dimensions of service quality. The sample sizes and response rates for the survey in each of the three regions are 227 observations from Asia Pacific for a response rate of 34%, 263 observations from Europe for a response rate of 30%, and 340 observations from North America for a response rate of 42%. Quantitative analyses of the survey data identified the same three abstract dimensions of service quality and linked them to perceptions of specific service operations. For example, responsiveness (an abstract measure) can be statistically linked to perceptions of response time for hardware requests. Consistent with means–end chain theory, we mapped the three abstract dimensions of service quality into hard (i.e., objective and concrete) measures that could be derived from the service operations data set using well-established procedures (see Kordupleski, Rust, and Zahorik 1993; Zeithaml and Bitner 2000, pp. 234–38). By linking customer preferences for service quality dimensions to concrete service attributes, we created a basis for market segmentation that is highly actionable for managers (Urban and Hauser 1993).

In summary, we ultimately measured the dimensions of service quality using the service operations data set. Our approach is different from cross-sectional studies that rely on perceptual measures of service quality (which can be standardized across companies and industries). However, it is consistent with within-company studies that relate perceptual service quality dimensions to specific business process metrics to produce actionable results for managers (e.g., Bolton and Drew 1994; Goodwin and Ball 1999, p. 33). Because low and high support have different characteristics, the low- and high-support equations use slightly different measures of service quality.

Measurement of service quality dimensions. Table 4 describes the measures of model constructs. Responsiveness refers to willingness to provide prompt service. Lack of responsiveness is measured by the average time until first response to a hardware request and by average resolution time for a software request. To obtain measures of responsiveness (rather than the lack thereof), we reverse code these measures.

Reliability refers to consistency or dependability in meeting service contract terms and conditions. Because

[3]Respondents included chief information officers, management information system managers, and service technicians who were identified from company records and screened by the consultancy to ensure that they were involved in the decision-making process for service contracts (either recommending or making the final decision). A few brief quotations from customers in different countries are provided here: (1) Responsiveness: "Our biggest problem is to shorten the response time to the trouble." "[We] need a highly flexible emergency team that can respond to ... different needs." (2) Reliability: "It's a full-time job trying to get people to do what we're paying them to do." "They should be concentrating on fulfilling their contracts, which would make me happy." "They have poor performance on their end.... Let's just say they make faulty promises." (3) Assurance: "I want a partner. Somebody I can trust and I know his background. I completely trust in him. We solve problems together." "Getting the right people ... who know what they're talking about and understand our environment." "I want to talk with someone more knowledgeable." "Get me the right person at the right time.... We need a higher level of expertise."

TABLE 4
Equation Constructs and Measures

Construct	Measure for Low-Support Offering Equation	Measure for High-Support Offering Equation
Price elasticity	Percentage change in quantity of support level contracts of type k, divided by percentage change in price of support level contracts of type k for each customer i	Same
Responsiveness	Reverse coding of average time until first response on hardware requests (in hours) Reverse coding of average time on responses to software requests (in hours)	Reverse coding of average travel time to hardware on-site requests (in hours) Reverse coding of average resolution time for software requests (in days)
Reliability	Reverse coding of extreme values of resolution time for software requests (number of occurrences)	Reverse coding of extreme values of engineer effort to resolve software requests (number of occurrences)
Assurance	Extreme values for time until first response on hardware request (number of occurrences)	Extreme values for travel time to on-site hardware requests (number of occurrences) Average engineer effort to resolve software requests (in minutes)
Organizational characteristics	Firm experience: number of high-support offerings held System criticality (self-report on a five-point scale)	Firm experience: number of low-support offerings held System criticality (self-report on a five-point scale)
Covariates		
Cultural characteristics	Hofstede's cultural index of individualistic/collectivistic cultures	Same
Price levels	List price expressed in U.S. dollars	Same
Covariates	Geographic dummies (where applicable)	Geographic dummies (where applicable), total budget spent on system support (scaled U.S. dollars)

response and resolution time are critical service "promises," lack of reliability in service delivery is measured by counting extreme incidents in which response or resolution time for hardware or software requests were unusually high compared with industry benchmarks. We do not use average response and resolution time to measure reliability; instead, we calculate measures of inconsistency in service by counting extreme values of response and resolution times (i.e., measuring skewness). Few or no extreme values imply that service is very dependable or reliable over time; that is, service operations levels are tightly distributed around average values.[4] Specifically, we measure lack of reliability by the number of incidents for which resolution time on a software support request exceeded 120 minutes (two hours) and by the number of incidents for which engineer effort to resolve software support requests was unusually high as measured by minutes spent. (In this data set, the service operations records indicate that 13% of hardware support incidents were resolved in more than 240 work minutes, and 11% of software support incidents were resolved in more than 120 work minutes.) In other words, we measure reliability by counting the number of instances of unreliable service (extreme deviations from promised levels). To obtain measures of reliability (rather than the lack thereof), we reverse code these two measures.

We measure the (combined) assurance and empathy dimension by two variables that reflect the knowledge, courtesy, and individualized attention provided by employees. We measure the average amount of engineer time invested in resolving software support requests and occasions of on-site visits to customer locations (when remote handling of the request was insufficient). Qualitative research indicates that customers recognize the additional quality delivered by an engineer relative to a (less knowledgeable) service technician, and they recognize on-site visits (as opposed to remote communications) as evidence of caring and concern within

[4]Distributions of customer service measures (e.g., employee labor, materials, resources allocated, response time, resolution time) are typically skewed and are characterized by a lower boundary of zero, a majority of observations within a certain range, and a few "extreme" outcomes. For example, a single service technician can usually deliver a service, using certain materials and procedures, within 24 hours of the customer's request. However, a customer's request may occasionally require efforts by multiple technicians, using more extensive materials and procedures, and therefore take much more time. These "extreme outcomes," or infrequent but extremely high (or low) levels of delivered service, are instances of unreliability.

the relationship. Although these two measures seem to correspond to assurance and empathy (respectively), we believed there was some overlap; however, we use the term "assurance" throughout the remainder of this article.

Two organizational characteristics are recognized (by both service providers and customers) as market-segmentation variables for all firms in this industry: (1) the customer organization's breadth of experience with support contracts and (2) a measure of the criticality of system support. In the equation for low-support contracts, we include the customers' total number of contracts (both low and high support) and the customer's number of high-support contracts. In the equation for high-support contracts, we include estimates of customers' total dollars spent on systems support (both low and high support) and the customer's number of low-support contracts. In other words, we use two measures in each equation to capture the quantity and quality of the customer organization's support service experience. (The low-support equation includes a measure of the number of high-support contracts, and the high-support equation includes a measure of the number of low-support contracts. We deliberately do not include the number of low-support contracts in the low-support equation or the number of high-support contracts in the high-support equation because these measures are used in the calculation of the equation's respective dependent variables.) The measures of experience might be proxies for the customer organization's size or relative importance of system support expenditures relative to other budget items as well as the organization's experience with system support contract purchases. However, because our study sample is restricted to extremely large businesses, we believe that these measures primarily reflect the customer organization's experience with system support contract purchases. Total support budget was measured by the estimated total dollars spent by the organization on system support (i.e., paid to the cooperating company and its competition). This budget is a numeric value expressed in U.S. dollars. The value has been multiplied by a constant to preserve the confidentiality of the company's records.

The equations for both low- and high-support offerings include covariates to capture national cultural distance. Similar to Kogut and Singh (1988), we estimate national cultural distance as a composite index based on Hofstede's (1980) four national culture scales that incorporate power distance, uncertainty avoidance, masculinity/femininity, and individualism. The index values are Japan (46), Korea (18), Singapore (20), Germany (67), United Kingdom (89), Canada (80), and United States (91). (Hofstede's cultural distance measure has a single value for each country, so there is no standard deviation.) In our sample, "regions" included Asia Pacific (Japan, Korea, and Singapore), Europe (Germany and the United Kingdom), and North America (Canada and the United States).

Estimation Procedure and Results

We estimate separate equations for low- and high-support-contract price elasticities. Price elasticity estimates for business customers in different countries of origin may have different amounts of measurement error as a result of different market characteristics. Furthermore, each customer's arc elasticity for a given type of support contract is calculated on the basis of the number of low/high contracts it holds, so that business customers who hold large numbers of contracts should have more precise elasticity estimates. Consequently, the error terms of each of the two price elasticity equations may be characterized by heteroscedasticity; that is, the magnitude of the equation errors may depend on the customer's country of origin and on the number of the low (or high) offerings purchased by the customer. We use Glesjer's (1969) test to test for heteroscedasticity of error terms due to these two features (Johnston 1972). This test confirmed heteroscedasticity stemming from the country of origin and the number of contracts used to calculate the price elasticity estimate as well as the nature of the contract. We use WLS to correct for heteroscedasticity. We calculate the weight for each observation in the data set by (1) estimating ordinary least squares regressions for each support level and country, (2) calculating the error variance for each combination of support level and country, and (3) dividing this error variance by the number of contracts used to calculate the price elasticity estimate. We use these in the WLS estimation of the equations (Greene 1993). Note that we do not use a systems estimation procedure because all customers do not hold both types of contracts.

We use a multiple-step procedure to test for the interaction effects of national and regional differences. First, we test for the existence of national differences in response to service quality dimensions and organizational variables by initially estimating an unconstrained model in which we use dummy variables for the six countries to create main and interaction terms with the measures described in Table 4.[5] We conduct F-tests to test the null hypothesis that the coefficients of a given predictor variable are equal in magnitude across countries in the same region. The results are reported in the columns labeled Asia Pacific, Europe, and North America in Table 5. A nonsignificant F-statistic in these cells indicates that there are no significant differences across countries within these regions. For example, for low-support contracts in Asia Pacific, we reject the null hypothesis that the coefficients of the predictor variables are equal across countries (Japan, Korea, and Singapore) for only two variables: (1) assurance, as measured by extreme values for time until first response on hardware requests (6.07, $p < .01$), and (2) price (4.20, $p < .05$). Thus, there are differences in customers' responses to assurance and price across the three countries in Asia Pacific.

Second, we conduct F-tests to test the null hypothesis that the coefficients of a given predictor variable are equal in magnitude across the three regions. (This test is only applicable when we do not reject the null hypothesis at the first step.) These results are reported in the right-hand column of Table 5. A nonsignificant F-statistic in these cells indicates

[5]Cultural distance is not subject to pooling tests because it takes on a single value for a given country. We test whether region coefficients can be constrained to be equal only for those regions where tests indicated that country coefficients could be constrained to be equal. For example, our test constrains price coefficients for North America and Asia to be equal, excluding Europe, because the United Kingdom and Germany have already been shown to have different values.

TABLE 5
F-Statistics from Pooling Test Results

Coefficient	Country Coefficients Equal Within Region: Asia Pacific	Europe	North America	Region Coefficients Equal
Low-Support Model Tests				
Responsiveness				
Average time until first response on hardware requests (reverse coded)	.02	2.21	.22	1.85
Average time on responses to software requests (reverse coded)	.49	9.15*	.04	.08 (NA = AP)
Reliability				
Extreme values of resolution time for software (reverse coded)	.36	.00	.06	1.26
Assurance				
Extreme values for time until first response on hardware requests	6.07*	2.58	.02	1.62 (NA = E)
Organizational Characteristics				
Criticality	.27	1.31	.09	5.89*
Number of contracts	.34	.27	.07	3.85**
Covariates				
Price	4.20**	3.72***	.09	No test
Geographic dummies	1.47	1.33	No test	1.52
High-Support Model Tests				
Responsiveness				
Average travel time for hardware on-site requests (reverse coded)	.01	.49	.03	6.18*
Average resolution time for software requests (reverse coded)	.40	.10	2.54	11.46*
Reliability				
Extreme values of engineer effort to resolve software requests (reverse coded)	7.48*	1.35	.08	3.20*** (NA = E)
Assurance				
Extreme values for travel time to on-site hardware requests	2.31	.01	.00	2.11
Average engineer effort to resolve software requests	4.09**	.28	.04	.69 (NA = E)
Organizational Characteristics				
Criticality	.33	1.73	No test	2.36***
Total support	.61	.83	No test	6.65*
Covariates				
Price	1.52	2.34	No test	.19
Geographic dummies	.73	2.93***	No test	.20 (NA = AP)

*$p < .01$.
**$p < .05$.
***$p < .10$.
Notes: NA = North America; AP = Asia Pacific; E = Europe. In right-hand column, constraints are across all three regions unless indicated otherwise. For example, "NA = E" indicates that the constraint was applied across North America and Europe.

that there are no significant differences across regions. For example, for low-support contracts, we cannot reject the null hypothesis that the coefficients of the predictor variables are equal across regions for reliability (1.26, $p > .10$) and responsiveness (1.85, $p > .10$).

On the basis of the results from Table 5, we estimate a pooled model (using data from all nations and regions) that allows for national and regional differences in the effects of service quality and organizational characteristics variables on price elasticity estimates. We examine this penultimate

model and delete all predictor variables that are not statistically different from zero at $p < .15$. (We use $p < .15$ rather than a smaller value to be conservative and avoid omitted variable bias). For example, Table 5 indicates that the effect of reliability was the same across countries and regions in the low-support model. Consequently, reliability is included in the penultimate model as a global effect, but it is not statistically different from zero at $p < .15$ in that model, so we drop it from the final model. We then estimate the final (reduced) models for both the low-support (Table 6) and high-support (Table 7) models. On the basis of the tests described in Table 5 and the results shown in Tables 6 and 7, we draw conclusions regarding our hypotheses.[6]

Tables 6 and 7 show that the R^2 for the low-support model is .28 ($p < .001$) and .55 ($p < .001$) for the high-support model. Both models fit well, especially when it is noted that each model accounts for differences in business customers' behavior, as measured by sometimes rather imprecise price elasticity estimates. The quality of fit is also represented in the service quality dimensions by engineering and operations measures, rather than relying on perceptual data, and these measures perform well. It is notable that we are able to explain much more of the variance in the customized or "augmented" product (i.e., high-support contracts) than in the standardized or "core" product. Note that Tables 6 and 7 provide detailed information about customer

[6]As part of this iterative testing procedure, we investigate whether each national or regional variable is a "pure" moderator (i.e., the main effect is not significant in the presence of interaction terms) or a "quasi moderator" (i.e., the main effect and the interaction effects are significant). We investigate this issue using the standard tests of moderated regression analysis (Baron and Kenny 1986; Irwin and McClelland 2001; Sharma, Durand, and Gur-Arie 1981). As shown in Tables 6 and 7, the results of these tests are mixed. National and regional characteristics are pure moderators in the low-support equation and quasi moderators in the high-support equation (because main effects for Germany and the United Kingdom are significantly different from zero). We believe that national and regional variables can be pure or quasi-moderator variables depending on idiosyncratic characteristics of the product markets, and these results will not necessarily generalize to other product markets. Consequently, we do not discuss this issue further.

TABLE 6
Low-Support Final Model: WLS Results

Variable	Coefficient Estimate	Standard Error	Standardized Coefficient
Intercept	.0075	.1281	
Responsiveness			
Average time on responses to software requests (reverse coded), Germany	−.0006	.0005	−.04
Average time on responses to software requests (reverse coded), United Kingdom	.0001**	.0000	.08
Reliability			
Not supported			
Assurance			
Extreme values for time until first response on on-site hardware request, Korea	1.2249*	.1362	−.38
Organizational Characteristics			
Criticality, Europe	−.0092*	.0058	.17
Number of high-support contracts, Europe	.0119*	.0035	.13
Number of contracts, Asia Pacific	−.0092	.0058	−.08
Covariates			
Hofstede cultural distance	.0004	.0018	.01
Price: Europe, Germany	−.0202***	.0114	−.07
Price: North America	−.0054***	.0031	−.07
Model Statistics			
R^2	.28		
Adjusted R^2	.27		
F-statistic	24.43*		

*$p < .01$.
**$p < .05$.
***$p < .10$.
Notes: All our hypotheses predict conditions under which customers will be more price insensitive. Our equations are specified, and our measures are constructed, so that a positive coefficient implies more price inelasticity or insensitivity and a negative coefficient implies more price elasticity or sensitivity.

TABLE 7
High-Support Final Model: WLS Results

Variable	Coefficient Estimate	Standard Error	Standardized Coefficient
Intercept	.7346	.3938	
Responsiveness			
Average travel time to hardware on-site requests (reverse coded), Europe	1.6582*	.1575	.71
Average travel time to hardware on-site requests (reverse coded), North America	.2741**	.1180	.10
Average resolution time for software requests (reverse coded), North America	2.2135*	.2733	.28
Reliability			
Extreme values of engineer effort to resolve software requests (reverse coded), Japan	.0722*	.0276	.11
Extreme values of engineer effort to resolve software requests (reverse coded), Korea	.1401*	.0246	.26
Extreme values of engineer effort to resolve software requests (reverse coded), Europe and North America	.3327*	.0497	.35
Assurance			
Extreme values for travel time to on-site hardware requests, all markets	.7857*	.0949	–.33
Average engineer effort to resolve software requests, Japan	.0070**	.0030	–.10
Average engineer effort to resolve software requests, Korea	.0076*	.0023	–.16
Average engineer effort to resolve software requests, Europe and North America	.0107*	.0016	–.32
Organizational Characteristics			
Criticality, Asia Pacific	–.1032	.0652	–.13
Number of low-support contracts, Europe	.0286*	.0057	.26
Total support budget, Europe	.0003*	.0001	.09
Total support budget, North America	–.0001***	.0001	–.06
Covariates			
Hofstede cultural distance	–.0044	.0051	–.08
Geographic dummy, Germany	–1.9537*	.3965	–.23
Geographic dummy, United Kingdom	–2.3561*	.3858	–.45
Model Statistics			
R^2	.55		
Adjusted R^2	.53		
F-statistic	33.00*		

*$p < .01$.
**$p < .05$.
***$p < .10$.
Notes: A positive coefficient implies more price inelasticity or insensitivity and a negative coefficient implies more price elasticity or sensitivity.

preferences for contracts. For example, for low-support contracts, Table 6 shows that German customers consider responsiveness, measured by the average response time to software requests, much more important than do U.K. customers.

We test our hypotheses by examining Tables 6 and 7. H_1 predicts that customers who receive more responsive service over time are less price sensitive than customers who receive less responsive service (ceteris paribus). In the low-support model (Table 6), U.K. customers are less price sensitive when the average resolution time for software requests is high ($p < .01$), but non-U.K. customers are not. In the high-support model (Table 7), customers are less price sensitive when average travel times to provide on-site hardware support are high (Europe, $p < .01$; North America, $p < .05$) and when average resolution time is high for software requests (North America, $p < .01$), which indicates horizontal segments exist across countries. These results support H_1.

H_2 predicts that customers who receive more reliable service over time are less price sensitive than customers who receive less reliable service. In the low-support model, none of the measures of reliability is shown to be statistically sig-

nificant in Table 6. In the high-support model, European, Korean, Japanese, and North American customers are price sensitive when engineer efforts to resolve software service requests are occasionally slow ($p < .01$), as shown in Table 7. This result supports the hypothesis that customers who experience more reliable service over time are less price sensitive.

H_3 predicts that customers who receive more assurance (e.g., because of efforts by employees) are less price sensitive than customers who receive less assurance. In the low-support model, Korean customers are less sensitive to price when technicians' time until first response on an on-site hardware request is occasionally high ($p < .01$). This initially surprising result is due to an on-site visit seldom being a first response to a hardware request, yet the customer clearly values this effort. In the high-support model, customers in Europe, Japan, Korea, and North America are less price sensitive when average engineer effort to resolve software requests is high and when technicians make infrequent but lengthy trips to resolve on-site hardware requests. These findings support the prediction in H_3 that customers who received assurance from employee efforts are less price sensitive.

H_4 and H_5 pertain to organizational characteristics. H_4 predicts that customers who purchase few services in a given industry are less price sensitive than customers who purchase many services. In the low-support model, European customers with a low number of support contracts are more price insensitive than those with large numbers of contracts ($p < .01$). In the high-support model, European customers with a low number of low-support contracts and low total support budgets are more price insensitive ($p < .01$). Consequently, H_4 is supported throughout Europe. However, in the high-support model, North American customers are more price sensitive when purchases (as measured by the size of their total support budget) are high, which thereby refutes H_4. We speculate that this anomalous result is due to the robust North American economy (compared with the rest of the world) during this period. H_5 predicts that customers who consider service offerings highly critical to their business are less price sensitive than customers who consider the service offerings less critical. Table 6 shows that this hypothesis is supported in the low-support model for European customers ($p < .01$); however, Table 7 shows that H_5 is not supported in the high-support model.

Through testing H_1–H_5, we have established that price-based, horizontal market segments exist that reflect dimensions of service quality and organizational characteristics. H_6 predicts that the effect of service quality dimensions and organizational characteristics on customers' price elasticities is moderated by national or regional differences. Many differences exist both among countries and among regions for both low-support and high-support service contracts. Here, we examine the (joint) F-test results for the low-support model displayed in Table 5. The price elasticities of European customers showed significant intraregional differences in the effects of responsiveness ($p < .01$). The price elasticities of Asia Pacific customers showed intraregional differences in the effects of assurance ($p < .01$). These results show that the influence of service quality dimensions on price elasticities is moderated by national and regional differences. In the low-support model, we found significant differences across regions for both criticality ($p < .05$) and number of contracts ($p < .01$). Thus, the influence of organizational characteristics on price elasticities is moderated by national and regional differences, and H_6 is supported by the results of the low-support model for responsiveness, assurance, criticality, and total support.

The results for the high-support model displayed in Table 5 indicate distinct differences across nations and regions. The relationship between responsiveness (measured as both average travel time for hardware on-site requests and average resolution time for software requests) and price elasticity is also moderated by interregional differences ($p < .01$). The influence of reliability (measured as extreme values of engineer effort to resolve software requests) on price elasticities is moderated by national differences (Asia Pacific, $p < .05$) and regional disparities ($p < .10$). The relationship between assurance dimension and price elasticities is moderated by national differences within Asia Pacific ($p < 0.05$). These results further support H_6. We found cross-regional interaction effects in the criticality–elasticity relationship ($p < .10$) and the firm size–elasticity relationship ($p < .05$), and thus H_6 is supported by the results of the high-support model for responsiveness, reliability, assurance, criticality, and total support. These results are summarized in Table 8.

Discussion

Although the principles of market segmentation may appear straightforward, market-segmentation research is still in the early stages of development both theoretically and methodologically (Steenkamp and Hofstede 2002; Wedel and Kamakura 1999). Market segmentation is particularly challenging in global markets where cultural and economic differences influence customer preferences and characteristics. This observation is especially true for managers who are attempting to develop profitable strategies and pricing schedules for services offered in global markets. Prior research on global marketing argues that it may be useful to identify segments on the basis of cultural or demographic differences within and across specific markets. However, our study of price elasticities indicates that market segmentation for international service offerings can be based on the business customers' revealed preferences for different service configurations and characteristics of the customer organization. This approach to market segmentation leads to the identification of horizontal market segments across nations and regions, whereby service offerings are customized to customer preferences for service attributes.

The development of a global market-segmentation scheme based on customers' price elasticities, in addition to service quality preferences and organizational characteristics that influence them, yields two benefits for service organizations. First, revenues can be enhanced by establishing specific price points for service feature bundles that attract and retain customers. Second, service delivery systems can be simultaneously customized to match individual customer

TABLE 8
Summary of Hypothesis Tests and Results

Hypothesis	Low-Support Offerings Result	High-Support Offerings Result
H_1: A horizontal market segment exists such that customers who receive more responsive service are less price sensitive than customers who receive less responsive service.	Supported in the United Kingdom only. Customers are less price sensitive when average resolution time for software requests is low. See Table 6.	Supported in Europe and North America. Customers are less price sensitive when average travel times to provide on-site support are high and when average resolution time for software requests is low. See Table 7.
H_2: A horizontal market segment exists such that customers who receive more reliable service over time are less price sensitive than customers who receive less reliable service.	Not supported.	Supported in Korea, Japan, Europe, and North America. Customers are less price sensitive when engineer effort to resolve service requests does not vary over time (i.e., across requests). See Table 7.
H_3: A horizontal market segment exists such that customers who received more assurance or empathy from service representatives over time are less price sensitive than customers who received less assurance.	Supported in Korea only. Customers are less price sensitive when technicians' time until first response on hardware request (usually for on-site visit) is high but infrequent. See Table 6.	Supported in Asia Pacific, Europe, and North America. Customers are less price sensitive when average engineer effort to resolve software requests is high and when technicians make infrequent lengthy trips to respond to on-site hardware requests. See Table 7.
H_4: A horizontal market segment exists such that customers who purchase few services in a given industry are less price sensitive than customers who purchase many services.	Supported in Europe. Customers with lower numbers of high-support contracts are less price sensitive. See Table 6.	Supported in Europe (number of low-support offerings) and North America (total support budget). See Table 7.
H_5: A horizontal market segment exists such that customers who consider service offerings highly critical to their business are less price sensitive than customers who view the service offerings as less critical.	Supported in Europe. Customers with highly critical systems are less price sensitive. See Table 6.	Supported in Europe (number of low-support offerings) and North America (total support budget). See Table 7.
H_6: Vertical market segments exist such that the effects of dimensions of service quality and organizational characteristics on price sensitivity are moderated by national and regional variables.	Supported for measures of responsiveness, assurance, criticality, and total support. See Table 5.	Supported for measures of reliability, responsiveness, assurance, criticality, and total support. See Table 5.

preferences for perceived service quality—reliability, responsiveness, and assurance—yet standardized to create global, horizontal segments that are cost effective for the service organization. (Unlike goods, services usually cannot be resold, and thus service organizations are likely to be less concerned with the diverting of sales across national boundaries.) To enjoy these benefits, however, global service providers must understand how price elasticities vary across different service delivery and organizational profiles and how these relationships are moderated by national and regional differences. This study indicates that customer preference, customer retention, and (consequently) price elasticities differ across service quality dimensions in vertical, horizontal, and global segment dimensions.

Simultaneous Vertical and Horizontal Segmentation in the Low-Support Market

A key finding of this study is the identification of both horizontal and vertical segments among service customers. In the low-support model, significant differences in the influence of service responsiveness on customer elasticities exist within the European market, such that only U.K. customers are more price sensitive when average response times for service requests are high. Such vertical segments (i.e., those within one market or culture) follow traditional perspectives toward segment identification (Hofstede, Steenkamp, and Wedel 1999), which requires customization of service dimensions to individual country markets.

The low-support model also demonstrates how horizontal segments can exist at the regional level by identifying organizational characteristics that influence elasticities similarly across countries within a region. Specifically, business customers in Europe are price insensitive when they consider the service critical to the company's business success or when the customer holds few service contracts; otherwise, they are price sensitive. Thus, changes in price to European customers (but not Asia Pacific or North American customers) influence repatronage behavior differently. Some European firms with noncritical systems or many service contracts may be much less willing to tolerate price increases for low-support contracts.

At the same time, there is also empirical evidence identifying a horizontal segment that cuts across national and regional boundaries. The low-support model indicates that service reliability does not influence price elasticities in any country or region, which indicates that current levels of reliability are within the zone of tolerance for all customers worldwide. This observation is consistent with a horizontal segmentation scheme that standardizes certain aspects of service operations within upper and lower bounds that are common across global markets. Furthermore, if competitors offer similar levels of reliability, then the company might also consider deemphasizing reliability in its marketing communications.

How Customer Expectations Influence the Segmentation of Premium Service Markets

The contractual obligations of the service organization are higher for the premium (high-support) service contract than for the core (low-support) service contract. When contractual obligations are high, customers' expectations change. This shift is evident in a comparison of the high- and low-support models. In the premium (high-support) model, service reliability is acutely important, especially the reliability of engineer effort to resolve software service requests. Highly reliable software resolution times lead to price inelasticity in Japan and Korea, as well as in North America and Europe (i.e., horizontal segments across countries within a region). However, the effect of reliability on price elasticity relationship was not statistically significant in the low-support model. Consequently, it is apparent that most customers demand more reliable service as contracts increase in price, though the weights differ somewhat across countries and regions.

Balancing Customization and Standardization of Each Service Quality Dimension

The delicate balance between customization and standardization of service delivery dimensions is particularly evident in the premium service market. The importance of service responsiveness is roughly equivalent across countries within Asia Pacific, European, and North American regions, which provides support for the presence of horizontal segments. However, significant differences exist between these three regions. European and North American customers' price elasticities are affected by the timeliness of the service organization's responses to their on-site requests, and North American customers are also affected by resolution times. Yet price elasticities for Asia Pacific customers are not influenced by either of these dimensions of service quality. This observation illustrates how a service organization may standardize service delivery (e.g., responsiveness) for markets within each region, yet customize service delivery to specific regions. This segmentation strategy partially arises from local regional conditions (e.g., physical terrain, national customs procedures, efficiency of transportation and communication hubs) that influence the service organization's response and resolution times.

The high-support model also shows that horizontal segmentation requires subtle customization of service delivery efforts. For example, assurance provided by employees influences price elasticities in virtually all markets. When assurance is represented by employees' willingness to make a long trip to resolve an on-site hardware request, the results show that the effect of assurance on price elasticity is reasonably similar across countries and regions. This result for assurance indicates that a global market exists for this dimension of service quality. In other words, all customers appreciate the effort of the service employee in traveling to fulfill the company's obligations, and they are (consequently) more price insensitive. However, when assurance is represented by engineer efforts to resolve software requests, the size of its effect on price elasticity varies across countries in Asia Pacific and across regions. In Europe, Japan, Korea, and North America, high levels of assurance (due to high engineer efforts to resolve requests) lead to price inelasticity. However, in Singapore, engineer efforts to resolve requests apparently are not noticed or not valued. Marketing managers undoubtedly find such nuances difficult to execute, especially given the complexity of most service delivery processes.

Organizational Characteristics Still Matter

Customer size influences price elasticity in the high-support model, and this relationship is moderated by regional differences. European customers holding many low-support contracts or with large total support budgets are more price sensitive for high-support contracts. Conversely, North American firms with large total support budgets are more price insensitive, probably because of the exuberant U.S. economy in the late 1990s. These findings indicate that from a strategic perspective, organizational characteristics of customer firms influence the price adjustments made by service providers, depending on the regional location of the customer.

Conclusions, Limitations, and Directions for Further Research

As multinational business becomes increasingly service oriented, managers need to develop strategies for segmenting global markets and marketing services to business customers. This challenge is relevant to companies that sell manufactured goods with ancillary pre- and postpurchase service (Hensler and Brunell 1993), as well as to companies that sell conventional services. The effective identification

of market segments is critical to the success of multinational companies for several reasons. First, service providers can customize their offerings in ways that maximize customer utility and thereby can charge price premiums. Second, providers may standardize their offerings to a greater degree through the identification of horizontal (regional) or global segments, thereby enjoying cost reductions and more efficient allocation of critical resources. Thus, when customers, as opposed to countries, are used as the basis for identifying global market segments, the effectiveness of marketing strategies will increase (Hofstede, Steenkamp, and Wedel 1999; Jain 1989).

This article has developed and tested a model of how price elasticities depend on dimensions of service quality and organizational characteristics and how these effects are moderated by national and regional differences. Our research shows how these variables can be used to identify nontraditional, vertical, and horizontal market segments. To our knowledge, we are the first researchers to study price elasticities to derive implications for the market segmentation of services. However, several limitations of this study should be recognized. First, our study focuses on two system support services offered by a single global company in a specific industry. Further research should investigate how price elasticities vary across multiple companies and service industries as well as customers. Second, we measure arc price elasticities over a relatively short period during which competitive activity is relatively stable. Additional research could model price elasticities and how they vary within a dynamic model of purchase behavior that incorporates competition. Third, we examine customers from only seven countries. Although these locations are culturally and economically distinctive, further research should consider using data from a larger pool of markets. Fourth, our study uses operational rather than perceptual measures of service attributes. Prior research links operational measures to perceptual measures of service quality, or it links perceptual measures to repeat purchase behavior, whereas our study ties operational measures to repeat purchases. Further research is needed to develop a comprehensive model of how customers' perceptions (and cognitive processes) mediate the relationship between service operations and customer purchase behavior. Fifth, we use regional or country dummy variables rather than incorporating characteristics of regions and countries that might act as moderators. Additional research using much more extensive data could use more sophisticated cultural and economic measures to determine any interaction effects.

Our understanding of markets and segments for services is hindered by the blurring of distinct market boundaries. Day and Montgomery (1999, p. 7) remark that "The continuing progression from a world of distinct boundaries to one of linked global markets is being fueled by the persistent forces of the homogenization of customer needs and the recognition of the competitive advantage of a global presence." The homogenization of customer needs will yield horizontal segments that cut across country, and sometimes regional, boundaries. Truly adaptive organizations will be able to develop service strategies that fit an evolving, nonconventional global marketplace characterized by both vertical and horizontal segments. Although our study provides a platform from which further research can begin, additional investigations of global services are needed.

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