

Marketing Models of Service and Relationships

Roland T. Rust
and
Tuck Siong Chung

Roland T. Rust holds the David Bruce Smith Chair in Marketing and is Executive Director of the Center for Excellence in Service and Chair of the Department of Marketing, and Tuck Siong Chung is a doctoral student, Robert H. Smith School of Business, University of Maryland. The authors thank P.K. Kannan for many helpful suggestions.

Please address correspondence to:

Roland T. Rust
Robert H. Smith School of Business
University of Maryland
College Park, MD 20742
Phone: 301-405-4300
Fax: 301-314-2831
Email: rrust@rhsmith.umd.edu

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Abstract

Given the growth of the service sector, and advances in information technology and communications that facilitate the management of relationships with customers, models of service and relationships are a fast-growing area of marketing science. This article summarizes existing work in this area and identifies promising topics for future research. Models of service and relationships can help managers manage service more efficiently, customize service more effectively, manage customer satisfaction and relationships, and model the financial impact of those customer relationships. Models for managing service have often emphasized analytical approaches to pricing, but emerging issues such as the tradeoff between privacy and customization are attracting increasing attention. The tradeoffs between productivity and customization have also been addressed by both analytical and empirical models, but future research in the area of service customization will likely place increased emphasis on e-service and truly personalized interactions. Relationship models will focus less on models of customer expectations and length of relationship, and more on modeling the effects of dynamic marketing interventions with individual customers. The nature of service relationships increasingly leads to financial impact being assessed within customer and across product, rather than the traditional reverse, suggesting the increasing importance of analyzing customer lifetime value and managing the firm's customer equity.

Key words: Services marketing, relationship marketing, customer satisfaction, service quality, service productivity, customization, service design, e-service, service demand, pricing of services, service guarantees, complaint management, customer retention, customer relationship management, word-of-mouth, customer lifetime value, customer equity, return on quality

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1 Introduction

Traditionally, mainstream marketing science has involved itself principally with the goods sector and sales transactions. For example, in the inaugural issue of Marketing Science, in 1982, three of the five articles related to the goods sector and the other two were not specific to sector. The early history of marketing science was typified by understanding the sales of coffee, or the diffusion of consumer durables. Product design was studied as the determination of the optimal set of attributes. Expenditures were by product, and the optimal marketing mix determined product strategies.

By comparison the Fall 2004 issue of Marketing Science featured ten articles, of which only one explicitly related to the goods sector. Newer research in marketing science is typified by such topics as understanding customer behavior on the Internet, or the cultivation of customer relationships. Customer strategy is studied in terms of the optimal interactions with the customer. Expenditures are increasingly by customer, and customer interaction strategies are increasingly determined in a disaggregate way, leading to the customization of service.

The reason for the shift in emphasis in marketing science topics is that the economy itself has changed significantly. For example, in the year 1920 the service-producing sector in the United States was responsible for 53% of the Non-Farm employment. By 1960 that percentage had increased to 62%, and by 2000 the percentage had increased to 81% (U.S. Department of Labor, Bureau of Labor Statistics). A similar pattern is found in every developed economy of the world. The trend toward service is greatest in the most advanced economies, as there is a strong positive relationship between GDP and the percentage of the economy that is service (Sheram and Soubbotina 2000).

The degree to which service dominates the economy may actually be understated, given that service also plays a large and important role in goods sector companies and the public sector (Quinn, Doorley and Paquette 1990). The reason for the importance of service in these sectors is the positive relationship between market orientation and better firm performance, as shown in the research on market orientation (e.g., Jaworski and Kohli 1993; Narver and Slater 1990), and the related concept of customer orientation (Deshpande, Farley and Webster 1993). With the increasing commodization of goods, firms are increasingly turning to service as the most promising means of differentiation. Firms are adding new activities and reconfiguring existing activities to create services-led growth (Sawhney, Balasubramanian and Krishnan 2004).

The growth of the service sector may also be viewed as a manifestation of the changes brought by the information revolution, which has brought revolutionary changes in computing, data storage, and communications. Information technology is a key enabler to help firms collect and analyze data on consumer activities, and to make interaction with individual customers economically viable. In a more direct way, the information revolution brings about the growth of the service sector, as it results in the growth of information services in such areas as computer software, financial products, telecommunications and entertainment. Because the advance of technology is a one-way street, given that knowledge of technology can be stored and passed along to others, the continuing expansion of the service sector and the service part of the goods sector appears to be assured.

The increasing importance of models of service and relationships also results from several other important factors¹. First, there has been an explosion of low-cost data produced by new technologies in service sector firms. Second, research focusing on the largest part of the service sector (retailing and business-to-business service) has in many ways provided an

academic foundation for much of service research. Finally the role of service operations research in developing mostly OR-based models in the marketing-related fields of routing, supply chains, yield management, and scheduling have provided a basis for marketing models in related areas.

We find it useful to classify the literature on service and relationships into four categories. The relationship between these four categories is shown in Figure 1. The area of *managing service* addresses the strategic and tactical decisions (e.g., pricing) that a firm must make to acquire and retain customers most effectively. The area of *customizing service* refers to the firm's efforts to personalize and individualize service products and service delivery. *Customer satisfaction and relationships* addresses the mechanisms that result in a successful, continuing customer relationship. The final area, *financial impact of customer relationships*, has to do with the efforts of the firm to quantify the profitability of its customer relationships.

Table 1 presents some representative articles in the evolution of models of service and relationships. We can see from the table that relatively little progress was made until the mid-1980's, when an explosion of interest occurred. Early work centered on methods of measuring service quality (e.g., Parasuraman, Zeithaml and Berry 1988) and early models of customer retention and its financial impact (e.g., Fornell and Wernerfelt 1987; 1988). The early 1990's saw the first serious attention to service customization and customer addressability (e.g., Blattberg and Deighton 1991), due to the emergence of large-scale customer databases. That era also saw the development of national customer satisfaction surveys (e.g., Fornell 1992) and the connection of managerial decisions to customer outcomes (e.g., Bolton and Drew 1991). The increasing importance of service and relationships also led to more attention to analytical models of those topics (e.g., Hauser, Simester and Wernerfelt 1994).

¹ Thanks to the reviewers and Editor for their help in identifying these factors.

The mid-1990's saw the emergence of models of financial accountability (e.g., Rust, Zahorik and Keiningham 1995) and the first model of customer equity (Blattberg and Deighton 1996). The mid to late 1990's saw increasingly sophisticated analytical models of service (e.g., Shugan and Xie 2000) and the first models of internet marketing and e-service (e.g., Bakos and Brynjolfsson 1999). Also around this time, researchers began using more sophisticated methods such as hazard models (e.g., Bolton 1998) and fully Bayesian approaches (e.g., Rust, Inman, Jia and Zahorik 1999) to study customer satisfaction and retention. Also at this time, models and approaches were proposed in direct marketing that would eventually evolve into CRM models (e.g., Bult and Wansbeek 1995).

In recent years the most important advance has been the development of models that focus marketing expenditures on individual customers, (e.g., Reinartz, Thomas and Kumar 2004), link marketing investments to customer lifetime value and customer equity (e.g., Rust, Lemon and Zeithaml 2004), and ultimately connect customer equity to the market capitalization of the firm (e.g., Gupta, Lehmann and Stuart 2004). Models have tended increasingly to emphasize customization and personalization (e.g., Ansari and Mela 2003), and to draw on elements of the emerging technological environment, such as the Internet and information service products (e.g., Jain and Kannan 2002).

Table 2 presents the major modeling areas in service and relationships, along with the primary methodological approaches used to investigate them. In general we see that a variety of research approaches has been used to investigate service and relationships. Analytical approaches have been used most for investigating managing service, and especially service pricing, using the economic paradigm. The survey and experimental approaches have been most extensively used for models of customer satisfaction and relationships, for the reason that one

needs to ask customers for their perceptions, because those drive satisfaction and retention. Database and panel approaches have been used primarily to map the relationships between managerial actions and customer behavior and its financial impact, as typified by CRM research today.

The remainder of the paper summarizes existing work in models of service and relationships, and suggests promising future research directions. Section 2, *Managing Service*, explores research about the optimization of existing service marketing decisions. These decisions include such topics as controlling service pricing and demand, influencing customer's willingness to pay (e.g., service guarantees, complaint management, etc.), and incentivizing employees to maintain the service standard. Section 3, *Customizing Service*, summarizes research about adjusting the service product and service delivery to better suit the needs of the customer. Apart from the unique challenges faced by a service firm in customizing its service, the firm has to balance the tradeoff between increasing customer satisfaction through customization and increasing firm's productivity through standardization. Together with the advent of the Internet Technology, comes not only new possibilities for managing this tradeoff, but also a better way to serve the customer through e-service. Section 4, *Customer Satisfaction and Relationships*, discusses research about how customer satisfaction and delight are formed, and the impact of customer expectations on the quality of the relationship. Section 5, *Financial Impact of Customer Relationships*, explores research about the financial impact of service improvements, customer lifetime value, customer equity, customer relationship management and how customer equity affects the value of a firm. Section 6 concludes the paper with a discussion of the most promising topics for future research.

2 Managing Service

Managing service is different from managing goods, due to long-recognized differences between the nature of service and the nature of goods (Parasuraman, Zeithaml and Berry 1985). Some of the notable characteristics of service that make managing service different are (1) intangibility, (2) heterogeneity, (3) simultaneity of production and consumption, and (4) perishability. Intangibility implies that service cannot be inventoried or easily displayed. Heterogeneity arises because service often depends upon labor, which is inherently more unreliable than machines. Simultaneity of production and consumption (inseparability) means that the consumer participates in the transaction, and therefore service is not easily centralized. Perishability means that for many services, once the time of potential service passes, the opportunity to sell that service perishes. Recently the four characteristics of service have been challenged, as researchers (e.g., Lovelock and Gummesson 2004; Vargo and Lusch 2004) have criticized the usefulness of the intangibility, heterogeneity, inseparability and perishability framework in separating goods and service, mainly because the line separating goods and service is increasingly becoming blurred. Nevertheless, the characteristics of intangibility, heterogeneity, inseparability and perishability are the primary characteristics of service that result in the unique challenges and opportunities for marketing science.

2.1 Service Demand

The key characteristic of service demand is that timing matters. Service demand is perishable, and thus it is important to manage that timing. If demand exceeds capacity at any time, then an opportunity is lost. In the most basic form, the management of service demand is a yield management problem, a problem for which Kimes (1989) provides an excellent review. Yield management is a process of allocating the right inventory to the right customer at the right

time, at the right price, with the objective of maximizing revenue. To achieve these objectives, a firm has to forecast demand and optimize its marketing mix based on the forecast. Sometimes the complexity of the operating environment may make the forecasting and optimization extremely difficult. It is interesting to note that when the environment is complex, some research (e.g., Van Ryzin and McGill 2000; Ha 2001) advocates the use of simple guidelines and heuristics as a viable service and demand management alternative.

The movie industry demonstrates the critical importance of managing the timing in which a service is made available to the consumers. Service demand in the movie industry is highly perishable, and the control over the movie release date critically affects the success of a new movie. It is always easier for a firm to maximize its revenues if the firm can forecast demand accurately. When demand follows a set pattern through time, the firm can make use of past sales data to improve its estimates. Sawhney and Eliashberg (1996) show that the motion picture box office revenues follow a highly regular pattern. This pattern is influenced by the intensity of information flowing to the consumers and the intensity of product distribution. Learning from the past life cycles and seasonal patterns of a movie launch can greatly improve the launch timing, and thus a movie's success. Incorporating seasonal patterns into a service model will also improve the accuracy of demand predictions. We can refer to Radas and Shugan (1998b) for a method of incorporating seasonal patterns to any dynamic model without changing the model's fundamental assumptions. Neelamiegham and Chintagunta (1999) deal with a more complex problem of scheduling movie launches across multiple markets with different availability of data and determinants of viewerships. They are able to accurately forecast the success of movie launches using a Hierarchical Bayes formulation of the Poisson model. The competitive dynamics of the movie industry is another important consideration for the timing of

movie launches (Foutz and Kadiyali 2003). Krider and Weinberg (1998) show that, depending on the product life cycle, it is better for a weaker movie to delay its opening in order to prevent head-to-head competition with stronger movies.

In addition to timing the availability of the service, a firm can manage demand through shaping the expectations of consumers on the utilities that they will derive from the service. Customer expectations play a major role in shaping consumption behaviors for the movies, theaters and recreational industries. Critical reviews, along with other psychological variables such as product perception and interest, influence box office receipts and whether consumers will consume the service in the first place (see Neelamiegham and Jain 1999). By controlling the review process, the firm controls the amount of product information provided to the consumers, and thus controls the formation of consumer expectations. As such, managing demand in the movies, theaters and recreational industries depends in part on how well a firm can influence the review process (Eliashberg and Shugan 1997; Basuroy, Chatterjee and Ravid 2003).

Another way that customer expectations affects demand is through influencing what customers perceive to be a fair exchange. Payment equity is the fairness perceived by the customers when they exchange payment in return for the service that a firm provides. It is evaluated using the difference between a customer's expectations and the actual firm's performance; this equity will determine the customer's usage of the service (Bolton and Lemon 1999).

2.2 Service Pricing

Managing demand also involves strategies for pricing over time. The optimal pricing schemes differ with the kinds of service that a firm provides and the consumer segments a firm serves. Different consumers have different reservation prices for different types of service. In

addition, these reservation prices can change from one period to the next. A firm improves its profitability when it can observe the reservation prices of the different consumers. This can be done to some extent by observing consumer purchasing behaviors.

One way for a firm to know what kind of pricing strategy it should adopt is by looking at the type of service the firm provides. For example, Desiraju and Shugan (1999) provide a categorization of service types based on the differences between customers' reservation prices during the different periods of arrival. Using this categorization, they prescribe different pricing strategies for the different types of service. As an illustration, services involving airlines, hotels and car rentals experience early arrivals from customers with relatively lower reservation prices. These services are grouped into the same category. One of the pricing strategies prescribed for the firm is to limit the sales in the earlier time period. This reserves capacity for customers with relatively higher reservation prices in later periods. We can optimally set advance and spot purchase prices using these differences (Shugan and Xie 2000; Shugan and Xie 2004). Another pricing strategy that can be used in the airlines, hotels and car rental industry is contingent pricing. Contingent pricing price discriminates a customer based on the probability that this customer will obtain the product. One customer may pay a high price in exchange for the certainty of receiving the product. Another customer may pay a low price but face the possibility of not receiving the product. This pricing scheme allocates product to those who value the product most, and compensates customer who risk not receiving the product with a lower price (Biyalogorsky and Gerstner 2004).

Technological advancements have made it viable to implement complex pricing schemes, as new technologies have greatly reduced the costs and also the possible abuse of such schemes (Xie and Shugan 2001). In addition, Xie and Shugan (2001) show that the profits from advance

selling do not come from extracting more surpluses from consumers, but from making it possible for more consumers to purchase the product. The more a firm knows about the customers' reservation prices, the more a firm can improve its pricing strategy. For example, when customer demand is uncertain and customers are risk averse, Png (1989) shows that it is optimal for a firm to offer reservations to customers at no cost, as a means of inferring how much customers value the service.

The firm may face varying demand over different time periods. During peak periods the full capacity of the firm is utilized to help satisfy the demand. In off peak periods, demand is lower, and there is unutilized firm's capacity. One of the usual capacity management techniques involves lowering the price charged during the off peak period (i.e., off peak price) to smooth out the fluctuations in sales demand. The notion is that smoothing out demand will help increase yield. Although this is a conventional practice, Radas and Shugan (1998a) show that in some situations a firm is better off increasing the customers' willingness to pay during the peak period. Their model achieves this through bundling peak service with off peak service, without decreasing the off peak price. Other support for the use of service bundling is found in Guiltinan (1987) which provides a framework for selecting the different services to form mixed bundles. That article demonstrates that by concurrently selling product bundles and their individual components (i.e., mixed bundling), a firm is able to cross-sell to existing customers and also to obtain new customers who were not purchasing the firm's products in the past.

If we are to evaluate the short-term profitability impact of bundling alone, the increase in total margins from the use of bundling depends on the ability and quantity of the service that customers are able to consume, based on their cost of time, price sensitivity, and reservation prices (Venkatesh and Mahajan 1993). In addition, the profitability of the bundling strategy also

depends on the costs incurred for bundling and administering the sales of the bundle. Thus, in the case of digital goods, when the marginal costs of production and product aggregation are low, it makes sense to use bundling to increase the appeal and competitiveness of the product (Bakos and Brynjolfsson 1999). When a seller of information goods incurs cost of administering a usage-based pricing scheme, Sundrarajan (2004) shows that offering a fixed-fee pricing in addition to a nonlinear usage-based pricing is always profit improving. In addition, the bundle of information goods can be made more appealing to the customers if the seller offers the right combination of fixed-fee and usage based contracts.

Whether to use a mixed bundling strategy or a pure bundling strategy (i.e., selling the bundle only and not the individual components) depends in part on the costs of administering mixed bundling. Ansari, Siddarth and Weinberg (1996) demonstrate this in a user-maximizing non-profit organization. In their model the non-profit organization faces a non-deficit constraint, and thus is particularly mindful of the fixed costs involved in delivering its products. The administrative cost of offering mixed bundling is higher than pure bundling without substantially increasing product usage. Therefore, a pure bundling strategy is preferred. Maximizing the number of users is especially relevant in the case of a nonprofit service organization. For a nonprofit organization, the main goal may be to maximize the total utilities of the individuals that the organization serves, instead of maximizing the organization's profits (Metter and Vargas 1999).

Dhebar and Oren (1985) characterize an optimal pricing strategy as one that takes into account maximizing the present value of a firm's profits, as well as the dynamics of consumer demand. The pricing of a service affects the adoption rate by consumers. Thus, a service firm may choose to charge a lower price in the introductory stage of the service, in order to generate

positive word of mouth among the consumers, and to speed up the learning of the service providers (Mesak and Darrat 2002). After trying a product from one firm, whether a customer will try another product from the competitor depends on the first product quality, and the likelihood of getting a worse product from the competitor. The likelihood of getting a second product that is worse depends on the distribution of product quality in the industry. Thus this quality distribution will affect how sustainable is the initial market share captured using a lower introductory price (Villa-Boas 2004). In the case of an existing product, firms have to be discerning with the segments of customer that they offer a lower price to. Anderson and Simester (2004) show that while deeper price discounts increase future purchases for the new customers, they reduce purchases from established customers. Deeper price discounts can encourage established customers to forward buy and be more sensitive to deals.

The pricing for a service can be done differently for the different components of the service. The idea behind this is that service access pricing and usage pricing have different effects on initial demand and customer retention. Incorporating the effect of customer attrition in a service model results in a better estimation of customer price sensitivity (Danaher 2002). For the case of membership services, Fruchter and Rao (2001) demonstrate the superiority of a two part-pricing scheme when a firm obtains its revenue separately from service access and usage. In their model, keeping the membership fee low helps to boost the adoption rate of the service through word of mouth. As the early adopters tend to be heavy users, pricing the usage component high at the service's introductory stage extracts maximum surplus from consumers. Eventually the price of the usage component is lowered to encourage usage of the service by other consumers. The use of a two-part pricing scheme frees the firm from the need to price every component of the service low during the introductory stage.

Apart from differentiating the price charged for the different product options, firms may price differentiate based on how quickly services are delivered to the customers. Van Mieghem (2000) provides a model in which customers measure a firm's service quality by the delay they experienced in receiving the service. He has also provided a scheduling rule for dealing with such a scenario.

The applications of pricing strategies discussed in this paper so far are based mostly on traditional ("offline") service contexts. Nevertheless, pricing strategies are relevant in the online environment as well. Although the Internet has made price comparison easier, it has not ended the online price differences among the different firms. Some researchers (e.g., Pan, Ratchford and Shankar 2002; Ancarani and Shankar 2004) show that price differences among online firms still persist, and that online firms may adopt different pricing for different consumer segments. Internet shopping agents allow consumers to effortlessly compare the prices offered by the various online retailers. Iyer and Pazgal (2004) show that consumers who use the Internet shopping agents enjoy lower prices as compare to consumers who do not. The number of retailers that join an internet shopping agent affect the agent's consumer reach. This change in reach and the number of realiers within an internet shopping agent determine tha benefit of a price cut. Thus, the average prices paid within an Internet shopping agent can increase or decrease (Iyer and Pazgal 2004).

2.3 Service Guarantees

The greater heterogeneity of quality inherent in service leads to additional risk for the customer. This leads many businesses to create service guarantees that reduce consumer risk. How to construct these guarantees most effectively has formed a fruitful area of research in marketing science. Service guarantees are also relevant in the goods context. Each time a

consumer purchases a good, the service components that come with the good are purchased. These components include the delivery service provided by the seller and the after sales service provider by the manufacturer. Not only does service guarantees affect customer satisfaction, Slotegraaf and Inman (2004) show that the different aspect of a service guarantee affect customer satisfaction differently during the difference phases of a product's life.

Kumar, Kalwani and Dada (1997) show that providing an assurance on the amount of wait time generally improves customer satisfaction when customers are waiting for the service to be delivered. However, after the customers have received the service their satisfaction level is affected by whether the service is delivered within the time guaranteed. Service guarantees benefit the firm, as they encourage every consumer to try the product and not to reduce the actual product price paid to compensate for the risk of product non-performance (Fruchter and Gerstner 1999). Given the opportunity, a consumer may adjust the risk level to one that is more tolerable. For example, Padmanabhan and Rao (1993) show, that risk averse consumers will tend to purchase extended product service contracts if the contracts are available to augment the manufacturer warranty. Service guarantees serve as a credible signal of product quality, as low-quality products are more expensive to warrant (Lutz 1989). In addition, Moorthy and Srinivasan (1995) argue that a full money back guarantee is a more effective way to signal product quality than charging a premium price or presenting uninformative advertisements.

2.4 Complaint Management

Another effect of the heterogeneity of service is the inevitable incidence of consumer complaints when the service is not perceived as adequate. This was one of the earliest service areas to be addressed by marketing modelers, and had considerable impact on subsequent

marketing science research, because it introduced the elements of interactive customer experience, continuing customer relationships, and their long-term financial impact.

Not all dissatisfied customers complain, but dissatisfied customers have higher probabilities of reducing their product usages and purchases. Satisfied customers, on the other hand, have a higher probability of generating positive word-of-mouth, which helps to attract potential customers (Blodgett and Anderson's 2000). Complaint management benefits a firm, as it positively influences customers' expected utilities of a purchase, customers' perceived purchase risk, customers' perception of product quality, and the generation of favorable word-of-mouth. For example, Chu, Gerstner and Hess (1998) show that a more restrictive refund policy will increase consumers' perceived risk of dissatisfaction, and as a result reduce the number of products consumers purchase. Despite the possibility of customer abuse, they show that a no-questions-asked return policy can be optimal. In the case of a frequently purchased service, the value of future sales generated by a retained customer is likely to be much higher than the compensation needed to appease a complaint. As a defensive strategy, Fornell and Wernerfelt (1987) show that customer complaints should be encouraged, because complaints provide the firm opportunities to appease and retain dissatisfied customers. Fornell and Wernerfelt (1988) show that this strategy is more effective when the firm faces more competitors, and when the customers are more sensitive to quality. In addition, as complaint volume is higher in a concentrated industry where customers have fewer alternative service providers, the potential payoff from introducing complaint management is higher. Firms should be mindful, however, that factors other than the compensation policy also affect customer satisfaction with service failure recoveries. Smith, Bolton and Wagner (1999) show that the process that a customer goes through during the service recovery can also affect the level of customer satisfaction.

Complaint management, in the form of a firm's refund policy to its channel intermediaries, will likewise reduce the intermediaries' perceived purchase risks. Padmanabhan and Png (1997) show that by reducing purchase risks, the downstream intermediaries are encouraged to carry an increased supply of the firm's products. The increased supply of the product intensifies competition among these downstream intermediaries, as they compete among themselves for market share. This competition lowers final price to the consumer and helps boost manufacturer sales volume. This is a more effective and profitable way to increase sales quantity for the manufacturer than through lowering the price to the intermediaries. Padmanabhan and Png's (1997) results are driven largely by the intermediaries' uncertainty of their customers' demand. When the intermediaries are certain of the demand, there is no purchase risk. The intermediaries can then strategically reduce their stock holdings in order to increase their sale prices (Wang 2004; Padmanabhan and Png 2004).

2.5 Employee Incentives

While research has long shown that it pays the organization to satisfy customers, a corollary issue is how to incentivize employees to provide the appropriate behavior. The work of Hauser, Simester and Wernerfelt (1994) provides one approach to addressing this problem, and begins to tie the marketing issues to the HR issues required for successful service provision.

Hauser, Simester and Wernerfelt (1994) provide a means of incentivizing employees to increase the customer satisfaction level and thus ultimately increase the profitability of the service provider. By incentivizing employees on both sales and customer satisfaction, the employees are encouraged to make a short-versus-long-term tradeoff that is best for the firm. Employees put in more effort in improving customer's satisfaction when a larger portion of their bonus depends on it. Customer satisfaction levels will be a better measure than employee effort

levels to use for improving firms' profit when employee efforts are hard to evaluate. The model shows, however, that the reliance on customer satisfaction in an incentive scheme should depend on how precisely customer satisfaction is measured, in addition to how short-term focused the employees are. There is a limit to how much customer satisfaction can be gained from incentivizing employees. Employees work within the service design offered by the firm. The next logical step in increasing customer satisfaction will thus involve customizing the service to better suit the needs of customers.

3 Customizing Service

Unlike physical goods, service is often based primarily on personal interaction or information processing, both of which lend themselves well to customization. This is because a human service provider can adjust to the needs of the customer as part of the interaction, and a service based primarily on information may customize by merely changing bits of information. Thus, although service design uses many of the same approaches as product design, service delivery and interactive customization are best seen as very different from product design. Research indicates that customization and the satisfaction that results from it often form a tradeoff with productivity in the arena of service, whereas satisfaction and productivity tend to be in harmony in the manufacturing context. An important and growing application area with respect to service customization is e-service, the provision of service over the Internet.

3.1 Service Design and Customization

Traditional thinking in marketing science holds that the service design problem is no different than the product design problem for physical goods. We can see this viewpoint in the work of Green and colleagues (Wind et al. 1989), who applied standard conjoint methodologies to the problem of designing a service. A similar conceptualization is involved with the

application of discrete choice analysis (Verma, Thompson and Louviere 1999) and quality function deployment (QFD) (Griffin and Hauser 1993; Hauser and Clausing 1988) to service design. This traditional thinking fails in the context of service, as a key component of satisfying the customer in a service context is not only designing the service but also in delivering the service well. The delivery component becomes especially important in service because of the higher degree of variability usually encountered in service, which tends to be more labor-intensive.

Unlike physical goods, where product quality is primarily driven by adherence to manufacturing specifications, service demands a multidimensional view of the nature of quality. One conceptualization, that views all offerings as service (Rust, Zahorik and Keiningham 1996), posits that service can be broken down into the physical product, service product, service delivery, and service environment. The elements of physical product, service product (e.g., a warranty or service contract), and service environment (e.g., a showroom or a theme park) are amenable to standard product design methods. The element of service delivery, however, is not amenable to those methods, because service delivery relates to “working your plan” rather than “planning your work.” Service delivery and service design efficiency are seen as distinct (Frei and Harker 1999), and no matter how good the service design might be, the actual delivery of that service design may be lacking. In product design models, the emphasis is on the attributes of the product and adherence to specifications, whereas in service delivery and service customization the emphasis is on the perceptions of the customer and real-time customization to meet the needs of the customer. In other words, providing high-quality manufactured goods means standardizing as much as possible, but providing high-quality service means customizing as much as possible to what the individual customer desires.

3.2 The Satisfaction/Productivity Tradeoff

From the preceding section, we see that providing high-quality manufactured goods means standardizing as much as possible—making every part exactly the same, whereas providing high-quality service means customizing as much as possible—making every service contact different. Standardizing generally leads to higher efficiency, higher productivity, and lower costs. Customization on the other hand, may result in lower efficiency, lower productivity, and higher costs. The nature of service delivery inevitably leads to a trade-off between satisfaction and productivity for services that is not present for goods (Anderson, Fornell and Rust 1997). This same trade-off can lead to tension between the marketing function and the operations/engineering function, with the marketing function seeking to satisfy customers and increase revenues, and the operations/engineering functions seeking to increase efficiency and productivity and decrease costs. Research has shown that the performance feedback loops in the management of a company can systematically lead to the erosion of service quality over time (Oliva and Sterman 2001). Recent research suggests that ignoring the satisfaction/productivity tradeoff and trying to both increase revenues and decrease costs simultaneously can lead to sub-optimal financial results (Rust, Moorman and Dickson 2002).

There is theoretical evidence that the shift from standardization to customization is likely to become more pronounced over time. Varki and Rust (1998) provide a mathematical framework for how the advance of technology impacts optimal segment size (or equivalently, how the advance of technology impacts the degree of customization). The trend of technological changes in the area of flexible manufacturing and programmable automation for example, has been moving towards the reduction of variable production cost. This increased production efficiency has made smaller segments feasible. In addition, improvement in product technology

can stimulate consumer demand and increase the depth of consumer consumption. As the optimal segment size is reduced, firms can sell more to existing customers. The economy of scale effects on marginal cost, however, tend to favor an increase in segment size. The optimal segment size as a result of technological changes therefore depends on how the changes affect both demand and costs.

3.3 E-Service

The advent of the Internet has opened up new possibilities for personal interaction with the customer and customization of the service to better suit customer needs. First, the Internet is comprised of networked computers, which makes possible the processing of customer information. Second, the Internet is a web of two-way connections, making possible interactivity. Third, the information medium that the Internet operates in means that customer information can be readily sought, the information can be immediately processed, and the customized service product delivered in real time back to the customer.

The Internet empowers consumers as it reduces the cost of searching for information. This benefit to the consumer is shown in Bakos' (1997) model. In that model, a consumer's utility is determined by the reservation price, price paid, cost of fit and expected cost of search. Bakos shows that the lowering of search costs helps to reduce buyers' cost of fit, and thus a consumer ends up with a better suited product in a market with differentiated product offerings. The benefit of online searches, however, suffers from a diminishing marginal return effect. Ratchford, Lee and Talukdar (2003) show that those consumers with less initial information will gain more from an online search than those who started off with more information. Wu et al. (2004) show that a firm benefits by providing free product information online. This is true even if some customers free ride on the information provided and purchase the product elsewhere. A

firm that provides free product information improves its reputation, and increase the probability that a non-shopper will visit its website for service and purchases. The importance of a firm's reputation is greater in an online environment as many of the firm's service dimensions are not visible to the customer. Danaher, Wilson and Davis (2003) show that brand share (a proxy for reputation) has a higher correlation to customer loyalty in an online as compared to an offline environment. The ability to manage online relationships requires the ability to model online behavior (e.g., Bucklin and Sismeiro 2003; Sismeiro and Bucklin 2004; Telang, Boatright and Mukhopadhyay 2004), taking into account such issues as the difference in consumers' degree of brand considerations as a result of their online search behaviors (Wu and Rangaswamy 2003). As in all relationship management efforts, a firm requires a means of measuring service quality. Parasuraman, Zeithaml and Malhotra (2005) demonstrate the properties of a multiple item-scale for assessing electronic service quality, and demonstrate the need for a different scale for routine and non-routine online customers.

The promise of lower search costs and better product fit does not mean that all consumers will embrace the use of the Internet. Research shows that optimism, innovativeness, insecurity and discomfort are factors that will determine the readiness that individuals have for new technologies (Parasuraman 2000). Among consumers who utilize online services, there are differences in their abilities to reap the benefits of the service provided online. Jain and Kannan (2000) show that these differences in abilities determine a consumer's online service preference and how a firm should price its service optimally.

Information overload may result as a consequence of the massive amount of information available online and the ease of accessing this information. Consumers deal with this problem by being more selective to the types of information to which they respond. In return, firms work

harder to entice consumers to respond to their messages. Messages that are more customized and better designed help firms to get through to consumers. In addition, information that is better presented helps reduce the likelihood of information overload (Lurie 2004), this in turn helps a firm to get the key selling points across to consumers. Interestingly, the technology that brings about information overload also brings with it the capacity for better information customization. For example, Ansari and Mela (2003)'s optimization model uses clickstream data from web users to customize the design and content of an email to increase web site traffic. Apart from improving the content of the messages, firms may also manage the length and duration of consumers' exposure to them. Chatterjee, Hoffman and Novak (2003) show that consumers' responses to firms' messages may also depend on the frequency, duration, and time lapse between message exposures.

At the same time that the Internet empowers consumers with the ability to make better choices, the Internet also empowers firms to manage their customers better, and to better serve those customers' needs. In the area of improving customer management, Padmanabhan and Tuzhilin (2003) discuss the various electronic customer relationship management applications and the opportunities for optimizing them. On the Internet's role in improving a firm's ability to better serve its customers, Rust and Lemon (2001) cite three central changes that the Internet can help firms improve their services. They include true interactivity with the consumers, customer specific and situational personalization, and opportunities for real-time adjustments of the firm's offering to customers. For general discussions on the framework and future research opportunities for online personalization, we can refer to Murthi and Sarkar (2003).

To better serve the needs of their customers, firms need to obtain information on their customers' preferences. There are many ways in which customer preferences can be obtained

online. Raghu et al. (2001), for example, use an adaptive non-metric revealed preference approach to acquire customers' preferences. These preferences can then be used to segment customers into clusters, and finally to tailor the product makeup to best suit the average preferences of the clusters. The processes of acquiring customers' preferences and subsequently tailoring the product makeup to suit the customers are carried out dynamically online. The ultimate aim of such processes is to achieve real-time marketing, as discussed by Oliver, Rust and Varki (1998).

The Internet technology offers other benefits to the firms besides the ability to better serve their customers. For example it has the potential of improving a firm's revenue management through the use of dynamic and automated sales (Boyd and Bilegan 2003). In addition, Xue and Harker (2002) show that through the Internet, a firm is better able to involve the consumers as co-producers of the service. This increases the role that consumers play in the service production and delivery process. One benefit of engaging the customer in the co-production process is that it allows the firm to be more efficient in the way it manages its customers. Higher margins from the products sold are generated from this better fit between customers' needs and the products offered. Another caveat is that high tech does not mean neglecting the most important interactions between service employees and the customers. These "critical incidents" are customer experiences that have an important impact on customer satisfaction. Through a series of critical incident studies, Meuter et al (2000) demonstrated that even in self-service technologies where customers are supposed to help fulfill their own needs, employees' initiatives to improve service and customers' satisfaction in such area as technical support and troubleshooting still play a critical role in the firm's strategy.

4 Customer Satisfaction and Relationships

Although the quality of physical products may sometimes be adequately measured by attributes, objective performance indicators, or adherence to manufacturing specifications, the quality of service is adequately measured only by customer perceptions. This implies that customer satisfaction should receive considerable attention in service research. Also, while the marketing of physical goods (e.g., cars or breakfast cereal) may sometimes be adequately examined using individual transactions, the marketing of service (e.g., banking or airlines) generally requires the examination of relationships over time. Because customer satisfaction is one of the primary factors leading to the continuation of relationships, the connection between the two also forms an important area of research.

4.1 Customer Satisfaction and Delight

The measurement and modeling of customer satisfaction (and its most extreme manifestation, customer delight) leads to many interesting and useful research issues. The theoretical basis for models of satisfaction arises primarily from consumer psychology, and especially the theory of expectancy disconfirmation (Oliver 1980; Oliver, Rust and Varki 1997), which posits that the difference between what a customer expects and what the customer receives is a primary determinant of satisfaction. The early service quality models (Parasuraman, Zeithaml and Berry 1988) used a similar conceptual formulation.

The nature of consumer response to customer satisfaction surveys leads to the necessity of modeling many phenomena of practical importance, including response skewness (Peterson and Wilson 1992) and direct versus inferred measurement of the attribute importance (Griffin and Hauser 1993). Including customer satisfaction in a broader nomological net that includes

behavior led naturally to the construction of simultaneous equation models of the impact of satisfaction (Bolton and Drew 1991; Danaher and Rust 1996).

Researchers have also investigated the most extreme form of customer satisfaction, customer delight. Its theoretical nature and relationship to other constructs has been investigated (Oliver, Rust and Varki 1997), and its managerial implications explored analytically (Rust and Oliver 2000). Some researchers have posited a nonlinear effect for satisfaction, involving a “zone of tolerance” (Parasuraman, Zeithaml and Berry 1994) in which there is a first threshold of satisfaction, below which there is little behavioral impact, and a second threshold of satisfaction, at which customer delight kicks in. Researchers have shown that it is important to model nonlinearity when analyzing the behavioral impact of satisfaction (Rust, Zahorik and Keiningham 1994; Anderson and Mittal 2000).

4.2 Customer Expectations

With customer satisfaction being highly dependent on customer expectations (Oliver 1980), understanding and modeling the nature of expectations is very important. Expectations have generally been studied at the individual consumer level, but work also exists that studies the aggregate average of expectations, and how that relates to other aggregate measures (Johnson, Anderson and Fornell 1995). At the individual level, Tse and Wilton (1988) provided a deeper understanding of the nature of customer expectations, including the idea that there are multiple kinds of expectations. This idea was extended by Boulding et al. (1993) who incorporated the multiple expectations idea in a linear updating framework. Anderson and Sullivan (1993) provided an alternative updating model, and also suggested (but did not implement) the idea of a fully Bayesian updating model for expectations. A fully Bayesian expectations updating model was supplied by Rust, Inman, Jia and Zahorik (1999), who showed that a standard Bayesian

updating model, combined with a concave utility curve, can successfully predict some unintuitive behavioral effects, and demonstrated those effects with behavioral experiments. Some of that study's unintuitive behavioral effects include the finding that customers may rationally choose an option with lower expected quality, and that paying more attention to loyal customers can sometimes be counterproductive. The research also showed that consideration of the distribution of expectations, in addition to the point expectation, is necessary to explain some behavioral effects. Bordley (2001) provided an alternative Bayesian approach to expectations, providing a utility model based on probability of exceeding an expectations threshold.

4.3 Customer Satisfaction Measurement and Analysis

The growing importance of customer satisfaction led to companies initiating customer satisfaction measurement on a regular basis. This, in turn, led to longitudinal customer satisfaction databases, which could then be related to managerial initiatives and business performance. The most ambitious of these databases involve multiple industries and national customer satisfaction indices. The first of these was the Swedish Customer Satisfaction Barometer (Fornell 1992), followed by the American Customer Satisfaction Index (Fornell et al. 1996), and subsequent indices in a number of other countries.

At the individual firm level, companies such as AT&T pioneered in analyzing tree structures by which satisfaction on particular attributes influenced overall satisfaction, customer behavior, market share, and business performance (Kordupleski, Rust and Zahorik 1993; Gale 1994). Issues with interaction effects (Taylor 1997) and customer heterogeneity (Danaher 1998; Krishnan et al. 1999) were noted and addressed. Interestingly the high intercorrelations frequently seen between customer satisfaction items make it much less important to have multiple-item scales (Drolet and Morrison 2001).

Satisfaction tree models are used to identify attributes where investment is likely to be profitable (Johnson and Gustafsson 2000). This in turn has led to market testing to verify whether the expenditures actually are profitable (Rust, Keiningham, Clemens and Zahorik 1999; Simester et al. 2000). As it turns out, the complexity of the satisfaction => performance link makes careful experimental designs essential. Malthouse et. al (2004) show that the variation of customer satisfaction across organizational units must be modeled with care, and the modeling of different facets of variability has led to the use of generalizability theory to help design customer satisfaction measurement programs (Finn 2001).

4.4 Customer Retention and Duration of Relationship

The importance of retaining the customers and tracking the customers that a firm loses is emphasized in articles published by Reichheld and Sasser (1990). Reinartz, Thomas and Kumar (2004) show that insufficient allocation into customer retention efforts will have a greater impact on long term customer profitability as compared to insufficient allocation into customer acquisition efforts. Firms should also factor in the probability and cost of wrongly estimating a customer's future profitability in their customer retention and relationship building efforts (Malthouse and Blattberg 2005).

One way to motivate customers to take on a more long-term decision making approach to their choice of products is through the use of loyalty programs. Lewis (2004) for example, shows that loyalty program is successful in increasing the annual purchasing for a substantial proportion of the customers in the context of an online grocer and drug retailer. How customers respond to a loyalty program depends on the probability and the magnitude of the rewards provided. In addition, Kivetz (2004) shows that how customers evaluate the tradeoff between

the chance of winning a reward in a loyalty program and the value of the reward is systematically affected by the efforts required from them.

Marketing science researchers have typically used hazard models to model the length of customer relationship. Schmittlein, Morrison, Columbo (1987) for example, propose a model based on the number and timing of the customers previous transactions. This approach allows the computation of the probability that any particular customer's relationship is still active. Bolton (1998) analyzes instead the duration of the customer's relationship with a continuous service provider. Her results indicate that customer satisfaction ratings obtained prior to any decision to cancel or stay loyal to the provider are positively related to the duration of the relationship. Another important issue related to customer relationship is how frequently customers purchase a product from a firm. Helsen and Schmittlein (1993) provide such a model, where the inter-purchase time is estimated using the product's regular price, promotional price cut and past average inter-purchase time. Subsequent research has provided a more nuanced view of the psychometrics of customer loyalty behavior (Narayandas 1998) and the effect of personal characteristics on customer retention (Bhattacharya 1998; Mittal and Kamakura 2001). Other researchers have shown that future use projections also influence customer retention (Lemon, White and Winer 2002). Most of the research has focused on customer retention and has not explored the possibility of reinitiating relationship with customers. Reinartz, Krafft and Hoyer (2004) for example describe the operationalization of relationship initiation, relationship maintenance and relationship termination, but fall short of describing how relationships can be reinitialized. This shortfall is partly filled by Thomas, Blattberg and Fox (2004) who address the issue of targeting customers for reacquisition, and by Rust, Lemon and Zeithaml (2004) who model the retention and acquisition process using customer-specific Markov switching matrices.

4.5 Word-of-Mouth

Besides customer retention, customer satisfaction also affects profitability through word-of-mouth, generating sales and profits from other customers. Word-of-mouth can be either positive or negative, resulting in either an increase or decrease in sales and profits. One of the few empirical demonstrations of this effect shows that customer satisfaction has a positive impact on word-of-mouth, which in turn has a positive impact on sales and market share (Danaher and Rust 1996). Another empirical investigation of word-of-mouth (Anderson 1998) confirms popular expectations that dissatisfaction produces more negative word-of-mouth than satisfaction produces positive word-of-mouth. Hogan, Lemon and Libai (2003) explore the mechanisms by which word-of-mouth impacts customer profitability. They show that word of mouth is more important during the early part of the product life cycle, as the early adopters' word of mouth affects the growth rate of product adoption. One of the challenges in measuring word of mouth is that it is difficult to observe what is usually in the form of private conversations. Through monitoring online conversations, Godes and Mayzlin (2004) demonstrate how word of mouth can be measured. In addition, they show a relationship between the dispersion of online conversations across online communities and the popularity of television shows.

To encourage customer referrals, two possible strategies a firm can use is providing the customer with referral rewards, and providing the customer with exceptional value through price reduction. Biyalogorsky, Gerstner and Libai (2001) show that the optimal mix of price and referral reward depends on how demanding consumers are on the price reduction before they are willing to recommend the firm's product to others. The optimal mix also depends on how effective is the referral rewards in bringing in new customers. Their model explains why referral

rewards are not always used in practice. Verhoef, Franses and Hoekstra (2002) investigate the variables that impact the tendency to engage in word-of-mouth. They find that the length of the relationship between a customer and a firm plays a moderating role on how trust, satisfaction, commitment and payment equity affect customer referrals.

5 Financial Impact of Customer Relationships

With relationships increasingly the focus of business, rather than transactions, financial impact becomes less an issue of aggregate response based on aggregate expenditures, and more a matter of individual-level satisfaction, retention, and profitability. In addition, profitability of the relationship is projected in terms of future cash flows. This perspective has led to a proliferation of models of chains of financial impact, with the goal of modeling how service improvements affect profitability. These models have evolved into models that estimate customer lifetime value for each customer, aggregate those lifetime values into customer equity, and manage the financial impact of managerial interventions based on customer lifetime value and customer equity. Companies are increasingly able to manage those interventions at the individual customer level, resulting in a management approach currently referred to as customer relationship management (CRM).

5.1 Chains of Financial Impact

Models for projecting the financial impact of service improvements, based on customer retention, emerged in the early 1990's (e.g., Rust and Zahorik 1993). This approach, combined with the tree approach to customer satisfaction analysis (Kordupleski, Rust and Zahorik 1993; Gale 1994) culminated in the "return on quality" model (Rust, Zahorik and Keiningham 1994, 1995), a model that can project the return on investment from targeted service quality improvements.

An alternative model was the “service profit chain” (Heskett et al. 1994), which extended the return on quality model by also linking employee satisfaction, the idea being that happy employees lead to happy customers. Unfortunately there is weak empirical support for this extension (e.g., Loveman 1998), and the subsequent HR literature has shown that the linkage between employee satisfaction and customer satisfaction is far from straightforward (e.g., Schneider, White and Paul 1998). Nevertheless some researchers (e.g., Kamakura et al. 2002) have continued to build on this framework. While the link from employee satisfaction to customer satisfaction is precarious, the links from customer satisfaction to positive behavioral outcomes (and ultimately financial outcomes) have been demonstrated consistently (e.g., Zeithaml, Berry and Parasuraman 1996; Anderson, Fornell and Mazvancheryl 2004). Aggregate chains of effect linking customer satisfaction to financial impact have also been shown (Anderson, Fornell and Lehmann 1994; Johnson and Gustafsson 2000).

In the same way that customizing products improves customer satisfaction and profitability, Bowman and Narayandas (2004) show that tailoring customer management effort to the different customer is necessary to optimize profits. For example, larger customers are more demanding and the same customer management effort is more effective for customers with greater loyalty.

5.2 Customer Lifetime Value and Customer Equity

Customer lifetime value (CLV) models were first proposed in the direct marketing arena (Dwyer 1989), where the necessary data on individual-level marketing interventions and profitability were readily available. These concepts were soon applied also in financial services (Storbacka 1994). An excellent overview of available CLV models is given in Berger and Nasr (1998), based on the ability to accurately estimate customer profitability (Mulhern 1999).

The customer lifetime value concept was extended to the concept of customer equity (the sum of the firm's customers' customer lifetime values), enabling customer lifetime value to be used to guide corporate strategy (Blattberg and Deighton 1996; Blattberg, Getz and Thomas 2001; Fruchter and Zhang 2004; Thomas 2001). These models (see also Pfeifer and Carraway 2000) were based on firms that had a customer database, but no knowledge of competition. Econometric models for projecting the lifetime value of customers, based on customer databases, have been developed (e.g., Reinartz and Kumar 2000, 2003).

By combining the customer equity idea with the chain of effect models for return on quality, and collecting data necessary to analyze the impact of competition, it is possible to create a model that can project the impact on customer equity of any marketing expenditure (Rust, Zeithaml and Lemon 2000; Rust, Lemon and Zeithaml 2004). Subsequent authors have explored a variety of aspects related to the implementation of customer equity management in practice (Bell et al. 2002; Berger et al. 2002; Hogan, Lemon and Rust 2002; Rust, Zeithaml and Lemon 2004).

5.3 Financial Impact

Customer equity is a reasonable proxy for the value of the firm (Gupta, Lehmann and Stuart 2004; Rust, Lemon and Zeithaml 2004), implying that strategies that improve customer equity also increase the value of the firm. Linking customer assets such as customer satisfaction to the value of the firm and other measures of marketing productivity makes marketing accountable (Hogan et al. 2002). Chain of effect models that culminate in customer equity thus provide managers with "what if" capabilities that form a general model for evaluating marketing ROI (Rust, Lemon and Zeithaml 2004). A comprehensive overview of how customer equity and

other marketing assets relate to financial impact and other measures of marketing productivity is given in Rust et al. (2004).

5.4 Customer Relationship Management (CRM)

It is perhaps surprising, given the pervasiveness of customer relationship management today, that the term ‘CRM’, meaning “customer relationship management,” does not appear in a Proquest search of the leading marketing journals until 1999 (Srivastava, Shervani and Fahey 1999). CRM refers to managing customers one at a time—usually through automated or database-driven marketing interventions. The importance of customer relationships and customer lifetime value have naturally led to this approach.

Scientific methods for direct marketing (Blattberg and Deighton 1991) were devised as a result of data availability, interactivity, and the ability to direct marketing interventions to specific individuals. Methods for optimizing direct marketing followed (e.g., Bult and Wansbeek 1995; Haughton and Oulabi 1997). Many recent advances in direct marketing relate to the ability to analyze and explore large databases, using techniques such as data mining (Drew et al. 2001), stochastic frontier models (Byung-Doa and Sun-Oka 1999), multiple adaptive regression splines (Deichmann et al. 2002) and dynamic multilevel modeling (Elsner, Krafft and Huchzermeier 2004). Another direction is the segmentation of marketing interventions using a priori segmentation (Bitran and Mondschein 1996), latent class segmentation (Bult and Wittink 1996; DeSarbo and Ramaswamy 1994), and finally full personalization of marketing interventions using hierarchical models and MCMC methods (Rossi, McCulloch and Allenby 1996; Rust and Verhoef 2005).

CRM, however, differs from traditional direct marketing as it usually involves customer contact over a variety of contact media (e.g., direct mail, Internet contacts, personal selling

contacts, telephone contacts etc). Along with CRM's multi-contact media approach is the need to design a mix of marketing interventions for each customer individually (Dewulf, Odekerken-Schröder and Iacobucci 2001; Rust and Verhoef 2005). Given that customers have different characteristics, different types of interventions impact individual customers differently (e.g., Dewulf, Odekerken-Schröder and Iacobucci 2001). In addition, different CRM interventions could serve different purposes. Some interventions (e.g., direct mailings) help to trigger some favorable actions like cross purchasing among the customers, while other interventions (e.g., relationship mailings) are more oriented towards customer relationship building (Berry 1995, Bhattacharya and Bolton 1999, McDonald 1998).

6 Directions for Future Research

The continuation and possible acceleration of the same trends that produced the shift toward service and relationships make it possible for us to predict the most important areas for future research. We look, therefore, to the influence of computing, data storage, and communications, in predicting which areas of research will become more important in the future. In particular, we extrapolate from today's business environment to a day in which computing is more powerful, data storage is more extensive, and communications are more pervasive. What's more, we look to ways in which these trends interact. The remainder of the section highlights the future research areas that we believe will be particularly promising.

6.1 Privacy vs. Customization

As the data collection, storage, and analysis about individual customers proliferates, concerns mount about the potentially improper use of this information, leading many consumers to seek better protection for their privacy (Peterson 2001). Yet that same data collection, storage, and analysis permits companies to customize their offerings and serve customers better. The

result is a tradeoff between privacy and customization (Rust, Kannan and Peng 2002) in which neither complete privacy nor complete lack of privacy is preferred. Better analytical models are needed to more completely model this inherent conflict, and to derive optimal management policies that can steer around this tradeoff.

6.2 Marketing to Computers

Marketers are used to marketing to people, but increasingly the customer will not be human (Rust 1997). For example, many computerized agents exist that make buying decisions, or at least consideration set decisions, for their human masters. In such a case, marketing to a computer is necessary. So far efforts related to marketing to computers has involved finding out the algorithms that the computers use, and then addressing the algorithms directly. As algorithms become more complex, or as they become less easy to describe (e.g., neural networks) this approach to marketing to computers will become increasingly obsolete. We need to devise a science of “computer behavior,” in which simplifying behavioral rules and heuristics can be discovered that do not require knowledge of the exact algorithms employed. Bradlow and Schmittlein (2000) provide a glimpse of what such an approach will look like by studying the design of a webpage that is effective regardless of the different algorithms used by search engines. Many of the same approaches (e.g., market segmentation) can be employed with “computerized customers” just as with human customers.

6.3 Real-Time Marketing

The marketing function traditionally thinks of itself as a centralized function, with decisions being made by executives centrally, and application of those decisions accomplished in a uniform way throughout the sales area. An alternative is to allow marketing decisions to be decentralized, with decisions being made at the point of contact, in real time. This has been the

traditional modus operandi of field sales personnel, but the advance of information and communication technologies now is making it possible to extend this mode of marketing even to automated customer interactions. Known as real-time marketing (Oliver, Rust, and Varki 1998), this approach requires receiving the needs of the customer, and then calculating and formulating the optimal product in real time. Although such an approach is not always feasible for many physical goods (e.g., cars) it is often quite feasible for many services. For example, for information products, reformulating the product is often merely a matter of changing bits of information, which can often be accomplished virtually free and almost instantaneously. This approach can either be accomplished with centralized databases and rapid communication, or even faster and more privately using decentralized information storage (e.g., every customer stores his/her own data locally in a smart card or key chain storage device). Models need to be developed to show how optimal real-time marketing decisions can be made, and how customer data should be optimally stored, trading off privacy and speed against data storage capacity.

An interesting twist to the impact of technology is that with new technology we can actually convert some services that used to be consumed only in real time to something that the customers can consume at their convenience. Services such as entertainment can now be converted into physical manifestations such as DVD and videotapes. These items can be inventoried to meet customer demand and enable consumption at a later point in time. The impact of the timing of such products on the primary service is an interesting issue to investigate.

6.4 Service Networks

We are accustomed to thinking about service providers individually. Nevertheless, in many service scenarios an entire network of service providers is required to provide the complete service that the customer requires (Ghosh and Craig 1986). An example is an airline flight. The

airline provides the airplane, the pilots and crew, and the passenger check-in, but the service will not be successful without the participation of many other service providers, including the food caterer, air traffic controller, refueling personnel, and security staff. We need to understand better the interactions between these different dimensions of service. For example, if different service providers have different motivations (e.g., if the food caterer wants to charge a high price for food, but the airline wants to keep prices down to please the customers) what is the best way for the service network to be managed, to guarantee all parties receive the benefits they need? What if the food caterer, for example, has multiple contact points with the customer (e.g., a restaurant chain as well as food catering)? How will that affect the service network?

6.5 E-Service

The application of e-commerce by traditional companies has generally proceeded from the assumption that profits from e-commerce arise from automating processes and cutting costs (Lucas 1999; Poirie and Bauer 2000). An alternative viewpoint, known as e-service, instead touts the ability of e-commerce to increase profits through increasing revenues (e.g., Rust and Lemon 2001; Rust and Kannan 2003). This opens up the important research area of customer satisfaction, retention, word-of-mouth, and cross-selling online. We need to know not just what customers do in any particular e-commerce contact (as we see in most existing clickstream research) but also what they do (and how they perceive and feel) across multiple contacts. We need to investigate the kinds of online service that promote growth of the customer relationship, and the most effective ways to combine the online relationship with the offline relationship, with the idea that the full relationship with the customer is not complete without considering both online and offline, as well as how they interact.

6.6 Dynamic Interaction and Customization

The combination of advances in communication and advances in data storage and computing results in the potential to interact dynamically with the customer, and to use that dynamic interaction to customize the service offering(s). Instead of considering customer preferences to be fixed, we might instead model how they change over time. To what extent should older customer knowledge be considered just as valid as recent information (as would be assumed by standard Bayesian updating) and to what extent should it instead be considered evidence of a preference shift? How can customer communication and feedback be used to provide a more accurate view of how preferences are shifting over time, and how should that information be combined with observed behavior?

6.7 Infinite Product Assortments

Standardization has given way to product differentiation, and even to mass customization, but information services provide even more flexibility to the marketer. While typical physical products achieve mass customization capability through modularity (having individual components that each have several options, that may be combined with the other components combinatorially), information services may have virtually infinite variation, virtually free. For example, an online news web site could present stories relating to European news with 23.0% frequency for one customer, and 22.99487% frequency for another customer. In such an environment, to what degree should the necessary information be elicited from the consumer, to what degree should the information be inferred from behavior, and to what degree should the information be inferred from other customers? There are conceptual similarities to the recommendation agent problem (e.g., Ansari, Essegaiier and Kohli 2000), but with the added complication that a product optimization problem is overlaid.

6.8 Personalized Pricing

Personalized pricing is not the same as price discrimination. Price discrimination is the charging of different prices to different customers, for the same product. Amazon.com, for example, ran into trouble because it sought to use customer information to more effectively price discriminate, charging different prices to different customers for the same book. The Amazon.com problem will not always occur. For example, in the world of information services, very often the products themselves are personalized (see 6.7). This makes the issue one of personalizing the price for a personalized product, that may not be directly comparable to any other customer's product. How can information about the customer relationship be used to set the optimal price for personalized products?

6.9 Dynamic Marketing Interventions Models in CRM

The general marketing interventions problem in CRM may be viewed as the following: determine fully personalized levels of marketing interventions, using multiple marketing interventions, over time, in such a way as to maximize customer lifetime value. We might refer to this as the "Holy Grail" model of CRM. What makes this model difficult is the issue of endogeneity. If we sort customers according to customer lifetime value (CLV), then that implicitly assumes that the marketing interventions mix will be as it was historically, yet using the CLV estimates to change the marketing intervention mix will itself alter the CLV. Models exist that can optimize personalized marketing intervention levels over time for one type of intervention (e.g., Bult and Wansbeek 1995; Gonul and Shi 1998), provide individual-level models of future purchase (Schmittlein and Peterson 1994), provide multiple marketing interventions levels by ignoring important aspects of endogeneity (Venkatesan and Kumar 2004), or provide fully personalized marketing intervention levels that maximize intermediate-term profitability (Rust and Verhoef 2005). What is missing is a model that puts all of these elements

together. We need a model with the following characteristics: 1) marketing intervention levels personalized for each customer, 2) considers the effect of multiple marketing interventions, 3) maximizes customer lifetime value, at least up to an arbitrary time horizon, and 4) fully addresses the endogeneity issue.

6.10 Dynamic Customer Satisfaction Management

Suppose that we obtain customer feedback (directly or indirectly) that gives us information, in real time, from which we can infer the customer's satisfaction, repurchase intention, and other psychological bases of future behavior. Suppose we also know, from a study of related customers, that particular management interventions can be used to affect those psychological bases. Optimal control theory might be used to derive optimal customer-specific responses, to optimize the customer relationship. Also, research has shown that the solicitation of customer satisfaction and behavioral intention measures itself impacts future behavior (Dholakia and Morwitz 2002). Given that phenomenon, what is the optimal strategy for evoking customer satisfaction feedback and other measures of relationship health?

6.11 Relationships with Customer Networks

Except for the family context, we are used to thinking about customers one at a time. As communication technologies become more powerful and more pervasive, however, the word-of-mouth effect becomes increasingly important (Anderson 1998). In some cases it may be possible for a company to manage a relationship with an entire customer network, rather than with each customer separately. Suppose, for example, that an online financial services company decides to discontinue the relationship with one unprofitable member of a close network. That may cost the company several profitable customers. In other words, managing the relationship with the network profitably may require maintaining relationships with customers who are individually

unprofitable. Increasingly companies have information about networks of customers (e.g., Southwest Airline's "friends fly free") and may be able to analyze the network's data as a network. This implies that the interactions between the behaviors of the members of the network also need to be modeled.

6.12 Strategic Models of Customer Equity

If the company bases its marketing on customer relationships and customer lifetime value, rather than just transactions, aggregate expenditures, and aggregate sales, then it follows that the company should manage its strategy based on customer equity, the sum of the customer lifetime values of the firm's current and future customers. Although some models exist for addressing this strategy problem (e.g., Rust, Lemon and Zeithaml 2004), there is much more work to do. For example, some strategic initiatives may affect more than one driver of customer equity (e.g., service quality initiatives may improve brand equity as well as value equity, over time). How is customer response heterogeneity best handled in customer equity models? How can customer equity strategy be developed from observable behavioral data without requiring customer survey data? Also necessary is models of customer equity that cover a customer's relationships with a portfolio of the company's products.

6.13 Changes in Customer Profitability Over Time

Customer equity models are based on the ability to predict a customer's future profitability. Although some early attempts exist (e.g., Campbell and Frei 2004; Donkers, Verhoef and De Jong 2003; Reinartz and Kumar 2000, 2002, 2003), considerable additional work is necessary. Complicating the problem is that marketing interventions change future profitability. This implies that an optimal marketing intervention model needs to be overlaid on the customer lifetime value model, which is a difficult task. Early attempts (e.g., Venkatesan and

Kumar 2004) do not fully model this endogeneity. A good first step is to understand how and why customer profitability changes over time, as a function of both personal history and marketing interventions.

6.14 Cross-Selling and Customer Lifetime Value

If the company's relationship with a customer involves more than one product, as is commonplace in financial service, for instance, then the ability of the firm to cross-sell the customer becomes very important to the customer's lifetime value. We need to have a more complete understanding of how cross-selling works, and to what degree the relationship is more than the sum of its parts. This has a downside, too. To what degree does dissatisfaction with one of the firm's products damage the customer's relationship with the other products with which the customer has a relationship?

7 Conclusion

Inexorable technological forces make service and relationships more important over time in every developed economy. This makes the subject area of service and relationships a particularly important one for marketing scientists. These same trends, manifested by improvements in computing, data storage, and communications, make the service and relationships research area especially amenable to both analytical and empirical modeling by marketing scientists. As a result, it seems inevitable that the area of service and relationships will continue to grow in importance in marketing science research.

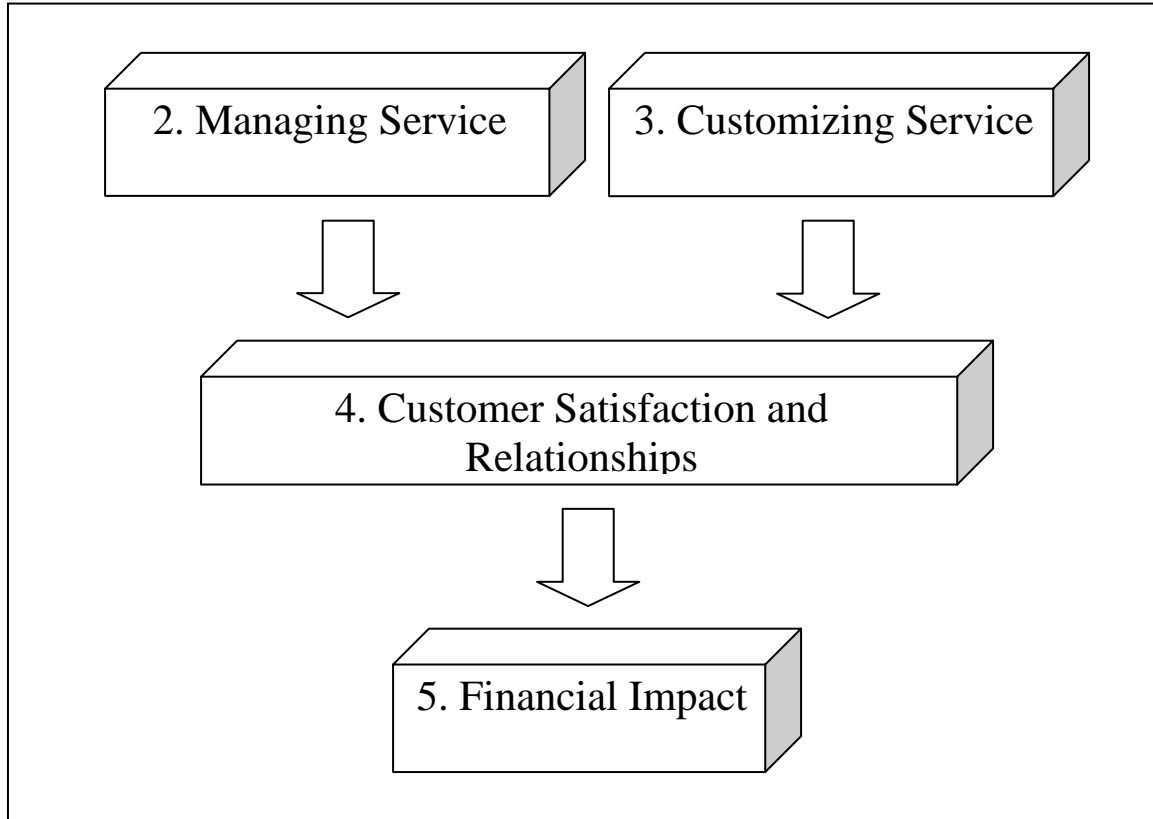
Table 1 Representative Articles in The Evolution of Service and Relationship Models

Era	Managing Service	Customizing Service	Customer Satisfaction and Relationships	Financial Impact of Customer Relationships
1980-1985	Dhebar & Oren 1985		Oliver 1980	
1986-1990	Png 1989		Parasuraman, Zeithaml & Berry 1988; Tse & Wilton 1988	Fornell & Wernerfelt 1987 & 1988; Dwyer 1989; Reichheld & Sasser 1990
1991-1995	Padmanabhan & Rao 1993; Hauser, Simester & Wernerfelt 1994; Moorthy & Srinivasan 1995	Blattberg & Deighton 1991	Bolton & Drew 1991; Fornell 1992; Boulding et al. 1993; Helsen & Schmittlein 1993	Rust & Zahorik 1993; Bult & Wansbeek 1995; Rust, Zahorik & Keiningham 1995
1996-2000	Padmanabhan & Png 1997; Radas & Shugan 1998a; Fruchter & Gerstner 1999; Bakos & Brynjolfsson 1999; Shugan & Xie 2000	Anderson, Fornell & Rust 1997; Varki & Rust 1998	Bolton 1998; Rust, Inman, Jia & Zahorik 1999	Blattberg & Deighton 1996; Berger & Nasr 1998; Gonul & Shi 1998; Rust, Zeithaml & Lemon 2000
2001-Present	Biyalogorsky, Gerstner & Libai 2001; Xie & Shugan 2001; Danaher 2002; Jain & Kannan 2002	Drew et al. 2001; Ansari & Mela 2003	Bordley 2001; Mittal & Kamakura 2001	Gupta, Lehmann & Stuart 2004 ; Hogan, Lemon & Libai 2003; Reinartz & Kumar 2003; Rust, Lemon & Zeithaml 2004
Topics for Future Research	Privacy vs. customization; Marketing to computers; Real-time marketing; Service networks	E-Service; Dynamic interaction & customization; Infinite product assortments; Personalized pricing	Dynamic marketing intervention models in CRM; Dynamic customer satisfaction management; Relationships with customer networks	Strategic models of customer equity; Predicting changes in customer profitability; Cross-selling and customer lifetime value

Table 2 Topics and Methodologies – Representative Articles

Topic	Analytical / Simulation Approaches	Survey / Experimental Approaches	Database / Panel Approaches
2. Managing Service			
2.1 Service Demand	Krider & Weinberg 1998; Radas & Shugan 1998b;	Neelamiegham & Chintagunta 1999	Sawhney and Eliashberg 1996; Eliashberg and Shugan 1997; Bolton & Lemon 1999; Basuroy, Chatterjee and Ravid 2003
2.2 Service Pricing	Dhebar & Oren 1985; Png 1989; Radas & Shugan 1998a; Bakos & Brynjolfsson 1999; Shugan & Xie 2000; Xie & Shugan 2001	Danaher 2002	
2.3 Service Guarantees	Moorthy & Srinivasan 1995; Fruchter & Gerstner 1999	Padmanabhan & Rao 1993	
2.4 Complaint Management	Fornell & Wernerfelt 1987 & 1988; Padmanabhan & Png 1997	Smith, Bolton & Wagner 1999	
2.5 Employee Incentives	Hauser, Simester & Wernerfelt 1994		
3. Customizing Service			
3.1 Service Design and Customization		Griffin & Hauser 1993	
3.2 The Satisfaction / Productivity Tradeoff	Varki & Rust 1998	Anderson, Fornell & Rust 1997	Oliva & Serman 2001
3.3 E-Service	Jain & Kannan 2002	Ratchford, Lee & Talukar 2003	Ansari & Mela 2003
4. Customer Satisfaction and Relationships			
4.1 Customer Satisfaction and Delight	Rust & Oliver 2000	Oliver 1980; Bolton & Drew 1991	Parasuraman, Zeithaml & Berry 1988
4.2 Customer Expectations	Bordley 2001; Rust, Inman, Jia & Zahorik 1999	Oliver 1980; Tse & Wilton 1988; Fornell 1992; Boulding et al. 1993; Rust, Inman, Jia & Zahorik 1999	Anderson & Sullivan 1993; Johnson, Anderson & Fornell 1995.
4.3 Customer Satisfaction Measurement and Analysis		Fornell 1992; Fornell et al. 1996; Simester et al. 2000	Rust & Zahorik 1993
4.4 Customer Retention and Duration of Relationship	Schmittlein, Morrison & Columbo 1987.	Bolton 1998; Mittal & Kamakura 2001; Rust, Lemon & Zeithaml 2004	Helsen & Schmittlein 1993; Bolton 1998
4.5 Word-of-Mouth	Biyalogorsky, Gerstner & Libai 2001	Hogan, Lemon & Libai 2003	Godes & Mayzlin 2004
5. Financial Impact			
5.1 Chains of Financial Impact		Rust, Zahorik & Keiningham 1995	Loveman 1998
5.2 Customer Lifetime Value and Customer Equity	Blattberg & Deighton 1996; Berger & Nasr 1998	Dwyer 1989; Rust, Lemon & Zeithaml 2004;	Reinartz & Kumar 2003
5.3 Financial Impact	Gupta, Lehmann & Stuart 2004	Rust, Lemon & Zeithaml 2004	Venkatesan & Kumar 2004
5.4 Customer Relationship Management (CRM)	Blattberg & Deighton 1991	Elsner, Krafft & Huchzermeier 2004	Bult & Wansbeek 1995; Gonul & Shi 1998; Rust & Verhoef 2005

Figure 1 **Principal Areas of Research in Service and Relationships**



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