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**Amanda Beatson[1], Leonard V. Coote[2] and John M. Rudd[3]**

*Queensland University of Technology*

*University of Queensland*

*Aston University*

# Determining Consumer Satisfaction and Commitment Through Self-Service Technology and Personal Service Usage

*This paper expands research into self-service technology in the service encounter. Self-service technology is where customers deliver service themselves using some form of a technological interface. There is still a great deal unknown about self-service technology, in particular its impact on consumer satisfaction and consumer commitment. With that in mind, this empirical study explores the relative impact of self-service technology on consumer satisfaction and on a multidimensional measure of consumer commitment containing affective commitment, temporal commitment and instrumental commitment. The results reveal that in a hotel context personal service still remains very important for assessments of satisfaction, and affective and temporal commitment. What is particularly interesting is that self-service technology, while impacting these constructs, also impacts instrumental commitment. This suggests that positive evaluations of self-service technology may tie consumers into relationships with hotels. A discussion and implications for managers are provided on these and other results, and the paper is concluded with further potential research.*

[1] *Correspondence*: Dr Amanda Beatson, School of Advertising, Marketing and Public Relations, Queensland University of Technology, Queensland 4001, Australia, Tel: 617 3864 2471, Fax: 617 3864 1811, E-mail: *a.beatson@qut.edu.au*.

[2] Dr Leonard Coote, School of Business, University of Queensland, Queensland 4072, Australia, Tel: 617 3365 9721, Fax: 617 3365 6988, E-mail*: l.coote@business.uq.edu.au*.

[3] Dr John Rudd, Aston Business School, Aston University, Birmingham  B4 7ET, United Kingdom, Tel: 44 121 359 3094; Fax: 44 121 333 4313, E-mail: *j.m.rudd@aston.ac.uk*.

**Introduction**

Service encounters are conventionally between front-line staff and consumers (Bitner 1990; Czepiel 1990). However, frequently we are seeing these traditional encounters replaced by ones between consumers and self-service technology (SST) facilities (Meuter, Ostrom, Roundtree and Bitner 2000). SST facilities are where consumers deliver services themselves through the use of technology (Meuter et al. 2000). Examples of SST encounters include; withdrawing money from a bank using an Automatic Teller Machine (ATM) instead of a bank teller inside the branch, booking tickets to see a show over the Internet rather than going into the box office, or checking yourself out of a hotel via the automated facility on the television set in your room, rather than going down to the reception desk and interacting with hotel staff. There are increasing examples of SST facilities across a range of services, from traditional high contact services such as hotels to low contact services such as filling the car with petrol (Curran, Meuter and Suprenant 2003; Meuter et al. 2000). Given that advances in technology are so prolific, it is likely that SST facilities will continue to evolve and will play an even more important role in service delivery than they do currently. The challenge for service managers and researchers is to understand what potential impact these SST facilities may have on consumers' assessments of their interactions with the service organisation and what impact this may have on consumers' future intentions. It has been stated that, just as service organisations need to blend technology with the personal aspects of service delivery (Berry 1999), research investigating consumer use of SST must also include dimensions from interpersonal research (Curran et al. 2003). Consequently, the main aim of this study is to develop and test a model of the impact of SST on consumers' satisfaction with the service encounter and their ongoing commitment to the service organisation. The next section will focus on the literature relevant to this study and the development of the hypotheses which drive the study. The investigation undertaken to test the conceptual framework is then described and the findings are presented. A discussion of the results then follows, along with the managerial relevance of this research. Finally, the study's limitations are highlighted and a programme of future research concludes the paper. The study presented in this paper contributes to our understanding of SST in the service encounter and in particular, the relative impact of SST on consumer retention.

**Conceptual Framework**

SST is a relatively recent service delivery method (compared to personal service) and as a result there is comparatively little research on it. There have

been a number of calls for further investigation into the impact of SST on the service encounter, and in particular its impact on consumer retention (Curran et al. 2003; Meuter et al. 2000). In the past, the effect of technology on consumer retention has largely been investigated from the perspective of 'e-loyalty' (Smith 2000). This research has been particularly useful for understanding Internet based retention. However, SST usage includes other delivery methods as well as the Internet; therefore there is a need to further expand this investigation to incorporate consumer commitment to the organisation through general SST usage.

Past research has acknowledged that personal interactions between consumers and front-line employees are important for consumer satisfaction and consumer commitment (Ganesh, Arnold and Reynolds 2000). The concern is the impact this potential loss of personal interaction may have on these evaluations, as consumer satisfaction and consumer commitment are important for organisational survival (Anderson, Fornell and Lehmann 1994). Figure 1 shows the relationships among the key dimensions in the conceptual framework developed and discussed in this paper. This framework illustrates diagrammatically the hypotheses developed in the following literature sections.
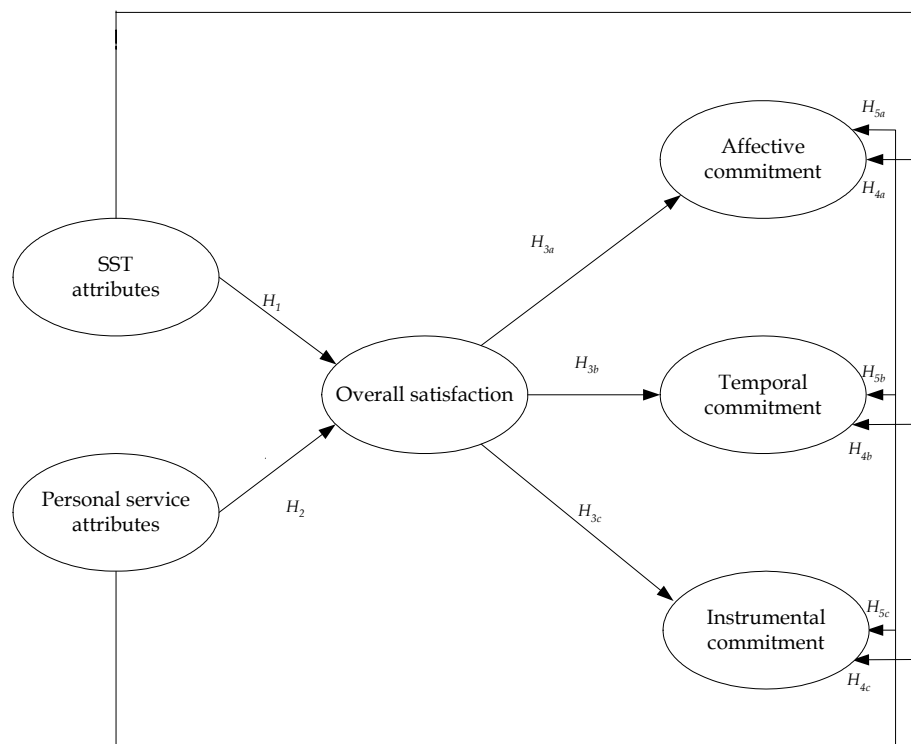


**Figure 1. Hypothesised Model**

It is well recognised that front-line employees influence consumers' perceptions of the service encounter (Bitner 1990; Bitner et al. 1990; Parasuraman, Zeithaml and Berry 1985, 1988).  As Bitner et al. (1990: 71) states "many times … (personal) interaction is the service from the customer's point of view".  Personal interactions have been identified as dominant contributors to consumer satisfaction and consumer commitment (Bitner 1990; Bitner et al. 2000; Czepiel 1990; McCallum and Harrison 1985; Reichheld 1993; Suprenant and Solomon 1987).  Therefore, it is important to understand what impact SST has on consumer satisfaction and consumer commitment.

Consumer satisfaction is a fundamental marketing concept (Fournier and Mick 1999).  Consumer satisfaction has been linked to overall firm performance and is seen as a primary objective for managers (Anderson et al. 1994; Yi 1990).  Consumer satisfaction is conceptualised in this study as overall satisfaction, and is defined as an affective state or overall emotional reaction to a service experience (Cadotte Woodruff and Jenkins 1987; Giese and Cote 2000; Oliver 1980; Spreng, MacKenzie and Olshavsky 1996).  Assessments of overall satisfaction are updated after each interaction the consumer has with the organisation (Boulding, Kalra, Staelin and Zeithaml 1993).

As well as assessing overall satisfaction, it is important to identify the key drivers of this satisfaction assessment as they enable managers to ascertain the relative importance of different components of the service (Garbarino and Johnson 1999).  By identifying these components managers are able to focus on those which are of primary importance to consumers, with the aim to improve overall satisfaction (Ganesh et al. 2000; Rust, Zahorik and Keningham 1995; Singh 1991).  By focusing on specific components, researchers are also able to pinpoint specific service problems (Mittal, Ross and Baldasare 1998).  For example, the consumer may be satisfied with three or four attributes but dissatisfied with the performance of one or two attributes.  This cannot be detected in an assessment of overall satisfaction, and has important consequences as a diagnostic tool for the organisation.

The importance of service attributes has been identified by a number of researchers, for example, Bitner (1990), Bitner et al. (1990), Dabholkar (1996), Ostrom and Iacobucci (1995), and Parasuraman et al. (1988).  Additionally, the relationship between overall satisfaction and these attributes has been established in a number of studies (Oliver 1993; Mittal et al. 1998; Spreng et al. 1996; Voss, Parasuraman and Grewal 1998).  By investigating both overall satisfaction and service attributes, the service organisation captures both an affective and a cognitive assessment of the service encounter (Sojka and Giese 1997).

It has been suggested that different industries have particular attributes

which are more important to that industry (Cronin and Taylor 1992). For example, where empathy may be a key attribute for a doctor to exhibit, trust may be perceived as the most important attribute for a mechanic. Furthermore, attributes may also differ across service-delivery mode (SST and personal service). It stands to reason that different elements become important when presented with different service-delivery modes. The manner in which a service is delivered may be more important when using personal service (e.g. the friendliness of staff), whereas with SST the outcome may be more important (e.g. the speed or convenience of the SST). Therefore in this conceptual framework, the service-delivery modes are presented as separate constructs. Attributes that are important for personal service interactions have been highlighted in past studies such as Goodwin and Gremler (1996) and Ostrom and Iacobucci (1995). Examples of these attributes include: prompt service, approachable service, trustworthy service, courteous service and professional service. Self-service attributes have also been identified in previous research (Dabholkar 1996; Meuter et al. 2000; Walker, Craig-Lees, Hecker and Francis 2002). Examples of self-service attributes in the current study (drawn from the aforementioned SST research) include: SST that saved time, convenient SST, customised SST and low risk SST.

In this study it is hypothesised that direct relationships exist from the attributes of the two service-delivery modes (personal service and SST) to overall satisfaction. This has support from the literature including: Churchill nd Suprenant (1982); Meuter et al. (2000); Mittal et al. (1998); Oliver (1993); Patterson, Johnson and Spreng (1997); Spreng et al. (1996); and Voss et al. (1998). It can be presumed that if consumers rate the performance of the various components of the service positively they are more likely to be satisfied overall with the complete service experience. It stands to reason that an overall evaluative judgement is made based on the individual elements that contribute toward this overall judgment. For example, if a consumer is pleased with the performance of the SST based on the components of the service which they feel are important, then they are likely to be satisfied with the overall service experience. Therefore the following hypothesis is suggested:

$H_1$: *SST attributes will have a positive effect on overall satisfaction.*

In this same manner, it is also likely that if consumers are pleased with the performance of the personal service based on the service components they feel are important for personal service, they will also be pleased with the overall service experience. Hence, when performance on service attributes is rated highly, customers are more likely to be satisfied with the total service

experience, if those attributes are important to them.   Therefore it is predicted that:

**H$_2$**:  *Personal service attributes will have a positive effect on overall satisfaction.*

Previous research has linked consumer satisfaction with consumer commitment (Garbarino and Johnson 1999).  The more satisfied consumers are with the service experience, the more likely they are to commit to a relationship with the organisation (Heskett et al. 1994; McQuitty, Finn and Wiley 2000; Oliver 1999; Singh and Sirdeshmukh 2000; Szymanski and Henard 2001).  Commitment in marketing is seen at both an organisational level, for example between channel partners, and at an individual level, for example, a customer's commitment to a service provider.  Most of the studies into commitment focus on business-to-business and organisational based relationships, such as strategic alliances or partnerships within distribution channels (Garbarino and Johnson 1999).  However, the construct can be used to investigate the relationship between service organisations and customers (Kelley and Davis 1994).  Where there is research into commitment at the consumer level it has adapted employee commitment scales from organisational behaviour research and literature (Garbarino and Johnson 1999).  Although employee commitment has been conceptualised as both a unidimensional construct and a multidimensional construct, consumer research has seldom investigated the multidimensional nature of commitment (Pritchard, Havitz and Howard 1999).  In consumer research, commitment is typically operationalised as a unidimensional construct and is measured using affective commitment (Kim and Frazier 1997).  Although unidimensional views provide a simple, easily interpretable measure of commitment, multidimensional views can foster more comprehension of the construct (Gundlach, Achrol and Mentzer 1995).

Given that the impact of SST on consumer commitment is unknown (Meuter et al. 2000), it seems important to investigate a comprehensive view of consumer commitment.   Therefore, it is proposed that consumer commitment in this study is conceptualised as a multidimensional construct with three dimensions; affective commitment, temporal commitment and instrumental commitment.  These three dimensions have been identified in previous research on commitment (Gundlach et al. 1995).  Gundlach et al. (1995) suggest that commitment measures should contain an attitudinal component (affective commitment) as this signifies an enduring intention to develop and maintain a stable long-term relationship; a temporal dimension (temporal commitment), which highlights that commitment means something over the long-term; and an input or instrumental component (instrumental commitment) as this shows an affirmative action taken by one

party that creates a self-interested stake.

Affective commitment is one of the more frequently conceptualised dimensions of commitment in both consumer and organisational behaviour research (Allen and Meyer 1990; Bloemer and Odekerken-Schröder 2003). Affective commitment is conceptualised as a desire to continue a relationship with an organisation because of a liking or a positive attitude toward the organisation. This is termed a positive affect or emotion, and is often referred to as psychological attachment (Garbarino and Johnson 1999). Affective commitment has also been described as an attitudinal construct and shares a similar meaning with other attitudinal constructs such as identification, motivation, loyalty, and involvement (Achrol 1997; Gundlach et al. 1995; Kim and Frazier 1997).

The second dimension of consumer commitment captured in this present study is temporal commitment. Temporal commitment refers to the longevity of the consumer's commitment to the organisation, or expectations of continuity (Garbarino and Johnson 1999), and is reflected in the stability of the relationship, suggesting that the relationship will exist over time (Kim and Frazier 1997). This long-term focus has also been termed continuance commitment (Kim and Frazier 1997). Dwyer, Schurr and Oh (1987) suggest that durability and consistency over time indicate two important components in a relationship. The temporal dimension is also commonly found in research on commitment in organisations (Allen and Meyer 1990; Roberts, Coulson and Chonko 1999).

The final commitment dimension is instrumental commitment. The instrumental view of commitment is that the consumer stays with the organisation because of the existence of perceived costs should they leave the relationship (Morgan and Hunt 1994). These costs can be economic or psychological in nature and can be real or perceived costs. The costs may include non-financial barriers such as the perceived hassle and risks associated with changing service providers. As a result, instrumental commitment is sometimes referred to in reference to investments in a relationship or as calculative commitment. Confusingly, instrumental commitment is also sometimes referred to as continuance commitment (Allen and Meyer 1990). Self-interested stakes are created by the parties involved in the relationship, which bind them to continue the relationship (Gundlach et al. 1995). The types of inputs that may be invested to ensure consistent behaviour include dedicated resources, transaction-specific investments and pledges; or, in a consumer setting, termination fees and loyalty points. A dependence condition is often the primary source of instrumental commitment. This can occur when there is a lack of potential alternative partners.

The links between satisfaction and commitment have been identified in a

number of different fields; however, few studies simultaneously examine satisfaction and all of the dimensions of commitment included in this study. For example, Allen and Meyer (1990) identified a link between employee satisfaction and affective and instrumental commitment to the organisation. In a marketing context, Gruen, Summers and Acito (2000) found that affective and temporal commitment were built on a series of satisfactory exchanges. Garbarino and Johnson (1999) found a link between satisfaction and affective and temporal commitment. Johlke, Duhan, Howell and Wilkes (2000) also indicated a direct path between job satisfaction and affective commitment. Additionally, Dwyer et al. (1987) argued for the link between satisfaction, and temporal and instrumental commitment.

It is reasonable to assume therefore that a relationship between satisfaction and all three dimensions of commitment exists. Logically speaking, when consumers are satisfied with their overall experience with the service organisation, they are more likely to be committed to that organisation. For example, if consumers are satisfied with the overall service experience with the organisation, it is conceivable that they are likely to feel a positive attitude toward the organisation. In other words, should their overall service experience be good, they are likely to want to continue to return to the organisation because they like the organisation. This suggests that overall satisfaction leads to affective commitment. Likewise, should consumers have a positive service experience overall with the organisation, it is likely that they will want to return to that organisation in the future. It makes sense to predict that, if consumers have a good service experience, they will want to go back to that same service organisation when they want the service delivered again. Therefore this purports a relationship between overall satisfaction and temporal commitment. Finally, consumers who are satisfied with the service encounter overall are likely to feel they have a vested interest in staying with that organisation as the costs to go elsewhere may be too high. Thus, if consumers have invested time and effort to locate a service organisation in the first instance, if they have a positive service experience overall, it makes sense that they will want to stay with the same organisation rather than spend the time and effort again finding another one. This, therefore, implies a relationship between overall satisfaction and instrumental commitment. Based on this discussion, there are three hypotheses proposed that relate to overall satisfaction and the dimensions of consumer commitment.

$H_3$: *Overall satisfaction has a positive effect on a) affective commitment, b) temporal commitment, and c) instrumental commitment.*

In addition to the relationships between overall satisfaction and the three

dimensions of commitment explored in this study, it is hypothesised that a direct relationship exists between the service attributes and the commitment dimensions. Although not as common as research focusing on service attributes and consumer satisfaction, direct relationships between service attributes and consumer commitment have been discussed by previous researchers, for example, Garbarino and Johnson (2001), Garbarino and Johnson (1999), and Spreng et al. (1996). The service attributes captured in all these studies relate to personal service. However, it is logical to expect that the same relationship will exist between SST attributes and consumer commitment. Additionally, although these studies have largely focused on unidimensional approaches of affective commitment, it is speculated that they will also exist with the other two dimensions of commitment relevant to this study, namely temporal commitment and instrumental commitment.

In the same manner that personal service attributes and SST attributes were speculated to relate to overall satisfaction, it can also be presumed that they will relate to the commitment dimensions. If consumers rate the performance of the attributes (SST attributes and personal service) positively, those attributes will have an impact on the consumers' future intentions with the organisation if those attributes are important to them. For example, if consumers have a positive experience with the SST attributes or the personal service attributes that are important to them (and therefore rates the performance of them favourably), they will feel more positively toward the organisation and wish to return. It makes sense to presume that positive experiences with the SST and personal service contribute toward a positive attachment to the organisation. Thus, SST attributes and personal service attributes contribute to affective commitment.

It is also probable that if consumers rate the performance of the SST attributes and the personal service attributes that are important to them positively, it is likely they will want to return to the service organisation in the future. When SST performance or personal service performance is good it is reasonable to assume that consumers will want to return to this same organisation next time they want the service, to receive this good performance again. This indicates a relationship between SST attributes and personal service attributes, and temporal commitment.

Additionally, if the ratings on the SST attributes and personal service attributes are favourable the consumer may not wish to leave the relationship with the organisation as they may feel they have invested in that relationship. Those consumers who have a positive experience with the attributes may feel that if they went elsewhere they may not receive the same level of service, in other words, the costs to change service organisations may be too great. Therefore this suggests a relationship between SST attributes and personal service attributes, and instrumental commitment. Therefore, it

is hypothesised that:

**H₄**:   *SST attributes will have a positive effect on a) affective commitment, b) temporal commitment, and c) instrumental commitment.*

**H₅**:   *Personal service attributes will have a positive effect on a) affective commitment, b) temporal commitment, and c) instrumental commitment.*

## Methodology

### Research Setting

The research setting for this study was hotels in a metropolitan area in Australia.   Respondents for the study included leisure and business travellers.   Hotels were selected for a number of reasons.   Hotels are traditionally classified as high contact services with a high degree of personalisation (Bowen 1990; Connolly 2000) and personal service is particularly important in hotels for determining consumer satisfaction and consumer commitment (Dube and Renaghan 1999; Solomon, Suprenant, Czepiel and Gutman 1985).   There is a trend in hotels, however, toward introducing SST to replace service encounters with front-line employees (Brown and Dev 2000) and some hotels have found it difficult to introduce a variety of SST while still maintaining service quality because of the lack of human interaction (Armstrong, Mok, Go and Chan 1997).   Examples of SST used during the hotel stay include: automated check-in and check-out facilities; automated room service ordering systems; automated message services; and automated house keeping services.   Moreover, hotels have two different market segments, leisure guests and business guests.   The needs of these two groups are likely to vary resulting in different expectations and perceptions of service levels and service offerings.

For these reasons hotels are an appropriate setting for the current study. It must be acknowledged, however, that the focus in this research is SST used during a hotel stay versus personal interactions in traditional service encounters with hotel employees.   There are other forms of SST available prior to a hotel stay such as Internet hotel booking services or using the Internet to obtain information about a hotel (Siguaw and Enz 1999) which were not investigated during this current study.

### Sample Characteristics

Three hotels participated in the fieldwork by distributing survey packs to guests over a two-month period.   The survey packs included a cover letter from the researcher explaining the study, a self-complete questionnaire and a reply-paid envelope.   Approximately 1,000 survey packs were distributed

and a total of 248 questionnaires were returned.   Seven surveys were discarded due to missing data, leaving an effective response rate of 24%.  Of the 241 usable returns, 150 were from business guests and 91 were from leisure guests.  An equal number of males and females are represented in the sample.  The average is 41 years of age (std. dev. = 15 years).  The majority of respondents have completed at least senior high school and their average income is AUD $71,000 per annum (std. dev. = $110,000).   The business respondents had on average 13 overnight stays in a hotel per year; the leisure respondents an average of five holidays in the last three years.  The average length of trips for the business respondents was two nights, and one night for the leisure respondents.  The business respondents had returned to their most frequently-visited business hotel on average six times in the last year; the leisure respondents only once in the last three years.

### Non-response Bias

Non-response bias could not be estimated in the typical manner of comparing early and late respondents (Armstrong and Overton 1977) as the surveys were not distributed at one point in time.  Demographic information about hotel guests staying in the three participating hotels was also unavailable to make a comparison.  Therefore, a demographic comparison based on age was made with industry data provided by the Queensland Visitor Survey (conducted for the Queensland Tourist and Travel Corporation by ACNeilson in 1997).  This suggests that non-response bias may not be an issue.  Table 1 illustrates the age percentages for the industry data.

**Table 1. Non-response Bias**

| Age Category | Queensland Visitor Survey | Present Study |
|:---:|:---:|:---:|
| 25-34 | 20.2% | 19.9% |
| 35-44 | 23.8% | 24.5% |
| 45-55 | 29.1% | 29.5% |

### Measures

Where possible, the measures used in this questionnaire were adapted from existing scales drawn from marketing and management literature.  In developing the questionnaire: a) four focus groups and twelve depth interviews were conducted to explore the research area and clarify terminology; b) a panel of academic experts assessed the substantive validity of the questions following Anderson and Gerbing (1991) and also commented on the wording and instrument format; c) a pilot study of 20 hotel guests was conducted.   Several modifications were made to the

questionnaire as a result of the above. A full list of the items in the questionnaire is included in the appendix.

### Affective Commitment

Affective commitment is defined as a consumer's desire to continue a relationship with an organisation because of a positive affect (emotion) toward the organisation (Kim and Frazier 1997). All of the indicators for the three commitment dimensions were measured on a multi-item Likert scale anchored from strongly agree (= 5) to strongly disagree (= 1). The indicators were largely drawn from previous studies in marketing and psychology (Allen and Meyer 1990; Ganesan 1994; Garbarino and Johnson 1999; and Morgan and Hunt 1994), but were modified to suit the research context. The items include the following: "I feel a sense of belonging to this hotel", "I am loyal to this hotel", "I would like to develop a long-term relationship with this hotel" and "I am committed to my relationship with this hotel". The scale was highly reliable (construct reliability = .91, variance extracted = .72).

### Temporal Commitment

Temporal commitment is a consumer's desire to continue a relationship with the organisation (Kim and Frazier 1997). The construct focuses on the consumer's expectation that the relationship will continue into the future. The items were drawn from Ganesan (1994), Garbarino and Johnson (1999), Kim and Frazier (1997), and Morgan and Hunt (1994). Statements from the scale include: "I expect to continue to return to this hotel for a long time to come", "My relationship with this hotel is something I intend to maintain", and "I am certain my relationship with this hotel will last a long time". The scale achieved high reliability (construct reliability = .91, variance extracted = .71).

### Instrumental Commitment

Instrumental commitment captures the expected losses from terminating the relationship. These losses result from a perceived lack of alternatives, and include both economic and psychological costs (Morgan and Hunt 1994). The measures were based on Barnes (1997); Ganesan (1994); Gundlach et al. (1995); and Morgan and Hunt (1994). Statements from the scale included the following: "In general it would be inconvenient to change hotels", "I do not have a good alternative to this hotel", and "It would cost me a great deal to stay in another hotel". The scale was reliable (construct reliability = .79, variance extracted = .49).

## Overall Satisfaction

Overall satisfaction is defined as an evaluation based on the consumer's overall experiences with a service organisation over time (Garbarino and Johnson 1999). The questions pertained to the respondent's last stay in their most frequently-visited hotel over the last twelve months (business guest) or three years (leisure guest). All of the items were measured on a five-point semantic differential scale based on the items used by Ganesan (1994). Respondents were asked among others, to indicate the extent to which they feel satisfied/dissatisfied, contented/disgusted, pleased/displeased and delighted/disappointed about their overall experience with their last stay in their main hotel. The scale achieved high reliability (construct validity = .95, variance extracted = .86).

## SST Attributes

SST attribute performance is defined as the actual performance of the self-service facilities rated by consumers. The SST attributes were selected from previous studies by Dabholkar (1996), Meuter et al. (2000), and Walker, Craig-Lees, Hecker and Kent (2000), and also derived from the focus groups and depth interviews used in the early stages of this research. Respondents were asked to rate the performance of the SST during their last hotel visit on each attribute. Each of the attributes was measured on a five-point scale, anchored from poor (= 1) to excellent (= 5). The attributes are: convenient; time savings; low risk; and customised. High reliability was achieved (construct validity = .92, variance extracted = .75).

## Personal Service Attributes

Personal service attributes reflect the actual service performance the customer receives from hotel staff. The indicators for this study were also derived from past studies (Bitner 1990; Goodwin and Gremler 1996; Ostrom and Iacobucci 1995; and Suprenant and Solomon 1987), and the early qualitative work. The attributes include, prompt; informative; approachable; trustworthy; and professional. These were measured on a five-point scale, with the anchors poor and excellent. High reliability was achieved for personal service attributes (construct validity = .93, variance extracted = .72).

## Analysis and Results

**Table 2. Construct Results**

| Construct | No. of items | Factor Loadings | | Inter-item Correlations | | Fit Statistics | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Lowest | Highest | Lowest | Highest | $\chi^2$ (d.f., *p*-value) | GFI | AGFI | RMSEA |
| Instrumental commitment | 5 | 0.55 | 0.85 | 0.50 | 0.72 | 0.45; 5 d.f.; *p* = 0.99 | 0.99 | 0.99 | 0.0 |
| Temporal commitment | 4 | 0.81 | 0.87 | 0.77 | 0.81 | 0.43; 2 d.f.; *p* = 0.81 | 0.99 | 0.99 | 0.0 |
| Affective commitment | 4 | 0.79 | 0.92 | 0.75 | 0.86 | 2.43; 2 d.f.; *p* = 0.28 | 0.99 | 0.98 | 0.0 |
| Overall satisfaction | 4 | 0.77 | 0.96 | 0.75 | 0.91 | 0.39; 2 d.f.; *p* = 0.82 | 0.99 | 0.99 | 0.0 |
| SST attributes | 4 | 0.81 | 0.96 | 0.78 | 0.86 | 1.15; 2 d.f; *p* = 0.56 | 0.99 | 0.99 | 0.0 |
| Personal service attributes | 5 | 0.81 | 0.88 | 0.78 | 0.85 | 3.57; 5 d.f.; *p* = 0.61 | 0.99 | 0.98 | 0.0 |

One factor models of the constructs were estimated first. The summary results of these models are illustrated in Table 2. The two-step approach described by Anderson and Gerbing (1988) was then followed for model estimation. Following this approach, a measurement model was estimated prior to examining the hypothesised relationships with a structural model. The constructs were modelled as correlated first-order constructs and the indicators were related only to their intended constructs. The model was estimated in LISREL 8.54 with sample covariances as input (Joreskog and Sorbom 1996). The chi-square statistic for the measurement model was significant, which is to be expected given the statistic's sensitivity to sample size ($\chi^2(194) = 260.51$, $p<0.0$) (Hair et al. 1998). The other fit measures indicate that there is adequate fit to the sample data (goodness-of-fit index [GFI] = 0.91, adjusted goodness-of-fit [AGFI] = 0.88, comparative fit index [CFI] = 0.99, root mean square error of approximation [RMSEA] = 0.04). Note that four items were removed at this stage, based on large standardised residuals. The indicators were measures of temporal commitment (one item), instrumental commitment (two items), and overall satisfaction (one item). All of the retained standardised estimates are significant ($p<0.05$) and equal or greater to 0.64 (see the appendix). These results provide evidence of

convergent validity, and item and scale reliability.    The construct intercorrelations are reported in Table 3.  Discriminant validity was assessed for each pair of constructs by following Fornell and Larcker (1981) and Kelloway (1995).  Discriminant validity was achieved across all possible pairs of constructs in this study using both criteria.

**Table 3. Construct Intercorrelations**

|  | 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|---|
| 1.Instrumental commitment | 1.00 |  |  |  |  |  |
| 2.Temporal commitment | 0.26 | 1.00 |  |  |  |  |
| 3.Affective commitment | 0.31 | 0.95 | 1.00 |  |  |  |
| 4.Overall satisfaction | 0.02 | 0.45 | 0.45 | 1.00 |  |  |
| 5.SST attributes | 0.26 | 0.40 | 0.39 | 0.33 | 1.00 |  |
| 6.Personal service attributes | 0.13 | 0.55 | 0.41 | 0.55 | 0.32 | 1.00 |

Following the assessment of the measurement model, the hypothesised model shown in Figure 1 was estimated.  Estimating this model produced a significant chi-square statistic, $\chi^2(196) = 269.09$, $p<0.0$.  The other fit statistics were acceptable indicating fit to the sample data (GFI = 0.91, AGFI = 0.88, CFI = 0.99, RMSEA = 0.04).  The standardised parameter estimates and $t$ values are illustrated in Table 4.  None of the error terms were allowed to covary in this hypothesised model.  Examination of the theta delta matrices suggested that no significant correlations existed between the error terms. As hypothesised in H1, the effect of SST attributes on overall satisfaction is positive and significant ($\chi_{41} = 0.17$, t = 2.70).  The impact of personal service attributes on overall satisfaction is also positive and significant ($\chi_{42} = 0.50$, t = 7.53) as hypothesised by H2.  The effect of overall satisfaction on affective commitment (H3a) is positive and significant as predicted ($\beta_{14} = 0.26$, t = 3.42), as is the effect of overall satisfaction on temporal commitment (H3b) ($\beta_{24} = 0.16$, t = 2.11).  Contrary to H3c, the effect of overall satisfaction on instrumental commitment, however, is not significant ($\beta_{34} = -0.13$, t = -1.29).

The next two sets of hypotheses explore the impact of the attributes on the dimensions of commitment.  As predicted, H4a, that SST attributes will have a positive effect on affective commitment, was positive and significant ($\chi_{11} = 0.25$, t = 3.75) as was the relationship between SST attributes and temporal

commitment (H4b) ($\chi_{21}$ = 0.22, t = 3.43). Additionally, H4c was also positive and significant as expected ($\chi_{31}$ = 0.26, t = 2.92), that is SST attributes have a positive effect on instrumental commitment. Personal service attributes has the positive and significant effect on affective commitment predicted in H5a ($\chi_{12}$ = 0.19, t = 2.57). H5b, that personal service attributes will have a positive effect on temporal commitment, is also supported ($\chi_{22}$ = 0.40, t = 5.11). Finally, although a positive relationship was predicted between personal service attributes and instrumental commitment (H5c), this was not supported ($\chi_{32}$ = 0.10, t = 1.06). The model explains 33% of the variance in overall satisfaction, 30% in affective commitment, 38% in temporal commitment, and 8% in instrumental commitment.

An alterative mediating model was also estimated which did not include the direct effects of the SST attributes and the personal service attributes on the three dimensions of commitment. Previous research has suggested that the relationship between attributes and commitment is mediated by satisfaction (Mittal et al. 1998).

This alternative model had a significant chi-square statistic, ($\chi^2$(202) = 345.55, $p$<0.0). The other fit measures indicate that there is adequate fit to the sample data (goodness-of-fit index [GFI] = 0.88, adjusted goodness-of-fit [AGFI] = 0.86, comparative fit index [CFI] = 0.98, root mean square error of approximation [RMSEA] = 0.05). However, a chi-square difference test revealed that the full hypothesised model fits the data significantly better than the alternative mediating model. Additionally, the explained variance in the mediating model is less than in the hypothesised model (24% overall satisfaction, 21% affective commitment, 21% temporal commitment, 1% instrumental commitment).

**Table 4. Structural Model Results**

|  | Initial Model | | Alternative Model | |
|---|---|---|---|---|
|  | **Standard Estimate** | ***t* value** | **Standard Estimate** | ***t* value** |
| SST attributes → Overall satisfaction (H1) | 0.17 | 2.70 | 0.17 | 2.83 |
| Personal service attributes → Overall satisfaction (H2) | 0.50 | 7.53 | 0.50 | 7.62 |
| Overall satisfaction → Affective commitment (H3a) | 0.26 | 3.42 | 0.46 | 6.99 |

**Cont'd...**

| | Initial Model | | Alternative Model | |
|---|---|---|---|---|
| | **Standard Estimate** | ***t* value** | **Standard Estimate** | ***t* value** |
| Overall satisfaction → Temporal commitment (H3b) | 0.16 | 2.11 | 0.46 | 6.73 |
| Overall satisfaction → Instrumental commitment (H3c) | -0.13 | -1.29 | 0.02 | 0.30 |
| SST attributes → Temporal commitment (H4b) | 0.22 | 3.43 | - | - |
| SST attributes → Instrumental commitment (H4c) | 0.26 | 2.92 | - | - |
| Personal service attributes → Affective commitment (H5a) | 0.19 | 2.57 | - | - |
| Personal service attributes → Temporal commitment (H5b) | 0.40 | 5.11 | - | - |
| Personal service attributes → Instrumental commitment (H5c) | 0.10 | 1.06 | - | - |

As an extension a multigroup analysis was conducted on the hypothesised conceptual framework to ascertain if there was a difference between guest type (business guests and leisure guests) in the current sample. Coote, Forrest and Tam (2003) was used as a basis for this analysis. The results of this exploration indicated that there appeared to be no significant differences in the conceptual framework due to guest type. The results of this test are shown in Table 5. The results of the study and implications of these are now discussed.

**Table 5. Multigroup Analysis**

| Moderating variable | Model | $\chi^2$ | df | GFI | CFI | RMSEA | $\Delta\chi^2$ | $p^a$ |
|---|---|---|---|---|---|---|---|---|
| Guest type | A | 520.76 | 445 | 0.80 | 0.99 | 0.04 | 8.84 | NS |
| | B | 512.92 | 435 | 0.80 | 0.99 | 0.04 | | |

**Discussion and Conclusion**

This study has gone some way to explore the relative impact of SST on consumer satisfaction and consumer commitment. To provide a fuller picture, the impact of SST and personal service on overall satisfaction was captured, along with the impact of these three constructs on a multidimensional measure of commitment (affective commitment, temporal commitment and instrumental commitment). The empirical results largely support the conceptual framework proposed in this study. There is evidence that personal service and SST both positively impact overall satisfaction, however, personal service appears to be the more important contributor. Overall satisfaction appears to impact affective commitment and temporal commitment; however it appears that it does not have an effect on instrumental commitment. SST attributes appear to have an impact on all of the three dimensions of commitment, whereas personal service attributes only impact affective and temporal commitment. Finally, the multigroup analysis indicated that guest type did not appear to have a significant moderating impact on the conceptual framework.

As hypothesised, both the SST attributes and personal service attributes contribute to overall satisfaction in the current research setting. This result is consistent with past studies in both SST and personal service (Bitner 1990; Crosby and Stephens 1987; Meuter et al. 2000, Ostrom and Iacobucci 1995; Parasuraman et al. 1988). What is interesting, however, is the magnitude of the relationships. In a hotel setting it appears that personal service still contributes a great deal more to overall satisfaction than SST. This is perhaps not surprising given that personal service is still the dominant service delivery mode in a hotel context despite the increasing use of SST facilities in hotels (Brown and Dev 2000). Nevertheless, it could also be argued that it is consistent with past research highlighting the importance of personal service for service encounter evaluations (Bitner 1990; Crosby et al 1990; Ganesh et al. 2000; Gwinner et al. 1998; Suprenant and Solomon 1982).

An unexpected result was the relationship between overall satisfaction and instrumental commitment in the current study. Although it was hypothesised that overall satisfaction has a positive impact on instrumental commitment, this was not supported. This suggests that satisfaction with the hotel experience does not necessarily mean the consumer will return to the hotel even if they feel they would lose out if they went to another hotel. This result is contradictory to past studies by Dwyer et al. (1987) and Allen and Meyer (1990), who found links between satisfaction (or job satisfaction in Allen and Meyer's study) and instrumental commitment. A possible explanation for the result in the current study is that the context again may have had an effect on the relationships. Hotels operate in competitive

markets and through hotel ratings (star ratings) and large hotel chains, consumers may feel they are able to receive approximately the same service levels and quality regardless of the actual hotel. Additionally, loyalty programs are related to hotel chains and often there is a connection between loyalty programs, so consumers may feel they are not tied to a particular hotel because of the lost benefits associated with staying elsewhere. These reasons could remove some of the switching costs associated with changing hotels; therefore instrumental commitment would not be such a concern.

Another unexpected finding was the relationship between SST attributes, personal service attributes, and instrumental commitment. Although positive relationships were expected between both sets of attributes and instrumental commitment, only the SST ones were supported. This is a particularly interesting area of the current study given that the relationship between SST and consumer commitment has not been empirically explored previously. These results are suggesting that consumers may perceive a learning curve associated with using the SST and a successful interaction may result in them not wanting to move to another service provider in case they do not receive the same service elsewhere. This would suggest that successful use of SST may 'tie' consumers into a service provider. The lack of a significant relationship between the personal service attributes and instrumental commitment suggests that consumers may not feel this same fear with successful personal service interactions. Perhaps consumers feel they are a lot more experienced with personal service interactions, enabling them to move to another service provider without having to learn the processes again as the front-line staff member will guide them through the interaction through the use of the "service script". Consumers have been exposed to an increasing number of SST facilities across a number of different industries over the last 10 years or so, and it will be interesting to see if continued exposure and experience reduces the learning curve that appears to be associated with it at present, thus reducing the link between SST and instrumental commitment.

*Implications for Practice*

Some of the main contributions of this research for hotel managers relate to the area of service attributes and consumer commitment. The identification of service attributes will enable managers to focus on core service performance drivers thus ensuring customers always receive the best possible service. Promotions can also be focused around these key attributes, enabling managers to create service empathy with their guests. The findings of this study suggest a number of key attributes for both SST and personal service. The attributes of SST that service managers should focus on, include: the convenience of the SST facilities; how much time savings are provided by

the SST facilities; whether the SST is perceived as low risk; and how customised the SST is.  One of the important factors about these attributes is adequate customer training.   Service managers must ensure that SST instructions are easy to follow thus limiting risk, increasing convenience and increasing the time savings associated with its use.  Customer training can come from instructions at the point of use, front-desk staff leading customers verbally through the facilities, or having staff on hand for queries, specifically for SST kiosks available in hotel lobbies.

It also appears that staff promptness, informativeness, approachableness, trustworthiness and professionalism are all fundamental aspects for determining satisfaction and consumer commitment in a hotel.   Service managers can ensure that consumers receive efficient service by maintaining adequate staffing levels at peak times.  The attributes identified largely relate to adequate staff training and staff attitudes.  Staff training must incorporate presentation skills as well as the specific job-related tasks thus ensuring that staff project professionalism and trustworthiness, as well as having the competency and information to complete their job.

In the same manner that managers make sure staff are available to serve customers, service managers must also ensure that SST is maintained and available for customer use.   Managers must ensure that if SST is implemented, there are adequate resources used to support it.  Ironically, staff must also be trained in its use to ensure that they are able to help guests. Service has always been a selling point of service providers, and it remains important whether it is provided through personal service or through SST.

Service managers must ensure that they carefully balance funding required for introducing new SST systems with monies available for staff training.  Managers must not lose sight of the fact that although SST may be important to consumer satisfaction; personal service is more important overall, particularly in a hotel context.  Managers should, however, keep in mind that SST is still a relatively new phenomenon (Meuter et al. 2000).  With time consumers' acceptance and use of SST may increase, and the contribution of self-service technologies to satisfaction and consumer commitment may strengthen.  It is important that this aspect is continually monitored to ensure that service providers are always meeting consumers' current needs and expectations.   The interesting result showing the relationship between SST and instrumental commitment should also be monitored to see if self-service technologies continue to tie consumers into staying with a specific hotel.

### Limitations and Research Directions

While this research was successful at increasing our understanding of the relationship between SST and consumer satisfaction and consumer

commitment, it is important to acknowledge some possible limitations. In particular, future research might expand beyond the single context of the current research to multiple contexts. This would also overcome the potential limitation of the current study, which is the selection of a context where personal service is still dominant over SST. The current research setting, however, was deemed appropriate as there is increasing evidence of self-service technologies in hotels and understanding its effect is therefore very important, as are isolating specific service attributes pertaining to SST in the hotel context. A final shortcoming of the current study is the capturing of the service attributes as reflective measures. While this is in keeping with conventional marketing practice it has been suggested that attribute ratings may be formative indicators rather than reflective measures (Spreng et al. 1996). In the future, it may be more applicable to model these attributes as formative indicators; however, this decision would have to be made based on theoretical considerations, study objectives and empirical issues (Diamantopoulos and Winklhofer 2001).

There are a number of obvious topics for further research stemming from this initial study. To overcome the issue of the study context, future contexts should ensure a more equal usage of SST and personal service. A suitable context could be banks, which would also be a relevant context to further investigate the impact of instrumental commitment. Banks not only have largely an equal use of SST and personal service, but also switching costs are more likely to have a stronger impact as consumers are also often tied into their relationship with their bank, owing to factors such as built up history, mortgage and loan switching costs. A related research topic is the expansion of this study to the Internet. The Internet is one of the fastest-growing uses of SST, and it is believed that the Internet will revolutionise the relationships businesses have with their customers (Piccoli, Spalding and Ives 2001). Gilbert, Powell-Perry and Widijoso (1999) make the observation that it is important that businesses use technology in a way that makes economic sense. It is imperative, therefore, that organisations understand the consequences of having an Internet site on their profitability and consumers' assessments of satisfaction and commitment.

Another direction for future research is the incorporating of cultural influences. In a cross-cultural study in the hotel industry Armstrong et al. (1997) identified difficulties in measuring service quality due to culture. It is important, therefore, that cultural differences are understood because these may impact consumer acceptance of and satisfaction with SST. Data from different settings and national contexts may also be used to ensure external validity of the measures and the generalisability of the findings in this study.

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## Appendix A.  Full List of Items in Questionnaire

| *SST attributes* | Rate the performance of the technology-based self-service during your last stay in this hotel on the following attributes:<br>Reliable<br>Easy to use<br>Easy to control<br>Enjoyable<br>Convenient *<br>Saved time*<br>Low risk *<br>Customised * |
|---|---|
| *Personal service attributes* | Rate the performance of the hotel staff during your last stay in this hotel on the following attributes:<br>Friendly<br>Responsive<br>Polite<br>Courteous<br>Prompt *<br>Informative *<br>Approachable *<br>Trustworthy *<br>Professional * |

Cont'd...

| | |
|---|---|
| *Affective commitment* | I feel a sense of belonging to this hotel. * |
| | I am loyal to this hotel. * |
| | I am committed to my relationship with this hotel. * |
| | I would like to develop a long-term relationship with this hotel. * |
| | I feel strongly attached to this hotel. |
| | I feel more attached to this hotel than other hotels. |
| *Temporal commitment* | I expect to continue to return to this hotel for a long time to come. * |
| | I plan to return to this hotel. |
| | My relationship with this hotel is something I intend to maintain. * |
| | I am certain my relationship with this hotel will last a long time. * |
| | Maintaining a long-term relationship with this hotel is important to me. |
| | I expect to visit this hotel again in the future. |
| | I want to continue returning to this hotel. |
| *Instrumental commitment* | It would be difficult for me to find another hotel of equal standard. |
| | I do not have a good alternative to this hotel. * |
| | The costs for me to find another hotel are very high. |
| | It would cost me a great deal to stay in another hotel. * |
| | I am concerned about what would happen if I stayed in another hotel. |
| | Moving to another hotel is not worth the effort. |
| | In general it would be inconvenient to change hotels. * |
| *Overall satisfaction* | Describe your feelings about your overall experience with your last stay in this hotel. |
| | Dissatisfied/satisfied. |
| | Sad/happy. |
| | Uncomfortable/relaxed. |
| | Disgusted/contented. * |
| | Displeased/pleased. * |
| | Exploited/rewarded. |
| | Disappointed/delighted. * |

*retained items

## Appendix B.  Measurement Model Results

|  | Standard Estimate | t value |
|---|---|---|
| *SST Attributes (CR =0.92; VE = 0.75)* | | |
| 1.  Convenient | 0.78 | 17.10 |
| 2.  Saved time | 0.86 | 18.14 |
| 3.  Low risk | 0.77 | 16.21 |
| 4.  Customised | 0.73 | 15.16 |
| | | |
| *Personal service attributes (CR = 0.93; VE = 0.72)* | | |
| 1.  Prompt | 0.82 | 16.09 |
| 2.  Informative | 0.83 | 17.08 |
| 3.  Approachable | 0.71 | 14.99 |
| 4.  Trustworthy | 0.74 | 15.41 |
| 5.  Professional | 0.81 | 17.44 |
| | | |
| *Affective Commitment (CR = 0.91; VE =0.72 )* | | |
| 1.  I feel a sense of belonging to this hotel. | 0.97 | 17.07 |
| 2.  I am loyal to this hotel. | 0.88 | 14.80 |
| 3.  I am committed to my relationship with this hotel. | 0.93 | 17.76 |
| 4.  I would like to develop a long-term relationship with this hotel. | 0.85 | 15.05 |
| | | |
| *Temporal Commitment (CR = 0.91; VE = 0.71)* | | |
| 1.  I expect to continue to return to this hotel for a long time to come. | 0.84 | 14.52 |
| 2.  My relationship with this hotel is something I intend to maintain. | 0.84 | 15.24 |
| 3.  I am certain my relationship with this hotel will last a long time. | 0.94 | 16.96 |
| | | |
| *Instrumental Commitment (CR = 0.79; VE = 0.49)* | | |
| 1.  I do not have a good alternative to this hotel. | 0.70 | 8.73 |
| 2.  It would cost me a great deal to stay in another hotel. | 0.76 | 9.01 |
| 3.  In general it would be inconvenient to change hotels. | 0.79 | 8.74 |
| | | |
| *Overall Satisfaction (CR = 0.95; VE =0.86 )* | | |
| 1.  Disgusted/contented. | 0.86 | 18.14 |
| 2.  Displeased/pleased. | 0.93 | 18.64 |
| 3.  Disappointed/delighted. | 0.92 | 19.91 |

*CR = Construct reliability, VE = variance extracted.*

**About the Authors**

**Amanda Beatson** (Ph.D., University of Queensland) is a Lecturer in Marketing at Queensland University of Technology.  Her research interests include self-service technology, and services management.  Amanda was awarded a UK CIM/AM Research Excellence Award in 2002.  Her research has appeared in the *International Journal of Tourism and Hospitality Administration*, and is forthcoming in the *Service Industries Journal*.  She has presented at a number of international conferences including EMAC, ANZMAC, AM, and AMA Services Frontiers.

**Leonard Coote** is a Senior Lecturer in Marketing in the UQ Business School at The University of Queensland.  He received his PhD in marketing and applied statistics from the Queensland University of Technology in 1999.  His research has appeared in the *Journal of Business Research, Journal of Business and Industrial Marketing, Journal of Services Marketing, Industrial Marketing Management*, and elsewhere.

**John M. Rudd** is a Lecturer in Marketing at Aston Business School and a Fellow of the Foundation for Management Education. John's main research interests are strategic marketing, strategic planning and stakeholder theory and he has received a number of awards for his teaching. His research has appeared in the *Journal of Business Research* and the *Journal of Strategic Marketing*.