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ABSTRACT

Identifying the drivers of relationship quality, satisfaction and customer loyalty has been the subject of much marketing research for over twenty years. However, there are a number of gaps in the literature, especially in understanding the nature of the drivers of customer loyalty over time. We explored the relative stability of several customer attitudes over four financial quarters, from a Fortune 100, B2B services provider. Our longitudinal research design allowed us to compare attitudes between the respective time periods. We found that many of the customer attitudes changed substantially across the four quarters. Additionally, some of the path coefficients in our structural models also changed significantly between quarters, suggesting that the nature of the business relationship between a B2B customer and a supplier is also dynamic, even in the short-term. The main implications of this study are that firms should track customer attitudes more closely, anticipate changes in such attitudes quicker, and then proactively manage their customer relationships better. From a theoretical perspective, research must be cautious in drawing firm conclusions from cross-sectional surveys as attitudes appear to be dynamic.

Keywords

Drivers of Customer Loyalty in B2B Services:
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This paper focuses on attitudes that drive customer loyalty in a B2B services context. In many B2B businesses, customer attitudes towards the relationship performance of a supplier are drivers in the decision to continue business with that firm, either through contract renewal or contract upgrade decisions (Bolton, Lemon, and Verhoef 2008; Rauyruen and Millar 2007; Woo and Ennew 2004). For example, in a study into B2B relationships in mature, industrial markets, it was found that a decision maker's positive evaluation of service performance during a contract leads to a positive effect on its commitment to that supplier (Narayandas and Rangan 2004). Further benefits of a strong extended relationship between customers and suppliers in B2B markets include lower transaction costs, enhanced productivity, improved innovation and higher economic returns (Kalwani and Narayandas 1995; Noordewier, John, and Nevin 1990; Palmatier, Dant, and Grewal 2007).

In many studies, there has been a strong link found between customer loyalty and profitability (Lam et al. 2004; Reichheld 1996; Reichheld and Sasser 1990). In B2B markets such loyalty links to profitability have even more importance, as B2B customers tend to spend larger amounts on single transactional contracts than B2C consumers (Rauyruen and Millar 2007). The importance of understanding the development of strong relationships between B2B buyers and sellers is thus paramount to maintaining long-term profitability of the firm (Rauyruen and Millar 2007). The clear links between relationship marketing and business performance has attracted a wealth of research literature, which furthers our understanding of inter-firm B2B relationships and their impact on firm performance (Bolton, Lemon, and Verhoef 2008; Hibbard,

Kumar, and Stern 2001; Morgan and Hunt 2004; Narayandas and Rangan 2004; Palmatier et al. 2006).

Despite the attention of marketers and academics, there are several gaps in the research literature. In particular, we noticed that few researchers have looked at the dynamic nature of inter-firm relationships, and whether drivers of loyalty are stable over time. Narayandas and Rangan (2004) concur and suggested that there was little empirical research in business marketing about the process through which industrial buyer-seller relationships evolve over time. The majority of existing studies have typically focused on cross-sectional analysis of customer attitudes (Bolton, Lemon, and Verhoef 2008). Such studies examine the relationships among attitudes at a single point in time, ignoring the dynamic nature of the external environment (Flint, Woodruff, and Gardial 1997). This may be due to the difficulty of capturing relational data across time (Palmatier 2008).

Of 636 empirical articles appearing in the Journal of Marketing or the Journal of Marketing Research from 1996-2005, 178 were based on survey research (Rindfleisch, Malter, Ganesan, and Moorman 2008). Of these 178, 94% were cross-sectional. Such cross-sectional studies are often interesting, but lack generalizability due to their snap-shot nature (Eggert and Ulaga 2005). In addition, Lehmann, McAlister, and Staelin (2011) suggested that research in marketing should be broad in nature and strive to yield insights that help us better understand the consequences of marketing actions. This may be done more effectively by studying customer attitudes and their inter-relationships longitudinally. A number of longitudinal studies have examined objective measures such as economic activity, financial metrics and market share data, but relatively few have measured loyalty attitudes over time.

The dynamic nature of the business environment has been duly noted with several authors outlining its impact on firms. For example, Kotler (2011) and Day (2011) suggested that market velocity, the rate of change in markets, and market complexity have increased dramatically in recent years. As such, marketers must now deal with rapidly changing environmental factors such as; globalization, cultural differences, evolving internet capabilities, social media, brand proliferation, micro-segmentation, retail concentration, and economic recessions. Such changes in the business environment can be viewed as "trigger events" that cause firms to alter their strategies (e.g. downsizing), which can destabilize existing business relationships (Flint, Woodruff, and Gardial 1997; Van Doorn and Verhoef 2008). It is contended that firms need to adapt quickly to these environmental changes, with strategies of adaptation and customization (Piercy 2009), to ensure that changing customer needs and expectations are constantly met. We also expected that such environmental dynamism would impact on customer attitudes over time, justifying the longitudinal approach in this study.

In our study, we investigated attitudes of service customers of a large B2B industrial services firm. The firm provided facilities management service solutions (heating, ventilation, air conditioning, security systems) to other businesses. The services include: hardware, software, training, and on-going maintenance (technical support) contracts for mainly large industrial, commercial, and government facilities. The B2B service relationship was specified through an annual service contract, with approximately 25,000 service contracts in place at the time of the study. Each service contract was similar in terms of structure and content with small variations in terms of size, and hence price, of the facility being serviced. Average contract size was around $18,000.00 per annum.

Consistent with the firm in our study, many B2B services have both a product and service component sometimes called "hybrid services" (Tuli, Kohli, and Bharadwaj 2007; Ulaga and Reinartz 2011). Most suppliers in this market provide hybrid services by customizing a highly capital-intensive building services installation, with a solution comprised of both products and services to fit each customer. Ulaga and Eggert (2006) noted that service support, personal interactions, supplier's knowledge, and time to market were core differentiators in B2B key supplier relationships. Product quality, acquisition costs, and operational costs however were relatively minor differentiators.

In this industrial B2B market, despite many of the macro-environmental changes noted earlier, we expected customer attitudes to be relatively stable. The capital-intensive and industrialized nature of the building management systems meant that it was often difficult to change quickly or willingly. The large-scale nature of the systems creates natural switching barriers, and a reluctance to change, which encourages longer-term buyer-seller relationships (Cooil et al. 2007; Kalwani and Narayandas, 1995). Suppliers thus tend to focus on relationship management rather than product technology to differentiate themselves (Narayandas and Rangan 2004). Customers also use the products and services repetitively in production and maintenance processes, which prompts continuous rather than limited and infrequent interaction (Narayandas and Ranagan 2004).

In addition, relationships between the facilities managers and the supplier's service personnel have evolved over many years, so that there is detailed knowledge of each other's operating practices, business capabilities and inter-personal characteristics. This social capital between buyer and seller is an additional switching cost, which means that there are often longer-term stable relationships in an industrial B2B markets (Palmatier 2008; Tuli, Kohli, and

Bharadwaj 2007; Ulaga and Reinartz 2011). There may also be an inertia effect from the long-term stability in industrial B2B relationships (Eggert and Ulaga 2005). In our study, of roughly 25,000 contracts, over 65% had been in existence for over five years, with around 30% over 15 years, reinforcing the longevity of the relationships.

It would appear therefore that there are two contrasting perspectives impacting on B2B attitudes. Firstly, there is the potential impact of a rapidly changing business environment, and its inherent impact on firms needing to respond adaptively to such changing customer needs and attitudes. In contrast, the relative stability and inertia of buyer-seller relationships in industrial B2B markets, suggest that customer attitudes do not change significantly over time. This paradoxical situation reconfirms the need for our longitudinal research design While there are few people who would argue that relationships change over time (Jap and Ganesan 2000; Palmatier 2008), there is little research conducted on which relationship drivers change, how quickly they change, what drives them to change, and in which contexts they change. The objective of this study is thus to investigate empirically the nature of B2B customer attitudes (drivers) for a B2B industrial services provider, and measure their respective impact on loyalty. We then examine these drivers over four financial quarters of data from the same firm, to determine whether the attitudes and their relative inter-relationships are stable or not.

MODEL DEVELOPMENT AND RESEARCH HYPOTHESES

With the potential link between loyalty and profits, researchers have conducted a series of studies aiming to find the main antecedents and consequences of loyalty for firms (Chandon, Morwitz, and Reinartz 2005; Gupta and Zeithaml, 2006; Keiningham, Aksoy, Cooil, Peterson, and Vavra 2006; Reichheld 2003). Many of these studies have used cross-sectional research

designs as noted earlier. In recent years, however, other studies have also started to look at loyalty and other attitudes longitudinally, to address this apparent gap in the literature (Bolton and Drew 1991; Bernard, Donthu and Kennett 2000; Cooil, Keiningham, Aksoy, and Hsu 2007; Gruca and Rego 2005; Williams and Naumann, 2011).

The study discussed here examined the attitudinal drivers of loyalty longitudinally in a B2B context, including service performance (technicians, account reps, and call center), products, price, and their effect on the traditional outcome variables of customer satisfaction and loyalty intentions. While there are wide array different conceptualizations of these customer attitudes, we draw on the studies where there is general consensus, for the purpose of framing the hypotheses.

Service Performance

Service quality research has taken a dominant role in the marketing literature for many years. Various authors have empirically tested service quality and consistently found it has a direct and positive impact on outcomes such as customer satisfaction, retention, behavioral loyalty and positive word-of-mouth recommendations (Cronin and Taylor 1992; Brady and Robertson 2001; Zeithaml et al. 1996;). Most of this research has been conducted in B2C markets (Boulding et al. 1993; Rauyren and Millar 2007), although a number of studies in recent years have looked at B2B markets (Palmatier, Dant, and Grewal 2007; Zolkiewski, Lewis, and Yuan 2007). In the B2B context of this study, we expected that the quality of a customer's service experiences over the term of an annual service contract would be an influential customer metric, particularly for contract renewal and contract upgrade decisions (Bolton, Lemon, and Verhoef 2008).

The main premise of our hypotheses is that poor service performance leads to less likelihood of contract renewal, and vice versa (Bolton, Lemon, and Verhoef 2008). It is through personal interactions via the customer contact points, that outcomes are achieved through maintaining ongoing relationships. Service performance and the inter-personal interactions between the service personnel and the sales-person are often the key drivers of relationships and loyalty (Jap and Ganesan 2000; Palmatier 2008). There are a variety of possible touch points of personal interaction in B2B service performance including account representatives, technical support personnel, and call center personnel. These touch points of personal interaction with customers can all potentially influence the customer's satisfaction with service delivery (Homburg and Rudolph 2001; Jackson and Cooper 1988; Patterson and Spreng 1997; Schellhase, Hardock, and Ohlwein 2000; Whiting and Donthu 2009).

In order to create a customized service solution, there must be an increased understanding of the customer's needs through relational exchange (Palmatier, Dant, and Grewal 2007; Rajamma, Zolfagharian, and Pelton 2011). Collectively, these dyadic supplier-customer interactions shape the customer's attitude towards service performance, and, therefore the nature of their relationship with the supplier. The multiple points of personal contact imply that the 'service provider-customer' relationship is a network with numerous participants (Palmatier 2008). In our study, we differentiate between the account reps, technicians, and call center personnel, as they were the key players in the service delivery process in this industrial context. These service delivery contact points usually interacted with the facilities manager from the customer organization.

Customer Satisfaction

Customer satisfaction might be the most frequently investigated concept in business and academic research. This is largely because it is generic and can be universally gauged for all products and services (Zeithaml, Bolton, Deighton, and Keiningham 2006). For many businesses, overall satisfaction is one of the most visible customer metrics. In the academic literature, customer satisfaction is often viewed as an antecedent of repurchase intentions and customer loyalty behaviors (Anderson and Sullivan 1993; Bolton 1998; Oliver 1999; Rust, Zeithaml, and Lemon 2000; Sirdeshmukh, Singh, and Sabol 2002). In B2B markets, satisfaction has also been shown to impact directly on loyalty (Geyskens and Steenkamp 2000; Lam et al. 2004). It appears that customer satisfaction; in conjunction with other drivers, has a direct positive influence on loyalty intentions (Martin-Consuegra, Molina, and Esteban 2007).

A good deal of academic research has found that loyalty intentions (repurchase intentions and positive word of mouth) are a consequence of satisfaction levels (Anderson and Sullivan 1993; Chandon, Morwitz, and Reinartz 2005; Fornell et al. 1996; Zeithaml, Berry, and Parasuraman, 1996). These studies have typically used customer satisfaction as an independent variable and behavioral intentions as a dependent variable. Some studies have found that satisfaction and intentions are strongly related to one another, particularly when both are measured on the same cross sectional survey (Mittal, Kumar, and Tsiros 1999). However, we model satisfaction as an antecedent of loyalty, and also as one which mediates the relationship between service performance and loyalty. Other studies have found the satisfaction is a consistent mediator between service quality and loyalty (Zeithaml, Berry, and Parasuraman 1996). In line with this research, we propose several hypotheses:

> *H1: There will be direct positive relationship between account rep service performance and customer satisfaction in all four quarters.*

H2: There will be direct positive relationship between technician service performance and customer satisfaction in all four quarters.

H3: There will be direct positive relationship between call center service performance and customer satisfaction in all four quarters.

H4: There will be direct positive relationship between customer satisfaction and loyalty intentions in all four quarters.

Product Quality

The literature reveals product quality perceptions are a driver of satisfaction in general, but with even more importance when product quality is viewed in a services context (Parasuraman, Zeithaml, and Berry 1988). For instance, in marketing and economics, quality has generally been considered in terms of product attributes (e.g., performance, reliability, customer-perceived quality, serviceability, aesthetics, and conformance) (Chase and Gravin 1989). In services literature, quality has been considered in terms of an overall assessment that integrates both product and service dimensions. In a dynamic marketing environment, it is important to redefine the notion of product quality in a services context both in terms of what is measured, and how it is measured. According to Vendermerwe (1994), understanding customers is important because it helps to capture value which in turn affects customer's overall experience over time. In this study we consider product quality (e.g. an installed system) as broadly independent of service perceptions, and is seen as the value deriving from a physical product (e.g., the system installed will perform as promised) (Dwyer and Tanner 1999; Eggert and Ulaga 2005).

It is well documented that many B2B services, particularly maintenance and support services, have a tangible product component (Tuli et al. 2007; Ulaga and Eggert 2006; Vargo and Lusch 2011). Recently, Ulaga and Reinartz (2011) coined the term "hybrid services" to describe

the integrated product and service offering in a B2B context. Therefore, the quality of the tangible product or system could have a direct effect on customer satisfaction and loyalty. There is some limited amount of research that shows the direct or indirect effects of product quality on customer satisfaction (Homburg and Garbe 1999; Homburg and Rudolph 2001) but we use this to frame our next hypotheses:

> *H5: There will be direct positive relationship between product quality and customer satisfaction in all four quarters time.*

Price

B2B customers are thought to be largely rational decision makers when evaluating value propositions, in balancing price against expected benefits (Gale 1994; Reichheld 1996). Cronin, Brady, and Hult (2000) considered price as an important influence on customer satisfaction, because of the necessary presence of a 'value' ingredient during customer's evaluation of the purchase situation. In a highly dynamic environment, B2B customers may re-evaluate the expected product and service benefits against proposed prices, when assessing contract renewal and the expected value received (Gale 1994; Zeithaml et al. 1988). This would seem to suggest that price perceptions relative to competitors in the industry directly influences loyalty intentions.

In agreement, Bolton and Lemon (1999) and Mattila and O'Neil (2003) found that price had a significant impact on overall customer satisfaction in their studies. Price perceptions are an important issue in vendor selection and contract renewal decisions, but may become less important as the relationship between the supplier and customer lengthens (Johnson, Hermann, and Huber 2006). There is very little research, however, that has empirically investigated the

nature of price and its impact on loyalty relationships over time (Bijmolt, Van Heerde, and Pieters 2005; Dawes 2009).

Others have found that price perceptions to be negatively related to both customer satisfaction and behavioral intentions (Gill and Ramaseshan 2007; Katsikeas and Leonidas 1996; Lye and Hamilton 2000; Noone and Mount 2007). A lower perception of price levels would indicate more favorable attitudes toward price, while a higher perception of price would indicate less favorable attitudes. We thus expected a negative relationship between price and loyalty intentions but not mediated through satisfaction. We thus propose the following hypothesis:

> *H6: There will be direct negative relationship between price and loyalty intentions in all four quarters.*

Relative Effects of the Attitudes in Predicting Loyalty Intentions

If we combine the issues and theory discussed to this point, we propose a conceptual model depicting the expected relationships among the variables (Figure 1). Based on existing theory, we expected the service performance dimensions (account reps, technicians, and call center) to be positively related to customer satisfaction. In turn, we expected satisfaction to be positively related to loyalty intentions. We also expected customer perceptions of products to be positively related to satisfaction, but price perceptions to be negatively related to loyalty intentions.

Insert Figure 1 about here

If we now go back to our earlier discussion on the relative stability of attitudes in mature B2B industrial markets, despite the rapidly changing business environment, we propose a further set of hypotheses, which assess the respective impact of each attitude in predicting loyalty over

time. Using structural equation modeling we were able to measure the customer attitudes and their respective interactions, using a simultaneous model. Assuming our samples were comparable, and that we found measurement model stability from our metric invariance tests across the four time periods, we would be able to assess the relative stability of the path coefficients. To support our hypothesis, we would expect similar path coefficients between each of the attitudes. In essence, we expected the magnitude of the path coefficients among the attitudes to be stable and consistent across the time periods.

> *H7:* *The magnitude of the path coefficient between account reps and customer satisfaction will be stable in all four quarters.*

> *H8:* *The magnitude of the path coefficient between technicians and customer satisfaction will be stable in all four quarters.*

> *H9:* *The magnitude of the path coefficient between the call center and customer satisfaction will be stable in all four quarters.*

> *H10: The magnitude of the path coefficient between product quality and customer satisfaction will be stable in all four quarters.*

> *H11: The magnitude of the path coefficient between customer satisfaction and loyalty intentions will be stable in all four quarters.*

> *H12: The magnitude of the path coefficient between price perceptions and loyalty intentions will be stable in all four quarters.*

RESEARCH METHODS

Research Design

The present study used a longitudinal research design to explore the relationships among various customer attitudes over time. It was hoped that the use of a longitudinal framework, over multiple time frames, would help us to gain insights beyond those that cross-sectional studies normally offer (Rust and Zahorik 1993; Zeithaml et al. 2006). Cross-sectional studies can often

mask the true relationship between the constructs in question as they do not factor in time-lags on the relationships between the main variables (Brown and Van der Weile 2002). Our goal was to examine the whether customer attitudes toward an industrial B2B services provider are stable in the current dynamic business environment.

Using a cross-sectional research design, Jap and Ganesan (2000) found that there was systematic variance in the interrelationships between several relationship drivers, depending on the phases in the relationship. They suggest more research attention is focused on field-based longitudinal case studies. Such studies would enable a deeper understanding of customer relationships by examining customer attitudes over time. We respond to this suggestion in our study by gathering data from one firm, over several time periods. To our knowledge, there are few B2B empirical studies that have measured customer attitudes from the same firm, over four time periods or longer. We were fortunate to collect four very large samples of customer attitude data from the same strategic business unit of a Fortune 100 firm to enable these comparisons.

There are several types of longitudinal studies (Bergh and Holbein 1997; Miller and Friesen 1982). One type of study is a controlled field experiment where "identical", or nearly identical, respondents are sampled at multiple points in time. In marketing, this is commonly done through the use of consumer panels. Cooil, Keiningham, Aksoy, and Hsu (2007) used this approach by studying a Canadian panel study of 10,000 customers over five years to examine customer attitudes and share of wallet. Although the same sample frame was used each year, not all respondents participated in all five years, so the samples were not "identical" in a true sense.

The other type of longitudinal research uses "comparable" samples over time (Bergh and Holbein 1997). Since measuring identical samples over time is difficult and costly, most longitudinal studies in the management literature have examined comparable samples (Bergh and

Holbein 1997). Comparable samples have been used to study strategic fit (Barnett and Burgelman 1996; Zajac, Kraatz, and Bresser 2000), planning and financial performance (Gibson and Cassar 2005), changes in information systems (Li, McLeod, and Rogers 2001), ISO certification and financial performance (Heras, Dick, and Casadesus 2002), ethical attitudes of managers (Gifford and Norris 1987), and quality management practices (Terziovski, Sohal, and Moss 1999). However, in marketing, relatively few studies have used comparable samples (Bernhardt, Donthu, and Kennet 2000). The use of comparable samples does require that sampling error is minimized and that specific assumptions about error terms be met. One of the ways to minimize sampling error is to draw large, random samples from the same sample frame (Rindfleisch et al. 2008).

Questionnaire development

The questionnaire was originally developed from recent service quality/customer satisfaction research studies and then adapted to the context of this study. The measures used in the study were also derived from previous B2B academic research (Barry, Dion, and Johnson 2008; Tokman, Davis, and Lemon 2007; Zolkiewski, et al. 2007). The questionnaire items were subsequently refined for the specific context of the study by conducting depth interviews with customers about their key drivers of service performance and satisfaction in the B2B facilities management services context. This qualitative data was contrasted with the extant literature to produce a questionnaire, which was then circulated to an executive steering committee from the firm for their feedback and approval. After several iterations, the questionnaire was finalized and included attitudinal measures about technicians, account reps, call center, products, price, satisfaction, and loyalty intentions. The items, constructs, and response scales are presented in Appendix A.

For the independent variables, account reps, technicians, call center, products, and price were measured with three items each. For dependent variables, we measured customer satisfaction as a linear composite of two items, "overall satisfaction" and "met expectations". The loyalty intentions construct also consisted of a composite of two items: "likelihood to renew" and "willingness to recommend". Much research has combined likelihood to repurchase, a behavioral indicator, with willingness to recommend, an affective indicator, to form a composite measure of loyalty intentions (Dwyer, Shurr, and Oh 1987; Johnson, Hermann, and Huber 2006; Sirdeshmukh, Singh, and Sabol 2002; Zeithaml, Berry, and Parasuraman 1996). This is consistent with most previous research on these subjects, which has used a similar approach (Oliver 1999; Zeithaml, Berry, and Parasuraman 1996) and was considered to be a more robust technique than using single-item measures. This operationalization of the two dependent variables of customer satisfaction and behavioral intentions, as a linear combination of two items, enabled multivariate analysis of the interval scaled dependent variables.

Sample

There were four consecutive quarters of data collected (n=708; n=949; n=850; n=772). These large samples had a precision level of plus or minus 3-4 percentage points, suggesting a small sampling error. There was no overlap of customers between consecutive samples, and for statistical purposes, the samples were considered comparable, but independent. After further discussions with the executives of the firm, the respondents from each quarter were considered representative of the whole customer base in terms of average contract size, average length of contract, and general demographic profile. The profile of firms participating in the surveys were similar across this strategic business unit and considered to be broadly representative of the whole customer-base of large facility management services customers.

Data was collected during each quarter utilizing telephone interviews of around 10 minutes each, with a random sample of customers who held an annual service contract with the firm. The target respondent was a key decision maker or a person with major influence in vendor selection decisions, and was identified at the initiation of the contract. The respondents were typically the main point of contact between the customer organization and the service provider. These people were considered well qualified to comment on the satisfaction levels and the service provider's performance. The cooperation rates (people contacted to completed surveys) typically ran in the 60-65% range. This high cooperation rate was due to the potential respondents agreeing to participate in a customer satisfaction survey when the contract was initiated. We acknowledge that we did not track non-respondents, so were unable to ascertain any potential non-response bias. However, with the high response rate, non-response bias was considered unlikely.

Analytical Techniques

Initial data quality tests were conducted to assess for non-normality, common error terms, outliers, and then we assessed for any measurement invariance across the models representing the four quarters of data. The most commonly used technique to test for equivalence, or invariance, is multi-group confirmatory factor analysis (Kumar et al. 1995; Steenkamp and Baumgartner 1998). In addition, the models were examined for construct validity and discriminant validity to determine the consistency in the conceptualization of the expected relationships in Figure 1 over the four time periods.

To examine the relationships among the variables, we used confirmatory factor analysis (CFA) and structural equation modeling (SEM) using a maximum likelihood estimation, to examine the relationships among the variables. SEM was used here to simultaneously develop,

compare, and contrast the models for the four quarters. The use of SEM technique indicates the ability of the independent variables to predict variation in the dependent variable (Anderson and Gerbing 1988). SEM is particularly appropriate since it is robust for small variances in error terms often found in longitudinal data (Byrne 2001; Ecob 1987).

DATA ANALYSIS

Preliminary Analysis and Model Validation

We used CFA to determine the construct validity of the main variables and the longitudinal stability of the conceptual measurement model. The stability of the model would help determine if customers conceptualize the main constructs similarly across multiple time periods in this B2B services context. A stable measurement model and metric invariance was necessary to enable comparison of the direct and indirect relationships in the structural model analysis. In essence, CFA was used to determine if the model, constructs, and items were consistent across all the four sets of quarterly data.

When performing the CFA, we restricted each item's loading to its a priori factor structure and allowed each factor to correlate with all other factors. This analysis was conducted using AMOS version 19. The CFA results indicated that the a priori model fit the four quarters of data very well, with all goodness-of-fit indices, for all four quarterly measurement models, above the recommended levels for CFA (Byrne 2001).

Place Table 1 Here: Model Validation Results for Four Quarters

Further preliminary tests were conducted to assess construct reliability. Table 1 provides the factor loadings, average variance extracted, internal consistency, and t-values. All factor loadings across the four measurement models were significant with t-values ranging between 2.15 to 26.70. The internal consistency for all factors, as recommended by Byrne (2001), was in the acceptable range from 0.76 to 0.92. All factors consisted of the same items in all four quarters of data suggesting that there was both construct equivalence (Van Herk, Poortinga, and Verhallen 2005) and measurement equivalence (Craig and Douglas 2001). Further by using multi-group confirmatory factor analysis, we determined that there was configural and metric invariance (Kumar et al. 1995; Steenkamp and Baumgartner 1998) allowing comparisons across the four datasets.

We estimated the discriminant validity of the constructs and the average variance extracted (AVE) for all four quarters using the method described by Fornell and Larcker (1981). In each case, the variance established by the construct was greater than its shared variance with other constructs. The AVE indices all exceeded the suggested minimum standards of 0.50 (Hair, Anderson, Tatham, and Black 1994) and were considered acceptable for further structural analysis to be undertaken. We concluded that was not any evidence of multi-collinearity in all four quarters of data.

Analysis of the Structural Models

Structural equation modeling was used to simultaneously compare, and contrast the models for the four quarters. One of the objectives of this study was to examine relative stability of the customer attitudes among variables across time periods. As the measurement models were acceptable, we ran the SEM analysis using the same independent constructs and items and loaded them onto the same dependent variables. The better the predictive power of an

independent variable, the more important it is in shaping overall attitudes toward customer satisfaction and loyalty intentions. Our structural model included all items that were used in the CFA measurement model for the four quarters (Q1 = 708; Q2 = 949; Q3 = 850; Q4 = 772). A summary of the fit indices of the structural models is shown in Table 2. As with the CFA, the fit indices for the SEM were quite consistent from quarter to quarter and within the recommended ranges (Byrne 2001).

Place Table 2 Here: Structural Models and Fit Indices

Although fit indices for all individual structural models were good, some small refinements were made. Specific results indicated that standardized residual co-variances for the "call center service" relationship with "product quality", was higher than the recommended value of 2.0 (Byrne 2001), but only in the fourth quarter. Following the suggestions of Byrne (2001) we deleted an item to further improve the model fit. The model was run again with the results suggesting that the hypothesized model now fitted the four quarters of data well. Table 3 shows the results of the structural analysis.

Place Table 3 Here: Results of Structural Model Analysis

To test our hypotheses we assessed the respective paths between the independent variables on the dependent variables for each quarter. For account reps and product quality, we can see that there is a significant relationship with customer satisfaction in all four quarters. H1 and H5 are therefore accepted. Similarly, there is a direct positive relationship between satisfaction and loyalty intentions in all four quarters, therefore H4 is accepted. However, there is variation in the other independent variables when loading on the respective dependent variables.

It can be seen that Technicians is significant in Q1, Q3, and Q4, but not in Q2, so H2 is rejected. Call center is significant in Q2 and Q3, but not in Q1 and Q4, so H3 is rejected. Price loads negatively on loyalty intentions in Q1, Q2, and Q3 but not in Q4, so H6 is rejected.

To test our final set of hypotheses (H7-12) further analysis was conducted into the variation in the magnitude of the path coefficients for each significant path across the four structural models. This comparison was made using a parametric procedure from Chin (2009), as originally described by Keil, Tan, Wei, Saarinen, Tuunainen, and Wassenaar (2000). The Chin t-test revealed that the magnitude of path coefficients was significantly different between several of the time periods. We expected there to be relative stability here in this context. For example, we thought that if the account rep service had relatively the strongest beta in predicting satisfaction in Q1, it would consistently be the strongest beta in the other quarters. We expected any variation across quarters to be not significant. The Chin test results revealed significant differences in many of the relationships between the independent variables and satisfaction and loyalty intentions.

Account reps had the largest path coeffient on satisfaction in Q1 (0.40), but in Q2-4 the path coefficient was much lower (0.22 to 0.25). While account reps were significantly related to customer satisfaction in all four quarters, the magnitude of the path coefficient varied. Hence, H7 was rejected. Technicians was significantly related to customer satisfaction in three quarters (Q1, Q3, and Q4). However, the path coefficient varied significantly across the four quarters (0.28, 0.12, 0.33, and 0.34). In Q3, technicians had the largest path coefficient of the independent variables. Hence, H8 was also rejected. Call center was significantly related to customer satisfaction in Q2 and Q3, but not in Q1 or Q4. The magnitude of the path coefficient varied significantly across the four quarters (0.12, 0.22, 0.14, and 0.04). Hence, H9 was also rejected.

Product perceptions were significantly related to customer satisfaction in all four quarters, having the largest path coefficient in Q2. But the magnitude of the path coefficient varied significantly (0.14, 0.33, 0.20, and 0.28). Hence H10 was rejected.

Customer satisfaction was consistently and significantly related to loyalty intentions in all four quarters. Additionally, the magnitude of the path coefficient was very stable, in the range of 0.90 to 0.94. Therefore, H11 was accepted. Price perceptions were negatively and significantly related to loyalty intentions only in Q2 and Q3. Additionally, the path coefficient for the price to loyalty intentions was variable across quarters (-0.12, -0.13, -0.08, and 0.03). Therefore H12 is rejected.

Discussion and Implications

The main finding of this study is that customer attitudes are dynamic over time in this B2B context. We expected the long-term nature of the industrial B2B services would result in customer attitudes being stable over time. We accepted four hypotheses (H1, H4, H5, and H11), but rejected eight hypotheses (H2, H3, H6, H7, H8, H9, H10, and H12) suggesting that the attitudes and their respective inter-relationships are unstable over time. The two main dependent variables in our study, customer satisfaction and loyalty intentions, appear to be more stable over time. The path coefficient was significant, large, and stable in all four quarters. It may be that the attitudes of satisfaction and loyalty intentions are developed over longer periods of time, and customers consider this long-term experience when expressing their attitudes. In other words, these more enduring attitudes are less subject to contextual variation in the dynamic business environment. This cannot be said for the more specific service performance dimensions, however, as the detailed independent variables are perhaps more immediate and top of mind.

All of the key drivers of satisfaction demonstrated longitudinal instability. This instability appeared in the structural models, and/or in the magnitude of the path coefficients for the five independent constructs. The obvious question is why did this occur? It is likely that this instability was a result of the dynamic external environment. One obvious candidate is the effects of the recession and the organizational changes made within the firm to respond to the economic pressures. Such changes are likely to affect the customer attitudes significantly. A recession causes firms to alter their strategies, business relationships, and expenditure patterns (Van Doorn and Verhoef 2008). In this recession, during the course of our study, our firm was looking for ways to reduce expenditures as revenues were constrained. Between Q1 and Q2 the firm downsized its service technicians by around 15%. While the impact of downsizing on customer attitudes has been well documented (Lewin 2009), its impact was not controlled for during our study. However, due to the close relationships between service technicians and customers, it was likely to have had an impact on the attitudes and their predictive ability on satisfaction and loyalty.

If experts such as Day (2011), and Kotler (2011) are correct, the highly dynamic business environment may now just be the norm. This has implications for both academics and managers. If B2B customer-supplier relationships are moving toward relational exchange that stresses supplier agility and innovation (Noordhoff et al. 2011), there must be a continuous feedback system that replaces periodic surveys. It is recognized that the dynamics of inter-firm relationships change over time (Jap and Ganesan 2000; Narayandas and Rangan 2004). They contend that deeper insights will only emerge through the use of longitudinal, field research that sheds light on how relationships evolve and adapt.

From a theoretical, standpoint, no two two quarters were identical, based on the significance levels of the the path coefficients. For example, if we compare the reults for Q1 and Q3, we see dramatically different results. In Q1, account reps were strongly related to satisfaction, while technicians and product quality were weakly related to satisfaction. Call center was not related to satisfaction, nor was price related to loyalty intentions. Converesely, in Q3 all independent variables were related to the dependent variables. The structural models for these two quarters have major differences, which would lead to different theoretical conclusions, despite using large samples drawn from the same population. The implication is that cross-sectional research studies are good at providing a snapshot view of what is happening at a point in time, but do not capture the longitudinal dynamism that apparently exists in business to business relationships (Ulaga and Eggert 2005).

As noted by Jaworski (2011) and Lilien (2011) good academic work should have managerial relevance. Based on our results, managers, in B2B industrial markets, must consider the use of longitudinal research design as it helps to recognize and respond to changes in customer attitudes over time. Managers would then consistently able to develop their marketing strategies that would help their businesses to maintain successful partnerships with their customers. For example, in our study, account rep performance was most strongly related to customer satisfaction in Q1 (based on the magnitude of the path coefficient), but product quality, technicians, and call center were each most strongly related to satisfaction in other quarters. Relying only on account reps for relationship maintenance would clearly be inappropriate. This implies that managers should use a team based approach to capturing changing customer needs and developing customized solutions (Rajamma, Zolffagharian, and Pelton 2011).

CONCLUSION

We conclude that customer attitudes, even in large B2B industrial markets, are dynamic over relatively short periods of time. Over the course of one year in our study firm, the influence of the respective customer attitudes was different in each of the four quarters. While we statistically tested for metric invariance and sample comparability, and used large samples of data to minimize sampling error, we accept that such variation in attitudes could be due to our random selection of customers who had different attitudes with their supplier. This is unlikely due to the large samples, but possible. We would recommend future researchers track 'identical' samples of customers and comparable samples, to assess for the differences between the two approaches..

Similarly, our research design did not enable control over all possible influences on customer attitudes. We, therefore, cannot suggest the causal impact of specific dimensions of the business environment on any subsequent changes in attitudes. It would be fruitful to examine exactly how certain environmental changes, such as a recession or the downsizing event on the firm, directly influence customer attitudes, and desired value propositions over time. These events certainly affect customer attitudes. But there is also little research suggesting how soon the impacts of extraneous trigger events will cause changes, if any, in customer attitudes. Nor is there any research that suggests how enduring changes in customer attitudes might be.

These shortcomings are due to the cross-sectional nature of most research, a single study at a point in time. From an academic perspective, researchers need to move away from the commonly used cross-sectional surveys (Bolton, Lemon, and Verhoef 2008) and toward more longitudinal studies that depict current reality (Flint et al. 1997; Sheth and Parvatiyar 2002). While longitudinal studies constitute only a small portion of publications in academic marketing

journals (Rindfleisch et al. 2008), longitudinal studies are quite common in other business disciplines (Bergh and Holbein 1997).

A final interesting observation of this study is the relative consistency of the measurement and structural models. Statistically speaking, our models held up to many of the rigorous tests of validity, metric-equivalence, and goodness-of-fit. While the customer attitudes may have changed, the CFA and the structural models were statistically stable, for all four quarters. This perhaps indicates that future researchers may be able to replicate our findings in other contexts, but using similar instruments and modeling techniques used in this study. It would be interesting to see if other customer related CFA models also tend to be stable longitudinally. While collecting longitudinal data is often difficult due to the dynamic nature of business and the limited time available to researchers, firms should still endeavor to measure these attitudes over different time periods to help manage long-term buyer-seller relationships (Eggert and Ulaga, 2005).

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Appendix A: Constructs And Measurement Items

Construct	Measurement Items
Technician Service 5 point scale (Excellent to Poor)	• courteous and friendly • technical competence • communicating effectively
Account Reps Service 5 point scale (Excellent to Poor)	• keeping in touch • timeliness of quotes • listening and clear proposals
Call Center Service 5 point scale (Excellent to Poor)	• Call handling promptness • Handling service need • Scheduling service
Price Perceptions 5 point scale (Sig above to Sig below industry average)	• new system prices • replacement parts prices • system maintenance prices
Product Quality 5 point scale (Excellent to Poor)	• Overall product quality • Dependable products • Product innovativeness
Customer Satisfaction 5 point scale (Very satisfied to Very dissatisfied)	• met expectations • customer satisfaction
Loyalty Intentions 5 point scale (Definitely to Definitely-Not recommend/renew)	• willingness to recommend • likelihood to renew

Figure 1
A Priori Model of Expected Relationships
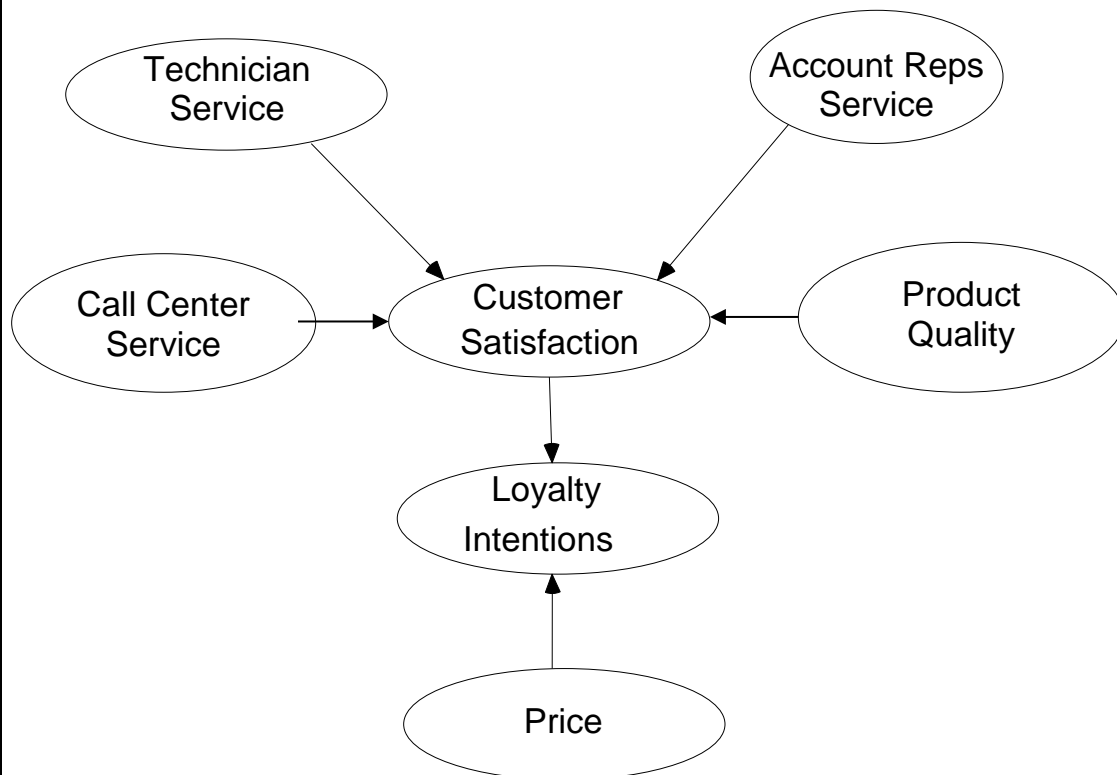
Table 1

Model Validation Results for Four Quarters

CONSTRUCT NAME AND ITEMS	(n=708)			(n=949)			(n=850)			(n=772)		
	Loading	AVE	IC	Loading	AVE	IC	Loading	AVE	IC	Loading	AVE	IC
Account Reps Service		0.72	0.88		0.70	0.88		0.77	0.91		0.77	0.91
Keeping in touch	0.84			0.82			0.89			0.88		
Timeliness of quotes	0.83			0.80			0.83			0.83		
Listening and clear proposals	0.86			0.89			0.91			0.92		
	t-value = 17.52			t-value =18.88			t-value =21.19			t-value =20.27		
Technician Service		0.70	0.83		0.70	0.88		0.69	0.87		0.72	0.89
Courteous and Friendly	0.76			0.76			0.73			0.77		
Competence	0.84			0.85			0.87			0.86		
Communication effectively	0.90			0.90			0.89			0.91		
	t-value = 16.91			t-value =20.45			t-value =19.28			t-value =18.71		
Price Perceptions		0.64	0.78		0.62	0.76		0.67	0.80		0.71	0.83
New installations	0.85			0.79			0.80			0.95		
Replacement parts	0.75			0.78			0.83			072		
	t-value = 2.15			t-value =2.26			t-value =15.27			t-value =2.17		
Call Center Service		0.74	0.90		0.75	0.90		0.82	0.93		0.82	0.93
Call handling promptness	0.84			0.86			0.89			0.88		
Handling service need	0.90			0.89			0.93			0.96		
Scheduling service	0.84			0.85			0.89			0.87		
	t-value = 19.20			t-value =23.15			t-value =26.70			t-value =24.69		
Product Quality		0.74	0.90		0.72	0.89		0.79	0.92		0.76	0.90
Overall product quality	0.78			0.76			0.81			0.78		
Dependable products	0.89			0.89			0.92			0.91		
Product innovativeness	0.91			0.89			0.93			0.91		
	t-value = 17.51			t-value =19.02			t-value = 21.63			t-value =18.57		

Notes*: AVE: average variance extracted; IC: internal consistency*

Table 2

Structural Models and Fit Indices

	(n=708)	*(n= 949)*	*(n= 850)*	*(n= 772)*
Chi square	174.860*	181.669*	190.746*	217.194*
CFI	.991	.993	.991	.987
GFI	.972	.978	.975	.968
AGFI	.958	.968	.963	.953
RMSEA	.031	.028	.032	.038

* $p < 0.001$; df = 103

Table 3
Results of Structural Model Analysis

	Q1 n=708		Q2 n=949		Q3 n=850		Q4 n=772	
	β	*t*-value	β	*t*-value	β	*t*-value	β	*t*-value
Effects on Customer Satisfaction								
Accounts Reps	.40	7.32**	.22	4.86*	.25	5.70**	.25	5.84**
Technicians	.28	3.93*	.12	1.94 n.s.	.33	5.65**	.34	7.21**
Product Quality	.14	3.10*	.33	7.84**	.20	5.05**	.28	6.59**
Call Centers	.12	1.70 n.s.	.22	3.55*	.14	2.63*	.04	0.93 n.s.
Effects on Loyalty Intentions								
Price	-.12	3.62*	-.13	3.58*	-.08	2.49*	.03	0.99 n.s.
Customer Satisfaction	.90	23.54**	.94	27.32**	.91	23.92**	.93	22.00**

Note: *$p < .050$; **$p < .001$; n.s. = not significant