

Institut für Marktorientierte Unternehmensführung  
Universität Mannheim  
Postfach 10 34 62  
  
68131 Mannheim

Reihe:  
Wissenschaftliche Arbeitspapiere  
Nr.: W 009

## **Institut für Marktorientierte Unternehmensführung**

*Homburg, Ch./Rudolph, B.*  
**Customer Satisfaction in Industrial  
Markets.**  
**Dimensional and Multiple Role Issues**

Koblenz 1997  
ISBN3-89333-169-7

*Professor Dr. Christian Homburg*

ist Inhaber des Lehrstuhls für Allgemeine Betriebswirtschaftslehre und Marketing I, Universität Mannheim, L 5, 1, 68131 Mannheim. Außerdem ist er Wissenschaftlicher Direktor des Instituts für Marktorientierte Unternehmensführung (IMU) an der Universität Mannheim und Vorsitzender des Wissenschaftlichen Beirates der Prof. Homburg & Partner GmbH.

*Dr. Bettina Rudolph*

ist frühere Wissenschaftliche Mitarbeiterin am Lehrstuhl von Prof. Homburg. Inzwischen ist sie im Bereich Kundenbindungsmanagement der DeTeMobil GmbH tätig.

Der Titel wurde anlässlich der Gründung des IMU aus einer Schriftenreihe des ZMU (Zentrum für Marktorientierte Unternehmensführung) an der WHU Koblenz übernommen.

The authors thank Hans Baumgartner, Joseph P. Cannon, Ajay Menon, and John P. Workman, Jr. for their helpful comments on a previous draft of this article. We also acknowledge the computational assistance by Harley Krohmer.

## **Das Institut für Marktorientierte Unternehmensführung**

Das **Institut für Marktorientierte Unternehmensführung** an der Universität Mannheim versteht sich als Forum des Dialogs zwischen Wissenschaft und Praxis. Der wissenschaftlich hohe Standard wird gewährleistet durch die enge Anbindung des IMU an die beiden Lehrstühle für Marketing an der Universität Mannheim, die national wie auch international hohes Ansehen genießen. Die wissenschaftlichen Direktoren des IMU sind

**Prof. Dr. Hans H. Bauer und Prof. Dr. Christian Homburg.**

Das Angebot des IMU umfasst folgende Leistungen:

◆ **Management Know-How**

Das IMU bietet Ihnen Veröffentlichungen, die sich an Manager in Unternehmen richten. Hier werden Themen von hoher Praxisrelevanz kompakt und klar dargestellt sowie Resultate aus der Wissenschaft effizient vermittelt. Diese Veröffentlichungen sind häufig das Resultat anwendungsorientierter Forschungs- und Kooperationsprojekte mit einer Vielzahl von international tätigen Unternehmen.

◆ **Wissenschaftliche Arbeitspapiere**

Die wissenschaftlichen Studien des IMU untersuchen neue Entwicklungen, die für die marktorientierte Unternehmensführung von Bedeutung sind. Hieraus werden praxisrelevante Erkenntnisse abgeleitet und in der Reihe der wissenschaftlichen Arbeitspapiere veröffentlicht. Viele dieser Veröffentlichungen sind inzwischen in renommierten Zeitschriften erschienen und auch auf internationalem Konferenzen (z.B. der American Marketing Association) ausgezeichnet worden.

◆ **Schriftenreihe**

Neben der Publikation wissenschaftlicher Arbeitspapiere gibt das IMU in Zusammenarbeit mit dem Gabler Verlag eine Schriftenreihe heraus, die herausragende wissenschaftliche Erkenntnisse auf dem Gebiet der marktorientierten Unternehmensführung behandelt.

◆ **Anwendungsorientierte Forschung**

Ziel der Forschung des IMU ist es, wissenschaftliche Erkenntnisse zu generieren, die für die marktorientierte Unternehmensführung von Bedeutung sind. Deshalb bietet Ihnen das IMU die Möglichkeit, konkrete Fragestellungen aus Ihrer Unternehmenspraxis heranzutragen, die dann wissenschaftlich fundiert untersucht werden.

Wenn Sie weitere Informationen benötigen oder Fragen haben, wenden Sie sich bitte an das **Institut für Marktorientierte Unternehmensführung, Universität Mannheim, L5, 1, 68131 Mannheim (Telefon: 0621 / 181-1755)** oder besuchen Sie unsere Internetseite: [www imu-mannheim.de](http://www imu-mannheim.de).

In seiner Arbeit wird das IMU durch einen **Partnerkreis** unterstützt. Diesem gehören renommierte Wissenschaftler und Manager in leitenden Positionen an:

**Dr. Arno Balzer,**  
Manager Magazin

**BASF AG,**  
Hans W. Reiners

**BSH GmbH,**  
Matthias Ginthum

**Carl Zeiss AG,**  
Dr. Michael Kaschke

**Cognis Deutschland GmbH & Co. KG,**  
Dr. Antonio Trius

**Continental AG,**  
Heinz-Jürgen Schmidt

**Deutsche Bank AG,**  
Rainer Neske

**Deutsche Messe AG,**  
Ernst Raue

**Deutsche Post AG,**  
Jürgen Gerdes

**Deutsche Telekom AG,**  
Achim Berg

**Dresdner Bank AG,**  
Dr. Stephan-Andreas Kaulvers

**Dürr AG,**  
Ralf W. Dieter

**E.On Energie AG,**  
Dr. Bernhard Reutersberg

**EvoBus GmbH,**  
Wolfgang Presinger

**Hans Fahr**

**Freudenberg & Co. KG,**  
Jörg Sost

**Fuchs Petrolub AG,**  
Dr. Manfred Fuchs

**Grohe Water Technology AG & Co. KG,**  
N.N.

**Stephan M. Heck**

**Heidelberg Druckmaschinen AG,**  
Dr. Jürgen Rautert

**HeidelbergCement AG,**  
Andreas Kern

**Hoffmann-La Roche AG,**  
Karl H. Schlingensief

**HUGO BOSS AG,**  
Dr. Bruno Sälzer

**IBM Deutschland GmbH,**  
Johann Weihen

**IWKA AG,**  
N.N.

**K + S AG,**  
Dr. Ralf Bethke

**KARSTADT Warenhaus AG,**  
Prof. Dr. Helmut Merkel

**Prof. Dr. Dr. h.c. Richard Köhler,**  
Universität zu Köln

**Körber PaperLink GmbH,**  
Martin Weickenmeier

**Monitor Company,**  
Dr. Thomas Herp

**Nestlé Deutschland AG,**  
Christophe Beck

**Pfizer Pharma GmbH,**  
Jürgen Braun

**Dr. Volker Pfahlert,**  
Roche Diagnostics GmbH

**Thomas Pflug**

**Dr. Ing. h.c. F. Porsche AG,**  
Hans Riedel

**Procter & Gamble GmbH,**  
Willi Schwerdtle

**Dr. h.c. Holger Reichardt**

**Robert Bosch GmbH,**  
Uwe Raschke

**Roche Diagnostics GmbH,**  
Dr. Manfred Baier

**Rudolf Wild GmbH & Co. KG,**  
Dr. Eugen Zeller

**RWE Energy AG,**  
Dr. Andreas Radmacher

**Thomas Sattelberger,**  
Continental AG

**SAP Deutschland AG & Co. KG**  
Joachim Müller

**St. Gobain Deutsche Glass GmbH**  
Udo H. Brandt

**Dr. Dieter Thomaschewski**

**TRUMPF GmbH & Co. KG,**  
Dr. Mathias Kammüller

**VDMA e.V.,**  
Dr. Hannes Hesse

**Voith AG,**  
Dr. Helmut Kormann

- W097 Bauer, H. H. / Mäder, R. / Wagner, S.-N.: Übereinstimmung von Marken- und Konsumentenpersönlichkeit als Determinante des Kaufverhaltens – Eine Metaanalyse der Selbstkongruenzforschung, 2005
- W095 Bauer, H. H. / Schüle, A. / Reichardt, T.: Location Based Services in Deutschland. Eine qualitative Marktanalyse auf Basis von Experteninterviews, 2005
- W094 Bauer, H. H. / Reichardt, T. / Schüle, A.: User Requirements for Location Based Services. An analysis on the basis of literature, 2005
- W093 Bauer, H. H. / Reichardt, T. / Exler, S. / Kiss, S.: Entstehung und Wirkung von Smart Shopper-Gefühlen. Eine empirische Untersuchung, 2005
- W092 Homburg, Ch. / Stock, R. / Kühlborn, S.: Die Vermarktung von Systemen im Industriegütermarketing, 2005
- W090 Bauer, H. H. / Falk, T. / Kunzmann, E.: Akzeptanz von Self-Service Technologien – Status Quo oder Innovation?, 2005
- W089 Bauer, H. H. / Neumann, M. M. / Huber F.: Präferenzschaffung durch preis-psychologische Maßnahmen. Eine experimentelle Untersuchung zur Wirkung von Preispräsentationsformen, 2005
- W088 Bauer, H. H. / Albrecht, C.-M. / Sauer, N. E.: Markenstress bei Jugendlichen. Entwicklung eines Messinstruments am Beispiel von Kleidung, 2005
- W087 Bauer, H. H. / Schüle, A. / Neumann, M. M.: Kundenvertrauen in Lebensmitteldiscounter. Eine experimentelle Untersuchung, 2005
- W086 Bauer, H. H. / Neumann, M. M. / Mäder, R.: Virtuelle Verkaufsberater in interaktiven Medien. Eine experimentelle Untersuchung zur Wirkung von Avataren in interaktiven Medien, 2005
- W085 Bauer, H. H. / Neumann, M. M. / Haber, T. E. / Olic, K.: Markendifferenzierung mittels irrelevanter Attribute. Eine experimentelle Studie, 2005
- W084 Homburg, Ch. / Kuester, S. / Beutin, N. / Menon, A.: Determinants of Customer Benefits in Business-to-Business Markets: A Cross-Cultural Comparison, 2005
- W083 Homburg, Ch. / Fürst, A.: How Organizational Complaint Handling Drives Customer Loyalty: An Analysis of the Mechanistic and the Organic Approach, 2005
- W082 Homburg, Ch. / Koschate, N.: Behavioral Pricing-Forschung im Überblick – Erkenntnisstand und zukünftige Forschungsrichtungen, 2005
- W081 Bauer, H. H. / Exler, S. / Sauer, N.: Der Beitrag des Markenimage zur Fanloyalität. Eine empirische Untersuchung am Beispiel der Klubmarken der Fußball-Bundesliga, 2004
- W080 Homburg, Ch. / Bucerius, M.: A Marketing Perspective on Mergers and Acquisitions: How Marketing Integration Affects Post-Merger Performance, 2004
- W079 Homburg, Ch. / Koschate, N. / Hoyer, W. D.: Do Satisfied Customers Really Pay More? A Study of the Relationship between Customer Satisfaction and Willingness to Pay, 2004
- W078 Bauer, H. H. / Hammerschmidt, M. / Garde, U.: Messung der Werbeeffizienz – Eine Untersuchung am Beispiel von Online-Werbung, 2004
- W077 Homburg, Ch. / Jensen, O.: Kundenbindung im Industriegütergeschäft, 2004
- W076 Bauer, H. H. / Reichardt, T. / Neumann, M. M.: Bestimmungsfaktoren der Konsumentenakzeptanz von Mobile Marketing in Deutschland. Eine empirische Untersuchung, 2004
- W075 Bauer, H. H. / Sauer, N. E. / Schmitt, P.: Die Erfolgsrelevanz der Markenstärke in der 1. Fußball-Bundesliga, 2004
- W074 Homburg, Ch. / Krohmer, H.: Die Fliegenpatsche als Instrument des wissenschaftlichen Dialogs. Replik zum Beitrag „Trotz eklatanter Erfolglosigkeit: Die Erfolgsfaktorenforschung weiter auf Erfolgskurs“ von Alexander Nicolai und Alfred Kieser, 2004
- W073 Bauer, H. H. / Neumann, M. M. / Lange, M. A.: Bestimmungsfaktoren und Wirkungen von Mitarbeiterzufriedenheit. Eine empirische Studie am Beispiel des Automobilhandels, 2004
- W072 Bauer, H. H. / Hammerschmidt, M. / Garde, U.: Marketingeffizienzanalyse mittels Efficient Frontier Benchmarking - Eine Anwendung der Data Envelopment Analysis, 2004
- W071 Bauer, H. H. / Neumann, M. M. / Hötzing, J. A.: Markenallianzen als Instrument des Imagetransfers im elektronischen Handel, 2004
- W070 Bauer, H. H. / Mäder, R. / Valtin, A.: Auswirkungen des Markennamenwechsels auf den Markenwert. Eine Analyse der Konsequenzen von Markenportfoliokonsolidierung, 2003
- W069 Bauer, H. H. / Neumann, M. M. / Hoffmann, Y.: Konsumententypologisierung im elektronischen Handel. Eine interkulturelle Untersuchung, 2003

- W068 Homburg, Ch. / Stock, R.: The Link between Salespeople's Job Satisfaction and Customer Satisfaction in a Business-to-Business Context. A dyadic Analysis, 2003
- W067 Homburg, Ch. / Koschate, N.: Kann Kundenzufriedenheit negative Reaktionen auf Preiserhöhungen abschwächen? Eine Untersuchung zur moderierenden Rolle von Kundenzufriedenheit bei Preisanstiegen, 2003
- W066 Bauer, H. H. / Neumann, M. M. / Hörling, J. A. / Huber, F.: Determinanten und Konsequenzen von Vertrauen im elektronischen Handel. Eine kausalanalytische Studie, 2003
- W065 Bauer, H. H. / Hammerschmidt, M. / Elmas, Ö.: Messung und Steuerung der Kundenbindung bei Internetportalen, 2003
- W064 Bauer, H. H. / Falk, T. / Hammerschmidt, M.: Servicequalität im Internet. Messung und Kundenbindungseffekte am Beispiel des Internet-Banking, 2003
- W063 Bauer, H. H. / Sauer, N. E. / Müller, V.: Nutzen und Probleme des Lifestyle-Konzepts für das Business-to-Consumer Marketing, 2003
- W062 Bauer, H. H. / Sauer, N. E. / Ebert, S.: Die Corporate Identity einer Universität als Mittel ihrer strategischen Positionierung. Erkenntnisse gewonnen aus einem deutsch-amerikanischen Vergleich, 2003
- W061 Homburg, Ch. / Sieben, F. / Stock, R.: Einflussgrößen des Kundenrückgewinnungserfolgs. Theoretische Betrachtung und empirische Befunde im Dienstleistungsbereich, 2003
- W060 Bauer, H. H. / Sauer, N. E. / Müller, A.: Frauen als Zielgruppe. Das Beispiel einer geschlechtsspezifischen Vermarktung von Bildungsangeboten, 2003
- W059 Bauer, H. H. / Keller, T. / Hahn, O.K.: Die Messung der Patientenzufriedenheit, 2003
- W058 Homburg, Ch. / Stock, R.: Führungsverhalten als Einflussgröße der Kundenorientierung von Mitarbeitern. Ein dreidimensionales Konzept, 2002
- W057 Bauer, H. H. / Hammerschmidt, M./Staat, M.: Analyzing Product Efficiency. A Customer-Oriented Approach, 2002
- W056 Bauer, H. H. / Grether, M.: Ein umfassender Kriterienkatalog zur Bewertung von Internet-Auftritten nach markenpolitischen Zielen, 2002
- W055 Homburg, Ch. / Faßnacht, M. / Schneider, J.: Opposites Attract, but Similarity Works. A Study of Interorganizational Similarity in Marketing Channels, 2002
- W054 Homburg, Ch. / Faßnacht, M. / Günther, Ch.: Erfolgreiche Umsetzung dienstleistungsorientierter Strategien von Industriegüterunternehmen, 2002
- W053 Homburg, Ch. / Workman, J.P. / Jensen, O.: A Configurational Perspective on Key Account Management, 2002
- W052 Bauer, H. H. / Grether, M. / Sattler, C.: Werbenutzen einer unterhaltenden Website. Eine Untersuchung am Beispiel der Moorhuhnjagd, 2001
- W051 Bauer, H. H. / Jensen, S.: Determinanten der Kundenbindung. Überlegungen zur Verallgemeinerung der Kundenbindungstheorie, 2001
- W050 Bauer, H. H. / Mäder, R. / Fischer, C.: Determinanten der Werbewirkung von Markenhomepages, 2001
- W049 Bauer, H. H. / Kieser, A. / Oechsler, W. A. / Sauer, N. E.: Die Akkreditierung. Eine Leistungsbeurteilung mit System?, 2001,
- W048 Bauer, H. H. / Ohlwein, M.: Zur Theorie des Kaufverhaltens bei Second-Hand-Gütern, 2001
- W047 Bauer, H. H. / Brünner, D. / Grether, M. / Leach, M.: Soziales Kapital als Determinante der Kundenbeziehung, 2001
- W046 Bauer, H. H. / Meeder, U. / Jordan, J.: Eine Konzeption des Werbecontrolling, 2000
- W045 Bauer, H. H. / Staat, M. / Hammerschmidt, M.: Produkt-Controlling. Eine Untersuchung mit Hilfe der Data Envelopment Analysis (DEA), 2000
- W044 Bauer, H. H. / Moch, D.: Werbung und ihre Wirkung auf die Tabaknachfrage. Eine Übersicht der theoretischen und empirischen Literatur, 2000
- W043 Homburg, Ch. / Kebbel, Ph.: Komplexität als Determinante der Qualitätswahrnehmung von Dienstleistungen, 2000
- W042 Homburg, Ch. / Kebbel, Ph.: Involvement als Determinante der Qualitätswahrnehmung von Dienstleistungen, 2000
- W041 Bauer, H. H. / Mäder, R. / Huber, F.: Markenpersönlichkeit als Grundlage von Markenloyalität. Eine kausalanalytische Studie, 2000
- W040 Bauer, H. H. / Huber, F. / Bächmann, A.: Das Kaufverhalten bei Wellness Produkten. Ergebnisse einer empirischen Studie am Beispiel von Functional Food, 2000
- W039 Homburg, Ch. / Stock, R.: Der Zusammenhang zwischen Mitarbeiter- und Kundenzufriedenheit. Eine dyadische Analyse, 2000
- W038 Becker, J. / Homburg, Ch.: Marktorientierte Unternehmensführung und ihre Erfolgsauswirkungen. Eine empirische Untersuchung, 2000
- W037 Bauer, H. H. / Fischer, M.: Die simultane Messung von Kannibalisierungs-, substitutiven Konkurrenz- und Neukäuferanteilen am Absatz von line extensions auf der Basis aggrigerter Daten, 2000
- W036 Homburg, Ch. / Pflessner, Ch.: A Multiple Layer Model of Market-Oriented Organizational Culture. Measurement Issues and Performance Outcomes., 2000

Weitere Arbeitspapiere finden Sie auf unserer Internet-Seite: [www imu-mannheim.de](http://www imu-mannheim.de)

## **Abstract**

It has been said that in industrial markets relationships are long-term oriented, enduring, and complex (Ford 1980; Hakansson, 1982; Hutt and Speh 1992; Turnbull and Wilson 1989). The relationships between buyers and sellers are often bilateral and the products need to be customized to the buyers' needs. Therefore, the customer is no longer a passive buyer, but an active partner. Against this background, the satisfaction of the customer may play an important role in establishing, developing, and maintaining successful customer relationships in industrial markets.

Clearly, the construct of customer satisfaction for industrial customers is of sufficient importance both theoretically and managerially to warrant more attention. In spite of the apparent importance of the concept, customer satisfaction in industrial markets remains a rather primitive concept. It is almost never conceptually defined, nor explicitly operationalized, when it is used. However, before customer satisfaction can play a positive role in its envisioned applications, it must be based on adequate conceptualization and suitable measurement methodologies, which, most researchers agree, are presently lacking.

In contrast to most of the studies in this area, we focus on customer satisfaction for industrial firms, specifically customer satisfaction in customer-supplier relationships. Customer satisfaction in marketing channels, i.e., satisfaction of a dealer with the overall relationship with a manufacturer (see Gassenheimer, Sterling, and Robicheaux 1989; Ruekert and Churchill 1984; Schul, Little, and Pride 1985), thus is not considered in this paper.

Our article makes several contributions: First and most important, our purpose is to develop a multiple-item measure of industrial customer satisfaction and assess its psychometric properties. Second, the influence of the identified dimensions of customer satisfaction on overall satisfaction is analyzed. Third, as buying decisions in industrial companies are usually not individual but group decisions (see, e.g., Haas 1989; Lilien and Wong 1984; Webster and Wind 1972a), we analyze differences in customer satisfaction between functional categories of the members of the buying center (referred to as "multiple role issues"). A buying center may be defined as an "informal, cross-sectional decision-unit, in which the primary objective is the acquisition, importation, and processing of purchasing-related information" (Spekman and Stern 1979, p. 56).

The paper is organized as follows. In the first section we review the relevant literature. In the two sections to follow we describe the research method and the scale development and validation. After this multiple role issues are analyzed. Finally we discuss theoretical, methodological, and managerial implications and offer directions for future research.

The last decades have spawned a number of studies on customer satisfaction. A key motivation for the growing emphasis on customer satisfaction is that highly satisfied customers can lead to a stronger competitive position resulting in higher market share and profit (Fornell 1992). Customer satisfaction is also generally assumed to be a significant determinant of repeat sales, positive word-of mouth, and customer loyalty (Bearden and Teel 1983; Fornell et al. 1996). As a result, there is increasing attention among academics and business practitioners to customer satisfaction as a corporate goal (e.g., Bolton and Drew 1991; Crosby 1991; Oliva, Oliver, and MacMillan 1992). Partly, this increasing focus on customer satisfaction is rooted in contemporary managerial tools such as total quality management (TQM) and business process reengineering. Especially the TQM movement has led to more focus on the measurement of the complex construct of customer satisfaction. This is particularly evident in the application guidelines of the famous *Baldrige Award* (see National Institute of Standards and Technology 1994). Recently, the widespread interest in customer satisfaction has led to the development of national customer satisfaction indices in different countries including Sweden (Fornell 1992; Anderson, Fornell, and Lehmann 1994), the U.S. (Fornell et al. 1996), and Germany (Meyer and Dornach 1997).

Researchers have defined customer satisfaction as a "response resulting from the customer's comparison of product performance to some prepurchase standard, such as expectation, ideal, or norm" (Halstead, Hartman, and Schmidt 1994, p. 122). This definition is in line with the confirmation/disconfirmation model (see, e.g., Churchill and Surprenant 1982; Oliver 1980; Oliver and DeSarbo 1988). In this model customers are assumed to evaluate consumption experiences and to compare perceived performance with some pre-consumption standard. The level of satisfaction is related to the size and direction of the disconfirmation experienced. Satisfaction occurs when performance matches or is better than the standard. Dissatisfaction occurs when performance is less than the standard. In this context, a number of psychological theories have examined the functional relationship between what was expected and what has been received. They include comparison level theory (LaTour and Peat 1979; Swan and Martin 1981), adaptation level theory (Oliver 1980, 1981; Oliver and Linda 1981), assimilation-contrast theory (Anderson 1973; Olson and Dover 1979; Oliver 1996), and assimilation theory (Anderson 1973; Cardozo 1965; Oliver 1996).

Most research on customer satisfaction has focused on satisfaction with consumer goods and services (see Oliver 1996 for an overview). Almost all empirical customer satisfaction studies published between 1986 and 1996 in the *Journal of Marketing* and the *Journal of Marketing Research* have used the individual consumer as the unit of analysis (see, e.g., Cadotte, Woodruff, and Jenkins 1987; Spreng, MacKenzie, and Olshavsky 1996; Tse and Wilton 1988). Research on customer satisfaction in business-to-business relationships is still modest and lagging far behind consumer marketing. Unlike in services marketing, where SERVQUAL (Parasuraman, Zeithaml, and Berry 1988, 1991, 1994) has become a reasonably well accepted model for measuring the extent to which a company meets its customers' expectations, a widely used measure of industrial customers' satisfaction does not exist to the best of our knowledge.

It has been said that in industrial markets relationships are long-term oriented, enduring, and complex (Ford 1980; Hakansson, 1982; Hutt and Speh 1992; Turnbull and Wilson 1989). The relationships between buyers and sellers are often bilateral and the products need to be customized to the buyers' needs. Therefore, the customer is no longer a passive buyer, but an active partner. Against this background, the satisfaction of the customer may play an important role in establishing, developing, and maintaining successful customer relationships in industrial markets.

Clearly, the construct of customer satisfaction for industrial customers is of sufficient importance both theoretically and managerially to warrant more attention. In spite of the apparent importance of the concept, customer satisfaction in industrial markets remains a rather primitive concept. It is almost never conceptually defined, nor explicitly operationalized, when it is used. However, before customer satisfaction can play a positive role in its envisioned applications, it must be based on adequate conceptualization and suitable measurement methodologies, which, most researchers agree, are presently lacking.

In contrast to most of the studies in this area, we focus on customer satisfaction for industrial firms, specifically customer satisfaction in customer-supplier relationships. Customer satisfaction in marketing channels, i.e., satisfaction of a dealer with the overall relationship with a manufacturer (see

Gassenheimer, Sterling, and Robicheaux 1989; Ruekert and Churchill 1984; Schul, Little, and Pride 1985), thus is not considered in this paper.

Our article makes several contributions: First and most important, our purpose is to develop a multiple-item measure of industrial customer satisfaction and assess its psychometric properties. Second, the influence of the identified dimensions of customer satisfaction on overall satisfaction is analyzed. Third, as buying decisions in industrial companies are usually not individual but group decisions (see, e.g., Haas 1989; Lilien and Wong 1984; Webster and Wind 1972a), we analyze differences in customer satisfaction between functional categories of the members of the buying center (referred to as "multiple role issues"). A buying center may be defined as an "informal, cross-sectional decision-unit, in which the primary objective is the acquisition, importation, and processing of purchasing-related information" (Spekman and Stern 1979, p. 56).

The paper is organized as follows. In the first section we review the relevant literature. In the two sections to follow we describe the research method and the scale development and validation. After this multiple role issues are analyzed. Finally we discuss theoretical, methodological, and managerial implications and offer directions for future research.

## LITERATURE REVIEW

### *Overview*

To the best of our knowledge, there is no comprehensive academic study of industrial customer satisfaction. Research using the construct has typically focused on very specific aspects. They include, e.g., customer satisfaction in the context of complaining behavior (e.g., Trawick and Swan 1981; Williams and Gray 1978) and the impact of the industrial buyer's perception of the purchase process on satisfaction (Tanner 1996). A second limitation of previous research is its reliance on single-item measures (Qualls and Rosa 1995; Trawick and Swan 1981) or multiple-item (but unidimensional) measures (Dwyer 1993; Han 1992; Han and Wilson 1992) of industrial customer satisfaction. Given the complexity of customer-supplier interaction in industrial marketing (Hakansson 1982, p. 14) it

seems questionable whether previous operationalizations of industrial customer satisfaction can adequately capture the construct's domain. A valid measurement scale for the satisfaction of industrial customers is not available in the literature.

In summary, previous work directly related to industrial customer satisfaction provides limited insight into the construct's nature. We therefore conduct a broader literature review in the industrial marketing area. The literature review focuses on three key issues associated with industrial customers' satisfaction. First, we aim at identifying possible dimensions of customer satisfaction in industrial markets leading to a preliminary understanding of the construct's domain. Second, we discuss different roles in the buying center in the context of industrial customer satisfaction. Third, we look for guidance on how to conceptualize the scale.

### *Content of Industrial Customer Satisfaction*

Prior to discussing potential dimensions of the construct under consideration we need to identify the object of industrial customer satisfaction. Research in the consumer goods area typically relates satisfaction to a single discrete transaction (e.g., Cardozo 1965; Churchill and Surprenant 1982). Since the work of Hakansson (1982) research in industrial marketing has emphasized the importance of customer-supplier relationships (see, e.g., Dwyer, Schurr, and Oh 1987). As an example, Hakansson (1982, p. 14) states that in industrial marketing settings

"the relationship between buyer and seller is frequently long term, close and involving a complex pattern of interaction between and within each company. The marketers' and buyers' task in this case may have more to do with maintaining these relationships than with making a straightforward sale or purchase."

Against this background, it is obvious that customer satisfaction in industrial marketing should be understood as a *relationship-specific* rather than a *transaction-specific* construct. Thus, our conceptualization of industrial customer satisfaction will be related to different facets of a buyer-supplier relationship. In the terminology of Anderson, Fornell, and Lehmann (1994) this corresponds to the use of a cumulative approach to customer satisfaction measurement. In the following we will

identify potential dimensions of industrial customer satisfaction. Multiple dimensions are an a priori assumption of our study because of the complex nature of industrial marketing relationships.

Prior to focusing explicitly on industrial customer satisfaction we will briefly review previous studies on consumer satisfaction to get first insights into potential dimensions of the satisfaction construct. Czepiel and Rosenberg (1977) suggested a comprehensive list of consumer satisfaction facets including the purchase process, the decision, the functional attributes, the aesthetic attributes, the psychological attributes, the service attributes, and the environmental attributes. Most research on consumer satisfaction has emphasized satisfaction with functional attributes. According to Czepiel and Rosenberg (1977, p. 409) they include "all attributes that affect the fitness of the product to the task and for the consumer - e.g. price, construction, quality, and performance". Other authors have suggested a distinction between aspects of the product itself and information about the product (e.g., Spreng and Olshavsky 1992).

The increasing interest in services marketing has also led to considerable research efforts related to consumer satisfaction with services (e.g., Singh 1991). Authors typically consider the costs, the service quality, the quality of employee interaction, the service delivery process, or the consumption experience (e.g., Bitner, Booms, and Tetreault 1990; Bolton and Drew 1994; Crosby and Stephens 1987; Danaher and Mattson 1994). Studies investigating consumer satisfaction with retail outlets typically use scales which include interaction-related facets such as the helpfulness, the politeness, or the friendliness of salespeople (e.g. Westbrook 1981).

In summary, the multi-dimensional nature of the consumer satisfaction construct is evident. This provides further justification for our multi-dimensional approach to conceptualizing industrial customer satisfaction. Additionally, some of the facets of consumer satisfaction are clearly relevant for studying satisfaction in an industrial marketing setting.

The product is the core of the exchange and as a result, the characteristics of the product are likely to have significant effects on an industrial relationship (Hakansson 1982). In this context, the attributes

which are usually related to the product include value/price relationship or product quality (Sheth 1973; Wind, Green, and Robinson 1968).

Also, services play an important role in determining an industrial customer's satisfaction. Industrial services, which usually are technically more complex than consumer services (Gordon, Calantone, and di Benedetto 1993), include, e.g., maintenance, repair, and operation services (see, e.g., Jackson and Cooper 1988; Jackson, Neidell, and Lunsford 1995; Mathe and Shapiro 1993). These are services that accompany the purchased goods and that an industrial customer needs to run its operations (Bowen, Siehl, Schneider 1989). Besides these technical services, the services that support the products and systems after delivery to the customer have to be mentioned. Since many industrial products are sufficiently complex, they require user training (Cohen and Lee 1990). For this reason, the availability and content of technical documentation or other documentation material (Kekre, Krishnan, and Srinivasan 1995) as well as technical training have to be considered in the context of industrial customer satisfaction.

Especially two processes, order handling and complaint handling, are particularly important in industrial marketing. Order handling typically involves a larger number of subprocesses. For example, Shapiro, Rangan, and Sviokla (1992) identify ten steps of an order management cycle where the company meets the customer, including order planning, order generation, order receipt and entry, scheduling, and fulfillment. Banting (1984) and Cunningham and Roberts (1974) found that delivery reliability, also a facet of the order handling process, is of great importance to industrial customers. Next to order handling, complaint handling has been mentioned as the second process to consider. Since it is known that the majority of dissatisfied customers do not complain, and if they complain, the problem is usually very serious (Andreasen and Best 1977), it is very important that a supplier makes a strong effort to respond adequately to valid complaints and provide satisfaction where possible (Barksdale, Powell, and Hargrove 1984, p. 93). In this context, it is not only a replacement guarantee which may be important for the customer (Banting 1984), but also the reaction of the supplier on product related complaints outside warranty periods. Complaints can be directly related to product

performance as well as to other aspects of the purchase and use process (Day and Landon 1977, p. 429).

The last area with which an industrial customer could be satisfied or dissatisfied and which needs to be included in our study is the interaction with the salesforce. This covers the knowledge of the salesforce about products and usage conditions as well as support in problem solving. Many of the relevant aspects have been included in the SOCO (selling orientation - customer orientation)-scale developed by Saxe and Weitz (1982). Their items are related to specific actions a salesperson might take when interacting with buyers (see also Michaels and Day 1985).

In summary, we may preliminarily define industrial customer satisfaction as a relationship-specific construct describing how well a supplier meets a customer's expectations concerning product features, services, order handling, complaint handling, and salespeople.

### *Multiple Roles in Industrial Buying*

The high complexity of industrial marketing relationships is also due to the involvement of many people in the decision process with complex interactions among individuals (Webster and Wind 1972a). A large number of conceptual schemes have been suggested to explain the nature and functioning of the buying center, drawing back on the conceptual foundation for the study of organizational buying laid by the seminal works of Robinson, Faris, and Wind (1967), Sheth (1973), and Webster and Wind (1972a, b). Webster and Wind (1972a, b) identified several distinct roles in the buying center including users, influencers, buyers, deciders, and gatekeepers. Since it is quite likely that several individuals will occupy the same role within the buying center or that one individual may occupy two or more roles, empirical studies in this area typically do not use this formal role model. Rather, they focus on the different functional units the members of the buying center belong to (e.g., purchasing, manufacturing, engineering, quality control, finance, marketing, and sales). It is generally assumed that different organizational functions correspond to different roles (see, e.g., Webster and Wind 1972b).

Numerous studies have attempted to identify the organizational functions most centrally involved, or most influential, in buying center activities. On an overall basis, purchasing, engineering, and manufacturing are represented most prominently in the buying center (see, e.g., Brand 1972; Johnston 1981, p. 132; Johnston and Bonoma 1981a, b; Lilien and Wong 1984; McQuiston 1989; Moriarty and Bateson 1982; Sheth 1973; Wilson and Woodside 1995). Several other functions in the organization may be, but are typically not, involved in the buying center (Sheth 1973, p. 52).

Each of the mentioned functions has unique interests and orientations, and each of them may therefore consider different criteria in judging a supplier (Sheth 1973, p. 52). Purchasing managers' activities typically include those tasks associated with order processes, and supplier identification and selection, among others (Crow and Lindquist 1985; Spekman, Stewart, and Johnston 1995). For the salespeople, the purchasing manager is often the most easily reached member of the buying center (Johnston and Bonoma 1981b). Therefore, the purchasing manager is usually the person who maintains regular contact with a supplier and thus might be concerned with personnel continuity in a supplier's salesforce (Naumann, Lincoln, and McWilliams 1984). On a more general level, purchasing managers may be more concerned with commercial factors, while managers in engineering may place greater importance on technical attributes (Mast and Hawes 1986, p. 3). Manufacturing personnel are the product users and probably mainly concerned with technical product features (Naumann, Lincoln, and McWilliams 1984, p. 121, Sheth 1973, p. 52).

Thus, it is evident that the different functions have different perspectives, which arise from their distinct roles within a company. Against this background, the appropriateness of the single-informant approach typically used in studies of customer satisfaction in business-to-business settings seems questionable. On a more general level, the shortcomings of the key informant approach are many. There is empirical evidence that key informant data have questionable reliability and validity (Phillips 1981). It is often difficult to know whether a single individual in a complex buying situation can provide valid information. Key informants are often asked to make inferences about macro-level phenomena or perform aggregations over persons, tasks, and organizational subunits. This may place unrealistic demands on them as respondents or it could produce unreliable responses, so that

substantial random errors can occur (Bagozzi, Yi, and Phillips 1991; Silk and Kalwani 1982). The informant's position, length of time in the organization, or other personal or role characteristics could influence his or her reports (Kumar, Stern, and Anderson 1993; Seidler 1974). Those distortions in key informants reports may be attributable to systematic sources of error such as bias or ignorance (Phillips 1981, p. 410).

In summary, a multiple informant approach is considered to be adequate for studying industrial customer satisfaction. It is hypothesized that the different roles in the buying center induce differences in customer satisfaction. These differences may relate to the level of satisfaction as well as to the importance of the construct's dimensions. We will therefore focus on the different roles in the buying center distinguishing between purchasing, engineering, and manufacturing.

### *Conceptualization of Industrial Customer Satisfaction*

A question that still needs to be addressed relates to the nature of scale conceptualization. Given our definition of industrial customer satisfaction, one might consider measuring the construct based on differences between a customer's perception of performance and expectations. This would imply using a double scale as Parasuraman, Zeithaml, and Berry (1988) did in developing the SERVQUAL scale for measuring service quality. Based upon a definition of service quality as the "degree and direction of discrepancy between consumers' perceptions and expectations" (Parasuraman, Zeithaml, and Berry 1988, p. 1) these authors use two scales to measure service quality on the five SERVQUAL dimensions. One scale is used to assess the expectations and another scale to assess the perceptions concerning the items of the scale.

However, marketing researchers have argued against this formulation on the basis of theoretical as well as methodological and empirical grounds (Peter, Churchill, and Brown 1993; Teas 1993, 1994). Babakus, Pedrick, and Richardson (1995) who applied SERVQUAL to industrial services, preferred for example a "performance only" scale, which turned out to have desirable psychometric properties. Also, questions about the nature and the role of the "expectations" construct have not been settled (see, e.g., Babakus and Boller 1992; Cronin and Taylor 1992; Oliver 1993). Another rather practical point

which argues for the use of a single scale is the length of the questionnaire. In summary, the shortcomings of the double scale approach are many, so that we will use a single scale for the measurement of industrial customer satisfaction.

### *Synthesis*

Several important implications derived from the literature review. First, the literature directly related to industrial customer satisfaction provides limited insight into the construct's nature. Second, we define customer satisfaction in industrial markets as a relationship-specific rather than a transaction-specific construct. It describes how well a supplier meets a customer's expectation concerning different facets of a buyer-supplier relationship. Third, the literature in industrial marketing suggests that the construct of customer satisfaction may be related to product features, services, selected processes, such as order handling and complaint handling, and salespeople. In view of those many facets, customer satisfaction has to be conceptualized as a multidimensional construct. Fourth, in view of the different roles in the buying center involved in industrial purchasing processes, a multiple informant approach is needed to study industrial customers' satisfaction. Based on a review of the literature on buying center structures we distinguish three roles including purchasing, engineering, and manufacturing. Fifth, in view of the complexity of the construct and the presumably many items to be used as well as the mentioned criticism, a double scale, such as it is used in the SERVQUAL approach, should be avoided. We will use a single scale for the measurement of industrial customers' satisfaction. This means that we will not measure expectations separately.

## **RESEARCH METHOD**

### *Research Setting*

Industrial customer-supplier relationships were selected as the general setting for our empirical study. On the basis of the tentative definition of industrial customer satisfaction, field interviews were used for item generation and for identifying possible additional dimensions of the construct. Using qualitative methods prior to surveys is consistent with procedures recommended for marketing theory

development (Desphandé 1983). This approach is also consistent with other approaches in the marketing literature for developing important marketing scales (see, e.g., Kohli and Jaworski 1990; Kohli, Jaworski, and Kumar 1993). The set of industrial businesses chosen for the interviews represented a cross-section of a wide variety of industries including energy supply, chemicals, mechanical machinery, electronics, and food. The companies participating in the field interviews were chosen independently from the target organization which was later used for the collection of the data.

Then, the research setting for scale development and validation was a field study of the satisfaction of customers of a major German mechanical machinery company with their supplier. Thus, we use a single target organization for the scale development which is consistent with other scale development studies in the marketing literature (e.g., Narver and Slater 1990; Ruekert and Churchill 1984). The uniformly strong support we received from the company's top management made it possible to obtain customer satisfaction data from customers in twelve European countries on identical scales. This would not have been possible with multiple target organizations.

In industrial marketing different types of buying decisions have to be distinguished. A commonly accepted typology by Robinson, Faris, and Wind (1967) uses three categories. They include straight rebuy or routine purchase, modified rebuy, and new buy (see, e.g., Webster 1991). Since our goal is the development of a scale to measure industrial customers' satisfaction which can be used in a broad range of purchasing situations and product categories we did not focus on a specific type of buying class. Rather the target organization was chosen such as to cover all three types of buying situations. Specifically the company's product range includes completely standardized products bought by customers in high quantities on a regular basis (thus yielding a routine purchase situation) as well as products individually designed for important customers at every transaction (thus corresponding to a new buy situation). Additionally, the target organization was chosen such as to yield large variance on factors that have been found to impact on characteristics of the buying situation. These factors include product complexity, product type, importance of the purchase situation, novelty of the purchase, and innovativeness (see, e.g., Anderson, Chu, and Weitz 1987; Johnston and Bonoma 1981a; Kirsch and

Kutschker 1982; Lilien and Wong 1984; McQuiston 1989; Möller and Laaksonen 1986; Reve and Johansen 1982).

In summary, the target organization was chosen in such a way as to yield generalizable results across a wide variety of industrial marketing settings.

### *Field Interviews*

We conducted face-to-face interviews within 25 industrial companies. In each company respondents from the three functional areas (purchasing, engineering, and manufacturing) were interviewed for a total of 75 interviews. The main objective was to identify key factors of customer satisfaction that were important from the perspective of industrial customers. The interviews took from one hour to almost three hours. In addition to conducting interviews, we looked at checklists firms used for supplier evaluation. Interviews were organized around two key questions:

- "What do you think are the dimensions of industrial customer satisfaction?"
- "What potential areas of dissatisfaction exist concerning an industrial supplier?"

The identified dimensions are typically broad in scope and involve multiple elements. The first finding from the field interviews is that the construct of customer satisfaction is clearly related to the dimensions identified in the literature review. The *product dimension* was found to cover such issues as product reliability, price/value relationship, and service-friendliness among others. The *services dimension* covers the full range of technical services, such as maintenance, fitting, and repair. Besides the technical quality of the services, interviewees especially emphasized the speed of availability of service staff as an important item in this domain. *Processes* were captured through two basic processes, order handling (which covers order confirmation, order processing, delivery and invoicing) and handling of complaints (e.g. handling of product related complaints within as well as outside the warranty period). The *salespeople dimension* reflects how interactions between the salespeople and customers are handled, how well the salespeople know their products as well as their usage conditions

in the customer's company. Also, the social aspects of the interaction between the customers and the salesforce (e.g. salespeople's friendliness) were mentioned.

Field interviews indicated that the construct of customer satisfaction has also a *communication dimension*. It captures the communication with a supplier's personnel excluding the field salesforce, e.g., people in order handling departments, engineering, or manufacturing. Relevant items relate to the reachability of the relevant persons as well as to the quality of their reactions to written or telephone-based requests. Additionally, *product-related informations* were important for the customers. This includes information given by technical documentation as well as information given in brochures or prospectuses, for example.

### *Data Collection*

As a result of the interviews, an initial pool of 43 items was generated. A five-point scale ranging from "Strongly Satisfied" (5) to "Strongly Dissatisfied" (1), with no verbal labels for scale points 2 through 4, accompanied each satisfaction statement. The survey instrument contained additional questions including an overall rating of satisfaction with the target organization as a supplier ( $y_1$ ) and likelihood of recommending the target company as an industrial supplier ( $y_2$ ). The survey questionnaire was pretested with a pool of customers. Though the target organization was held constant for all evaluating organizations, the customers represented in the sample were diverse. They included a variety of industries and a broad range of company sizes.

*Sample 1:* Data collection focused on customers of the company which buy on a regular basis. Respondents were selected on the basis of a stratified sampling to ensure variance. The sampling included all customers that buy at least for 1 million Deutsche Mark per year, every second customer that buys for at least .5 million Deutsche Mark, and every fifth customer that buys for at least .1 million Deutsche Mark.

Knowledgeable respondents were identified and assigned to one of the three roles (purchasing, engineering, manufacturing) by the respective regional sales management directors. The questionnaire was administered to 2576 informants in German companies together with a personalized letter. Three

weeks later, a replacement copy of the questionnaire, again with a personalized letter, was sent to the informants who had not responded yet. Questionnaires with excessive missing data were eliminated. The procedure yielded 873 responses for an overall response rate of approximately 34 %, which compares favorably with rates reported in previous research. Response rates for the three functional areas were very similar. 310 questionnaires (30 %) were received from purchasing managers, 363 questionnaires (36 %) from engineering personnel, and 200 (37 %) from manufacturing respondents.

*Sample 2:* The second sample was used for cross-validating the scale developed on the basis of sample

1. Data for the second sample was obtained from the customers of the target company in eleven European countries (see Table 1). Again, respondents were classified by their role with the same categories as in sample 1. The original version of the German questionnaire was first translated into the language of the country under investigation by expert translators and then retranslated. Differences that emerged were reconciled by the translators. To ensure that the customers would be able to understand the translated items, drafts of the final questionnaires were pretested in the corresponding countries.

-----Insert Table 1 about here-----

Then, questionnaires together with personalized letters were distributed to 5449 informants in the eleven countries. Approximately four weeks after the initial mailing, a reminder with a replacement questionnaire followed. A total of 1679 informants returned completed and usable questionnaires which means a final response rate of approximately 31 %. Table 1 provides information on the total sample split up by countries. Response rates varied between 15 % for Italy and 72 % for Switzerland. Generally, the response rates were higher for Northern Europe than for Southern Europe. It is worth noting that the differences in surveys sent out are caused by the target company's market position in the different countries rather than by country size.

## **SCALE DEVELOPMENT AND VALIDATION**

In the first stage, the measures were evaluated according to the paradigm suggested by Churchill (1979) and extended by Gerbing and Anderson (1988). This means that sample 1 was used to purify

the list of 43 items. Also, validity properties and factor structure of the measure was evaluated using sample 1. A 29-item instrument (called INDSAT) for assessing customer satisfaction in industrial markets was developed. The Appendix provides a summary of the scale items included. Purification of the item pool began with exploratory factor analysis, the computation of coefficient alpha (Cronbach 1951) and item-to-total correlations. To further refine the measure, confirmatory factor analysis was used. It is widely accepted that confirmatory factor analysis is superior to more traditional criteria in the context of scale validation because of its less restrictive assumptions (see, e.g., Bagozzi, Yi, and Phillips 1991; Gerbing and Anderson 1988). For confirmatory factor analysis we used the ML (Maximum Likelihood) method in LISREL VIII (Jöreskog and Sörbom 1993) for parameter estimation.

In the second stage we used sample 2 for evaluating the psychometric properties of the INDSAT scale. The approach of using more than one sample closely parallels procedures recommended by Churchill's (1979) paradigm for developing better measures of marketing constructs. Sample 2 is also used for the cross-validation of the INDSAT scale with a new data set (see Cudeck and Browne 1983). Competing factorial models will be compared in terms of predictive validity.

### *Scale Development*

The first step in item analysis and assessment of dimensionality was exploratory factor analysis with an oblique rotation procedure to allow for intercorrelations among the dimensions. Items with low loadings on all factors or high loadings on more than one factor were eliminated. Exploratory factor analysis confirmed that there are seven dimensions underlying the satisfaction construct. As assumed before, the dimensions include satisfaction with products, with salespeople, with product-related information, with order handling and processing, with technical services, with communication with internal staff, and with complaint handling. The conceptualized structure of the satisfaction construct could be confirmed, even on the basis of a reduced set of items.

Next the reliability of each factor was assessed by calculating coefficient alpha (Cronbach 1951). Because of the multidimensionality of the satisfaction construct, coefficient alpha was computed

separately for the seven dimensions to ascertain the extent to which items making up each dimension shared a common core. Item-to-total correlations were also inspected, so that items with low correlations could be eliminated if doing so did not diminish the measure's coverage of the construct domain. The reliability coefficients for all the measures exceeded .8, well above the recommended standard of .7 that has been suggested by Nunally (1978, p. 254).

Every single factor was then submitted to a confirmatory factor analysis. All factor loadings were significant at the .01 level and all individual item reliabilities were far above the required value of .4 (Bagozzi and Baumgartner 1994, p. 402). According to the recommendations of Bagozzi and Yi (1988) and Bagozzi and Baumgartner (1994), an average variance extracted of at least .5 and a composite reliability of at least .7 is desirable. Those requirements were met.

After having assessed the individual factors, the reduced set of items were subjected, all together, to a confirmatory factor analysis. The results of the analysis are summarized in Table 2, together with some additional information on reliability and validity.

-----Insert Table 2 about here-----

As seen in Table 2, Alpha coefficients of the seven factors exceed the recommended threshold of .7. Also, the threshold values of .5 and .7 for average variances extracted and composite reliabilities, respectively, were exceeded. In sum, these criteria seem to suggest that the model fits the data adequately. There was no necessity of deleting any further items. The final scale consists of 29 items (7 factors).

Although the chi-square value was significant (659.07 with 356 d.f.,  $p < .001$ ), other goodness-of-fit measures indicate a good overall fit of the seven factor model to the data: GFI=.99, AGFI=.99 (see Jöreskog and Sörbom 1982), RMR=.04 (see Bagozzi and Yi 1988), RMSEA=.03 (see Steiger 1990), and CFI=1.00 (see Bentler 1990).

## *Assessment of Validity*

The next step is to assess the convergent and discriminant validity of the INDSAT scale. Convergent validity "represents the degree to which two or more attempts to measure the same concept through maximally dissimilar methods agree" (Bagozzi 1981, p. 376). One way to assess convergent validity is to check if all factor loadings are significant (Bagozzi, Yi, and Phillips 1991). As can be seen in Table 2, all factor loadings were significantly different from zero as evidenced by consistently large t-values.

To assess convergent validity, we also examined the association between the INDSAT scale and a factor (overall customer satisfaction) measured by the two previously mentioned items  $y_1$  and  $y_2$ . The squared multiple correlation coefficient for the structural equation, as shown in Figure 1, is .77. This can be seen as a desirably high value, especially in view of the fact that the data is gathered across different industries and different functional groups. This finding offers strong support for the convergent validity of the INDSAT scale. Specifically, this result indicates that a suppliers' ratings on the INDSAT scale explain almost 80 % of the overall customer satisfaction with the supplier. This compares favorably with validation results reported by Parasuraman, Zeithaml, and Berry (1988) for the SERVQUAL scale.

-----Insert Figure 1 about here-----

Discriminant validity is "the degree to which measures of distinct concepts differ" (Bagozzi and Phillips 1982, p. 469). Discriminant validity between the seven INDSAT factors was analyzed by performing chi-square difference tests. The chi-square difference tests were performed between the original model with the seven factors and models where a factor correlation is fixed at a value of 1.0, one-by-one. For the model investigated, the chi-square values were significantly lower for the unconstrained models, which suggests the factors exhibit discriminant validity. A more stringent procedure has been suggested by Fornell and Larcker (1981). For every pair of factors we compared the square of the correlational parameter estimate between them with the average variance extracted for each of them. Table 3 shows the correlation matrix between the seven INDSAT factors. For every pair of factors the squares of these values are lower than the corresponding variances extracted

reported in Table 2. Again, the discriminant validity of the seven INDSAT factors was supported. In summary, we find evidence of convergent and discriminant validity.

-----Insert Table 3 about here-----

### *Reanalysis of INDSAT Based on Sample 2*

Note that the analysis described up to now was entirely based on the data from German customers of the target organization. We now describe the reanalysis using a more general (i.e. international) sample. We reanalyzed the developed scale on the basis of new data to evaluate the robustness of INDSAT in the new sample. Table 4 summarizes the results of a confirmatory factor analysis of the 29 INDSAT items with seven underlying factors based on sample 2.

-----Insert Table 4 about here-----

All of the measures shown in Table 4 indicate very good psychometric properties of the INDSAT scale. The overall fit indices for sample 2 (a chi-square value of 1049.34 with 356 d.f.,  $p < .001$  a GFI of .99, an AGFI of .99, a RMR of .04, a RMSEA of .03, and a CFI of 1.00) are similar to the ones observed in sample 1 and provide evidence of a desirable fit of the model in the new sample. Additionally, convergent validity is also evident in sample 2 as all factor loadings are highly significant. Discriminant validity has been tested and supported using chi-square difference tests and the procedure suggested by Fornell and Larcker (1981). In summary, the seven factor model has shown sound psychometric properties in sample 2.

### *Cross-Validation*

Testing a model on a given data set "might capitalize on peculiar characteristics of that data set" (Bagozzi and Yi 1988, p. 53). The observed fit of the model may largely reflect the specific characteristics of one's data set rather than a generalizeable structure. To evaluate if the INDSAT scale is not the result of an overfitting to sample 1, cross-validation was used. Cudeck and Browne (1983)

have advocated the use of cross-validation for covariance structure models. In practice, this is usually done through splitting a data set into two parts, a calibration and a validation sample. Model selection is then based on the criterion of minimum discrepancy in fit between the validation-sample observed covariance matrix and the calibration-sample estimated covariance matrix (Bagozzi and Baumgartner 1994).

The main objective of cross-validation is to select, from a series of possible models, the model that provides the best approximation of the data in the two samples (Homburg 1991). Therefore, Cudeck and Browne (1983) recommend that models of different complexity should be compared. For every model, cross-validation is accomplished by fixing all free parameters to the values obtained in the calibration sample. The next step is to estimate this model in the validation sample (Bagozzi and Baumgartner 1994). Under these conditions, LISREL yields a discrepancy value (based upon the fit function) related to the covariance matrix estimated in the calibration sample and the empirical covariance matrix in the validation sample.

Since a seven factor model is a rather complex way of describing the structure underlying 29 indicators, it is particularly interesting to investigate whether more parsimonious models perform better in the cross-validation analysis. Therefore, we restricted the set of alternative models to models with a smaller number of factors. All of the three competing models were four factor structures combining individual INDSAT factors based on theoretical considerations. As an example, one alternative model contains a product dimension (INDSAT1), a services/documentation dimension (summarizing indicators related to INDSAT3 and INDSAT5), a process-related dimension (combining INDSAT4 and INDSAT7), and an interaction-related dimension (putting together INDSAT2 and INDSAT6). The seven factor structure exhibits the lowest fit function value of 4.05, while the three alternative models exhibit values of 9.10, 9.14, and 9.07, respectively. These results clearly suggest that industrial customer satisfaction should be modeled by a seven factor model.

### *Assessment of Importance*

Causal modeling was used to examine the impact of satisfaction dimensions on overall customer satisfaction. Usually, multiple regression is used to determine the relative importance (see Qualls and Rosa 1995; Parasuraman, Zeithaml, and Berry 1988 for examples). We consider causal modeling to be superior since, unlike regression analysis, it is not based on the assumption of error-free measurement.

The seven dimensions of customer satisfaction were used as latent exogenous variables with overall satisfaction being the latent endogenous variable. The results related to the structural equation model are found in Figure 1. In keeping with standard practice, theoretical variables are indicated by circles, observed variables by squares. The parameter estimates indicate that all seven factors influence the customer's overall satisfaction, though in varying degrees. Each of them was found to be significantly (at least on the .05 level) and positively related to the customer's overall satisfaction. From the magnitude of the coefficients, we observe that satisfaction with order handling and satisfaction with salespeople are the most important factors in determining overall customer satisfaction. Satisfaction with product-related information and with communication with internal staff are the least important factors.

It is interesting to note that the three factors with outstanding importance (i.e. a standardized parameter estimate of at least .2) do not include satisfaction with products which contradicts previous findings by Perreault and Russ (1976). Satisfaction of industrial customers obviously depends heavily on salespeople's interaction with customers as well as on the way a supplier manages the processes of order handling and processing and complaint handling. This is consistent with the findings of Tanner (1996).

## **MULTIPLE ROLE ISSUES**

The purpose of this section is to analyze industrial customer satisfaction focusing on the three different roles in the buying center. Specifically, we will be dealing with three questions:

- Does the seven factor model provide a viable description of the structure of customer satisfaction for each of the three roles?
- Does the level of customer satisfaction with respect to the different items vary across the different roles?
- Does the importance of the different dimensions of customer satisfaction vary across the three roles?

The first step concerning the multiple role issues is to assess the validity of the INDSAT scale on the basis of reduced data sets. We split the whole sample into three parts, one for every functional area. Then we assessed its validity using confirmatory factor analysis. In all cases, the satisfaction construct with the seven underlying factors revealed sound psychometric properties. For example, confirmatory factor analysis showed that overall fit indices for the manufacturing group were a chi-square value of 366.21 with 356 d.f.,  $p=.34$ , a GFI of .98, an AGFI of .98, a RMR of .07, a RMSEA of .01, and a CFI of 1.00. Results for engineers and purchasing managers also showed a fit as good as in the whole sample 1.

The causal model relating the seven INDSAT factors to overall customer satisfaction (see Figure 1) was also analyzed for the three subgroups. Squared multiple correlations for the structural equation are .70 for purchasing managers, .71 for engineering, and .81 for manufacturing (see Table 5). Those findings offer a strong support for the convergent validity of the INDSAT scale, even in the reduced sets of data. Additionally, discriminant validity has been tested and supported for the INDSAT scale for all of the three different functional areas. In summary, it is found that the seven factor model provides a good description of the structures underlying customer satisfaction for each of the three roles.

To assess if there are significant differences in the satisfaction ratings between purchasing managers, engineering people, and manufacturing, individual analyses of variance were carried out for each of the INDSAT items across the three categories. We found out that the level of satisfaction varied significantly (at least on the .1 level) across the three categories for nine of the 29 INDSAT items. For

three of those nine items the differences were significant even on the .05 level. Thus, although there is a reasonable degree of coherence between the different functional groups on an overall basis, we do observe a non-neglectable amount of significant differences between them concerning individual items.

-----Insert Table 5 about here-----

The third question raised at the beginning of this paragraph is related to possible differences of the seven factors' importance. We conducted a multiple-group LISREL analysis based on the model shown in Figure 1 with three subgroups corresponding to the three roles included in our study. The analysis involved a comparison between two models. First, a model which allowed free estimation of the parameters relating the seven INDSAT dimensions to overall customer satisfaction in each of the three subgroups was analyzed. In the second model, each of the seven parameters was restricted to be equal across subgroups. This restriction led to a significantly worse fit ( $\chi^2_{\text{diff}} = 26.94$ ,  $df_{\text{diff}} = 14$ ,  $p < .05$ ). Thus, significant differences concerning the importance of the INDSAT dimensions across the different roles in the buying center are evident.

The results of the causal analysis for each of the subgroups are shown in Table 5. With respect to purchasing managers, our results indicate that satisfaction with order handling and processing is the most important factor. This is consistent with previous findings by Cooper, Dröge, and Daugherty (1991) and Wilson and Woodside (1995). It also confirms our previous assumption that purchasing people are predominantly concerned with commercial factors. It is also not surprising to find that satisfaction with salespeople is very important for purchasing managers. As has been mentioned before, purchasing people are usually the members of the buying center who have the closest contact with a supplier's salespeople.

While satisfaction with complaint handling is very important across all three buying center roles, it is the dominant factor for engineering people. This is plausible, because engineering people usually make technical decisions that may be criticized in an organization once complaints with the supplier's products occur. Therefore, the way a supplier handles complaints may be very important for them.

Satisfaction with products is the most important factor for manufacturing people. This is plausible since they are the members of the buying center which have the closest contact with the products. It is interesting to observe that satisfaction with technical services has a negative impact on overall satisfaction for the manufacturing managers. A possible explanation for this finding is, that technical service is typically (although not exclusively) needed in situations where problems with the product occur. It may be assumed that a high level of satisfaction with technical services is typically associated with situations where significant problems with products have occurred previously.

In summary, the INDSAT scale and the corresponding seven factor model proved to be a valid conceptualization of customer satisfaction for each of the analyzed roles in the buying center. We observed a reasonable degree of coherence between the three functional groups concerning the level of customer satisfaction. However, on the level of individual items, a non-neglectable amount of significant differences were observed. Finally, and probably most importantly, we observe very clear differences related to the different factors' importance across the three roles.

## **DISCUSSION AND CONCLUSIONS**

A primary challenge of this study was to propose and evaluate a scale called INDSAT for measuring customer satisfaction in industrial markets. It represents one of the few attempts to outline a methodology to better understand customer satisfaction from the perspective of the industrial buyer. The study has the potential to make theoretical, methodological, and managerial contributions.

### *Theoretical Discussion*

Our study has several implications for marketing theory. Among other things it highlights the complexity of the construct of industrial customer satisfaction. Against this background the use of single item measures such as "How satisfied are you with the relationship in general?" is not adequate. Rather, future attempts to measure industrial customers' satisfaction should use the approaches developed in this paper. Obviously, in situations where customer satisfaction is but one of several other constructs under investigation, employing a 29-item-scale is not a viable alternative. In such

situations summarizing each of the seven INDSAT factors in one item and using a one-factor-model of industrial customer satisfaction with seven indicators may be a reasonable compromise between the use of the full scale and the use of primitive single item measures (see, e.g., Parasuraman, Zeithaml, and Berry 1988 who proposed this approach for the application of SERVQUAL). In other situations researchers might be interested in analyzing not the full range of industrial customer satisfaction, but only a limited domain of it. In such situations the scales developed for the different dimensions of customer satisfaction may be used. For example, when studying the effectiveness of different complaint handling techniques, our scale for measuring customer satisfaction with complaint handling may be used as outcome measure.

The analysis described in this paper may also contribute to an improved understanding of industrial marketing. Especially, our study reveals that the way a supplier handles specific customer-related processes as well as the salespeople's interaction with customers are key factors for achieving customer satisfaction in industrial markets. These issues should experience more attention in industrial marketing theory than in the past. Also, textbooks in industrial marketing typically focus on the classical marketing mix instruments (the 4 P's) and neglect such issues as order handling and processing and complaint handling.

Additionally, our study may contribute to an improved understanding of industrial buying behavior. Our analyses clearly reveal that different functional groups in the buying center emphasize different criteria when assessing a supplier's performance. While this has been stated in the literature before, empirical evidence on this important issue has been scarce, so far.

### *Methodological Issues*

Our study has shown that satisfaction ratings may differ considerably across different functional groups in a customer company. Thus, in studying industrial customer satisfaction a key informant approach (focusing e.g. on the purchasing manager's perspective) would imply a significant loss of information. Our study thus provides further evidence of the questionable quality of information concerning organizational phenomena obtained from key informants (see, e.g., Bagozzi and Phillips

1982; Kumar, Stern, and Anderson 1993; Phillips 1981; Wilson and Lilien 1992). Against this background multi-informant research of organizational issues should be employed more frequently than it is up to now.

An additional methodological contribution of our study is to illustrate the usefulness of advanced techniques for measure development for industrial marketing. While such modern techniques of scale validation are common in consumer behavior studies (see, e.g., Bearden, Netemeyer, and Teel 1989; Madden, Allen, and Twible 1988), their use in industrial marketing is still limited. Future research in industrial marketing should make use of these advanced techniques to a larger extent.

### *Managerial Implications*

Increasing customer satisfaction is an important goal in business practice today, and measurement of satisfaction is becoming increasingly common. Against this background, our research has several implications for industrial managers.

First of all, the INDSAT scale can be used as a guidance for managers. For example, the INDSAT scale can be used to assess customer satisfaction along each of the seven dimensions by averaging the scores on items making up a dimension. Computing average scores for each individual dimension yields valuable insight on how well a company deals with different components of customer satisfaction. The detailed analysis may also reveal activities that could be undertaken in order to increase customer satisfaction. It can also provide an overall measure of customer satisfaction in form of average scores across all seven dimensions. When necessary, the scale can be supplemented to fit the characteristics or specific needs of a particular organization.

INDSAT is also most valuable when it is used periodically to track customer satisfaction trends. A supplier would learn a great deal about the satisfaction of its customers and what needs to be done to improve it by administering INDSAT once a year or, at least, every second year. Another application of the INDSAT scale is the assessment of a company's customer satisfaction relative to its principal competitors. The INDSAT scale can also be used to survey multiple respondents.

In summary, INDSAT has a variety of potential applications. It is not only of use if a company wants to assess the satisfaction of its customers, but it can also help in identifying areas requiring action to improve the overall satisfaction as well as allocating scarce resources.

Our analyses have shown that industrial customer satisfaction depends strongly on salespeople's interaction with customers as well as on the two processes of order handling and processing and complaint handling, respectively. This finding has important managerial implications: Many firms producing and marketing industrial goods are strongly technically-minded implicitly assuming that the product is the most important source of customer satisfaction. Our research shows that the interaction and processes accompanying products offer great potential for establishing a high level of customer satisfaction. This suggests that industrial companies should also consider the 'soft' facts leading to customer satisfaction instead of almost exclusively focusing on product optimization.

Additionally, the knowledge of the different satisfaction dimensions' importance is important for management to define priorities for improvement efforts and decide about resource allocation (e.g., in TQM programs). Also, the knowledge of different weights of the dimensions across the different functions can be helpful for the training of salespeople. For example, if a salesperson knows that one member of the buying center (a purchasing manager, for example) is particularly concerned about the order processing, while another member (the product user in manufacturing) is most concerned about the product, the salesperson may be more effective in interacting with the different members of the buying center.

### *Limitations and Directions for Further Research*

In spite of the care taken at every stage of this research, there are several caveats to our study, but also potentially fruitful areas for further research. First of all, the results must be tentatively accepted until they are generalized across a number of studies. As usual in such research, the broad generalizability of these results cannot automatically be assumed. Replication is a crucial and often neglected aspect of generalizing marketing constructs (Jacoby 1978). Therefore, extending the INDSAT scale to new and related populations would be the essence of scientific generalization. Additional research, like the

replication studies of the SERVQUAL scale by Parasuraman, Zeithaml, and Berry (1991) in different customer samples would contribute to a broader understanding of customer satisfaction. By its nature, this follow-up research will take years to complete, but it is a necessary next step.

The second limitation is that, as mentioned before, the present study involved a cross-sectional survey and is not a longitudinal study. This means, the data were gathered at one point in time. As such, it offers a static view. An interesting area of research could be the use of the measure to track customer satisfaction over time to investigate how satisfaction changes over time. Projects that measure satisfaction over several time periods could also assess how the relative importance of the seven satisfaction dimensions changes over longer time periods. Therefore, the research must be replicated not only in diverse environments, but also over time to increase confidence in the nature and power of theory.

While the concept of customer satisfaction is emerging as an important research area of industrial marketing, there have been very few empirical studies that investigate customer satisfaction in this context. The purified measurement items of this study will provide a valuable guidance to the future empirical research concerning satisfaction and its relation to other constructs.

## Appendix: Final INDSAT Scale

---

<i>Variable</i>	<b>How satisfied are you with the ...</b>
<i>INDSAT1: Satisfaction with Products</i>	
INDSAT1-1	technical performance of this supplier's products?
INDSAT1-2	reliability of the products?
INDSAT1-3	price/value relationship of this supplier's products?
INDSAT1-4	cost efficiency of this supplier's products throughout their entire life cycle?
INDSAT1-5	service-friendliness of this supplier's products?
<i>INDSAT2: Satisfaction with Salespeople</i>	
INDSAT2-1	the knowledge of this supplier's salespeople regarding the usage conditions for this supplier's products within your company?
INDSAT2-2	product knowledge of this supplier's salespeople?
INDSAT2-3	support in problem solving provided by this supplier's salespeople?
INDSAT2-4	friendliness of this supplier's salespeople when interacting with you?
INDSAT2-5	personnel continuity concerning the salespeople that you work with?
INDSAT2-6	time taken by this supplier's salespeople in reacting to your requests for visits?
INDSAT2-7	frequency of this supplier's salespeople's visits to your company?
<i>INDSAT3: Satisfaction with Product-Related Information</i>	
INDSAT3-1	information provided in this supplier's technical documentation?
INDSAT3-2	availability of technical documentation?
INDSAT3-3	usability of the operating instructions relating to this supplier's products?
INDSAT3-4	information given in other documentation (for example brochures/prospectuses)?
<i>INDSAT4: Satisfaction with Order Handling and Processing</i>	
INDSAT4-1	time taken in returning order confirmation?
INDSAT4-2	reliability of order processing?
INDSAT4-3	delivery times as given in the order confirmation?
INDSAT4-4	adherence to delivery schedules?
<i>INDSAT5: Satisfaction with Technical Services</i>	
INDSAT5-1	speed of availability of service staff?
INDSAT5-2	technical quality of service provided?
INDSAT5-3	price/value ratio of this supplier's service?
<i>INDSAT6: Satisfaction with Communication with Internal Staff</i>	
INDSAT6-1	reachability of employees in manufacturing sites?
INDSAT6-2	reaction to requests made by telephone?
INDSAT6-3	reaction to written requests?
<i>INDSAT7: Satisfaction with Complaint Handling</i>	
INDSAT7-1	actions taken by this supplier's company with regard to product related complaints within the warranty period?
INDSAT7-2	actions taken by this supplier's company with regard to product related complaints outside the warranty period?
INDSAT7-3	reaction on general complaints?

All items employ 5-point scales with anchors "Strongly Satisfied" (5)/ "Strongly Dissatisfied" (1) with no verbal statements between point 2 to 4.

## REFERENCES

- Anderson, Erin, Wujin Chu, and Barton Weitz (1987), "Industrial Purchasing: An Empirical Exploration of the Buyclass Framework," *Journal of Marketing*, 51 (July), 71-86.
- Anderson, Eugene W., Claes Fornell, and Donald R. Lehmann (1994), "Customer Satisfaction, Market Share, and Profitability: Findings from Sweden," *Journal of Marketing*, 58 (July), 53-66.
- Anderson, Rolph E. (1973), "Consumer Dissatisfaction: The Effect of Disconfirmed Expectancy on Perceived Product Performance," *Journal of Marketing Research*, 10 (February), 52-9.
- Andreasen, Alan R. and Arthur Best (1977), "Consumers Complain - Does Business Respond?," *Harvard Business Review*, 55, 90-101.
- Babakus, Emin and Gregory W. Boller (1992), "An Empirical Assessment of the SERVQUAL Scale," *Journal of Business Research*, 24, 253-68.
- \_\_\_\_\_, Dennis Pedrick, and Andrea Richardson (1995), "Assessing Perceived Quality in Industrial Service Settings: Measure Development and Application," *Journal of Business-to-Business Marketing*, 2, 3, 347-66.
- Bagozzi, Richard P. (1981), "Evaluating Structural Equation Models With Unobservable Variables and Measurement Error: A Comment," *Journal of Marketing Research*, 18 (August), 375-81.
- \_\_\_\_\_, and Hans Baumgartner (1994), "The Evaluation of Structural Equation Models and Hypothesis Testing," in *Principles of Marketing Research*, ed. Richard P. Bagozzi, Cambridge, 386-422.
- \_\_\_\_\_, and Lynn W. Phillips (1982), "Representing and Testing Organizational Theories: A Holistic Construal," *Administrative Science Quarterly*, 27, 459-89.
- \_\_\_\_\_, and Youjae Yi (1988), "On the Evaluation of Structural Equation Models," *Journal of the Academy of Marketing Science*, 16 (Spring), 74-94.
- \_\_\_\_\_, \_\_\_\_\_, and Lynn W. Phillips (1991), "Assessing Construct Validity in Organizational Research," *Administrative Science Quarterly*, 36, 421-58.
- Banting, Peter M. (1984), "Customer Service in Industrial Marketing: A Comparative Study," *European Journal of Marketing*, 10, 3, 136-45.
- Barksdale, Hiram C., Terry E. Powell, and Earnestine Hargrove (1984), "Complaint Voicing by Industrial Buyers," *Industrial Marketing Management*, 13, 93-9.
- Bearden, William O. and Jesse E. Teel (1983), "Selected Determinants of Consumer Satisfaction and Complaint Reports," *Journal of Marketing Research*, 20 (February), 21-8.
- \_\_\_\_\_, Richard G. Netemeyer, and Teel (1989) "Measurement of Consumer Susceptibility to Interpersonal Influence," *Journal of Consumer Research*, 15 (March), 473-81.
- Bentler, Peter M. (1990), "Comparative Fit Indexes in Structural Models," *Psychological Bulletin*, 107, 238-46.
- Bitner, Mary J., Bernhard H. Booms, and Mary S. Tetreault (1990), "The Service Encounter: Diagnosing Favorable and Unfavorable Incidents," *Journal of Marketing*, 54 (January), 71-84.
- Bolton, Ruth N. and James H. Drew (1991), "A Multistage Model of Consumers' Assessments of Service Quality and Value," *Journal of Consumer Research*, 17, 375-84.
- \_\_\_\_\_, and \_\_\_\_\_ (1994), "Linking Customer Satisfaction to Service Operations and Outcomes," in *Service Quality: New Directions in Theory and Practice*, eds. Roland T. Rust and Richard L. Oliver, Thousand Oaks, Sage Publications, Inc., 173-200.
- Bowen, David E., Caren Siehl, and Benjamin Schneider (1989), "A Framework for Analyzing Customer Service Orientations in Manufacturing," *Academy of Management Review*, 14, 1, 75-95.
- Brand, Gordon T. (1972), *The Industrial Buying Decision*, London.
- Cadotte, Ernest W., Robert B. Woodruff, and Roger L. Jenkins (1987), "Expectations and Norms in Models of Consumer Satisfaction," *Journal of Marketing Research*, 24 (August), 305-14.
- Cardozo, Richard N. (1965), "An Experimental Study of Customer Effort, Expectation, and Satisfaction," *Journal of Marketing Research*, 2 (August), 244-9.

- Churchill, Gilbert A., Jr. (1979), "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research*, 16 (February), 64-73.
- and Carol Surprenant (1982), "An Investigation into the Determinants of Customer Satisfaction," *Journal of Marketing Research*, 19 (November), 491-504.
- Cohen, Morris A. and Hau L. Lee (1990), "Out of Touch with Customer Needs? Spare Parts and After Sales Service," *Sloan Management Review*, 31, 2 (Winter), 55-66.
- Cooper, M. Bixby, Cornelia Dröge, and Patricia J. Daugherty (1991), "How Buyers and Operations Personnel Evaluate Service," *Industrial Marketing Management*, 20, 81-5.
- Cronbach, Lee J. (1951), "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, 16 (October), 297-334.
- Cronin, J. Joseph, Jr., and Steven A. Taylor (1992), "Measuring Service Quality: A Reexamination and Extension," *Journal of Marketing*, 56 (July), 55-68.
- Crosby, L. A. (1991), "Expanding the Role of CSM in Total Quality," *International Journal of Service Industry Management*, 2, 5-19.
- and Nancy Stephens (1987), "Effects of Relationship Marketing on Satisfaction, Retention, and Prices in the Life Insurance Industry," *Journal of Marketing Research*, 26 (November), 404-11.
- Crow, Lowell E. and Jay D. Lindquist (1985), "Impact of Organizational and Buyer Characteristics on the Buying Center," *Industrial Marketing Management*, 14, 49-58.
- Cudeck, Robert and Michael W. Browne (1983), "Cross-Validation of Covariance Structures," *Multivariate Behavioral Research*, 18, 147-57.
- Cunningham, M. T. and D. A. Roberts (1974), "The Role of Customer Service in Industrial Markets," *European Journal of Marketing*, Spring, 15-28.
- Czepiel, John A. and Larry J. Rosenberg (1977), "Consumer Satisfaction: Concept and Measurement," *Journal of the Academy of Marketing Science*, 5, 4, 403-11.
- Danaher, Peter J. and Jan Mattson (1994), "Cumulative Encounter Satisfaction in the Hotel Conference Process," *International Journal of Service Industry Management*, 5, 4, 69-80.
- Day, Ralph and E. Laird Landon (1977), "Toward a Theory of Consumer Complaining Behavior," in *Consumer and Industrial Buying Behavior*, eds. Arch G. Woodside, Jagdish N. Sheth, and Peter Bennett, Elsevier, North-Holland, Inc., 425-37.
- Deshpandé, Rohit (1983), "Paradigms Lost: On Theory and Method in Research in Marketing," *Journal of Marketing*, 47 (Fall), 101-10.
- Dwyer, F. Robert (1993), "Soft and Hard Features of Interfirm Relationships: An Empirical Study of Bilateral Governance in Industrial Distribution," working paper, College of Business Administration, University of Cincinnati.
- , Paul H. Schurr, and Sejo Oh (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing*, 51 (April), 11-27.
- Ford, David (1980), "The Development of Buyer-Seller Relationships in Industrial Markets," *European Journal of Marketing*, 14, 5/6, 339-53.
- Fornell, Claes (1992), "A National Customer Satisfaction Barometer: The Swedish Experience," *Journal of Marketing*, 56 (January), 6-21.
- and David F. Larcker (1981), "Evaluating Structural Equation Models With Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18 (February), 39-50.
- , Michael D. Johnson, Eugene W. Anderson, Jaesung Cha, and Barbara Everitt Bryant (1996), "The American Customer Satisfaction Index: Nature, Purpose, and Findings," *Journal of Marketing*, 60 (October), 7-18.
- Gassenheimer, Jule B., Jay U. Sterling, and Robert A. Robicheaux (1989), "Long-term Channel Member Relationships," *International Journal of Physical Distribution & Materials Management*, 19, 12, 15-28.
- Gerbing, David W. and James C. Anderson (1988), "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment," *Journal of Marketing Research*, 25 (May), 186-92.

- Gordon, Geoffrey L., Roger J. Calantone, and C. Anthony di Benedetto (1993), "Business-to-Business Service Marketing," *Journal of Business & Industrial Marketing*, 8, 1, 45-57.
- Haas, Robert W. (1989), *Business Marketing Management*, Boston.
- Hakansson, Hakan (1982), *International Marketing and Purchasing of Industrial Goods - An Interaction Approach*, London: John Wiley and Sons.
- Halstead, Diane, David Hartman, and Sandra L. Schmidt (1994), "Multisource Effects on the Satisfaction Formation Process," *Journal of the Academy of Marketing Science*, 22 (Spring), 114-29.
- Han, San-Lin (1992), "Antecedents of Buyer-Seller Long-Term Relationships: An Exploratory Model of Structural Bonding and Social Bonding," working paper, Institute for the Study of Business Markets, Pennsylvania State University.
- and David T. Wilson (1992), "Antecedents of Buyer-Commitment to the Supplier: A Model of Structural Bonding and Social Bonding," working paper, Institute for the Study of Business Markets, Pennsylvania State University.
- Homburg, Christian (1991), "Cross-Validation and Information Criteria in Causal Modeling," *Journal of Marketing Research*, 28 (May), 137-44.
- Hutt, Michael D. and Thomas W. Speh (1992), *Business Marketing Management: A Strategic View of Industrial and Organizational Markets*, 4th ed., Fort Worth: The Dryden Press.
- Jackson, Ralph W. and Philip D. Cooper (1988), "Unique Aspects of Marketing Industrial Services," *Industrial Marketing Management*, 17, 111-8.
- , Lester A. Neidell, and Dale A. Lunsford (1995), "An Empirical Investigation of the Differences in Goods and Services as Perceived by Organizational Buyers," *Industrial Marketing Management*, 24, 99-108.
- Jacoby, Jacob (1978), "Consumer Research: A State-of-the-Art Review," *Journal of Marketing*, 42 (April), 87-96.
- Johnston, Wesley J. (1981), *Patterns in Industrial Buying Behavior*, Praeger: New York.
- and Thomas V. Bonoma (1981a), "The Buying Center: Structure and Interaction Patterns," *Journal of Marketing*, 45 (Summer), 143-56.
- and ——— (1981b), "Purchase Process for Capital Equipment and Services," *Industrial Marketing Management*, 10, 253-264.
- Jöreskog, Karl G. and Dag Sörbom (1982), "Recent Developments in Structural Equation Modeling," *Journal of Marketing Research*, 19 (November), 404-16.
- and ——— (1993), *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*, Chicago: Scientific Software International.
- Kekre, Sunder, Mayuram S. Krishnan, and Kannan Srinivasan (1995), "Drivers of Customer Satisfaction for Software Products: Implications for Design and Service Support," *Management Science*, 41, 9, 1456-70.
- Kirsch, Walter and Michael Kutschker (1982), "Marketing and Buying Decisions in Industrial Markets," in *Studies in Decision Making*, ed. Martin Irle, New York: Walter der Gruyter, 443-88.
- Kohli, Ajay K. and Bernard J. Jaworski (1990), "Market Orientation: The Construct, Research Propositions, and Managerial Implications," *Journal of Marketing*, 54 (April), 1-18.
- , ———, and Ajith Kumar (1993), "MARKOR: A Measure of Market Orientation," *Journal of Marketing Research*, 30 (November), 467-77.
- Kumar, Nirmalya, Louis W. Stern, and James C. Anderson (1993), "Conducting Interorganizational Research Using Key Informants", *Academy of Management Journal*, 36, 6, 163-52.
- LaTour, Steven A. and Nancy C. Peat (1979), "Conceptual and Methodological Issues in Consumer Satisfaction Research," in *Advances in Consumer Research*, Vol. 6, ed. William L. Wilkie, Ann Arbor, MI: Association for Consumer Research, 431-7.
- Lilien, Gary W. and M. Anthony Wong (1984), "An Exploratory Investigation of the Structure of the Buying Center in the Metalworking Industry," *Journal of Marketing Research*, 21 (February), 1-11.

- Madden, Thomas J., Chris T. Allen, and Jacquelin L. Twibble (1988), "Attitude Toward the Ad: An Assessment of Diverse Measurement Indices Under Different Processing Sets," *Journal of Marketing Research*, 25 (August), 242-52.
- Mast, Kenneth E. and Jon M. Hawes (1986), "Perceptual Differences Between Buyers and Engineers," *Journal of Purchasing and Materials Management*, 22 (Spring), 2-6.
- Mathe, Hervé and Roy D. Shapiro (1993), *Integrating Service Strategy in the Manufacturing Company*, London: Chapman & Hall.
- Meyer, Anton and Frank Dornach (1997), "Das deutsche Kundenbarometer - Qualität und Zufriedenheit," in *Kundenzufriedenheit: Konzepte, Methoden, Erfahrungen*, eds. Hermann Simon and Christian Homburg, 2nd edition, 163-84.
- McQuiston, Daniel H. (1989), "Novelty, Complexity, and Importance as Causal Determinants of Industrial Buyer Behavior," *Journal of Marketing*, 53 (April), 66-79.
- Michaels, Ronald E. and Ralph L. Day (1985), "Measuring Customer Orientation of Salespeople: A Replication With Industrial Buyers," *Journal of Marketing Research*, 22 (November), 443-6.
- Möller, K. E. Kristian and Martti Laaksonen (1986), "Situational Dimensions and Decision Criteria in Industrial Buying: Theoretical and Empirical Analysis," *Advances in Business Marketing*, 1, 163-207.
- Moriarty, Rowland T. and John E. Bateson (1982), "Exploring Complex Decision Making Units: A New Approach," *Journal of Marketing Research*, 19 (May), 182-91.
- Naumann, Earl, Douglas J. Lincoln and Robert D. McWilliams (1985), "The Purchase of Components: Functional Areas of Influence," *Industrial Marketing Management*, 13, 113-22.
- Narver, John C. and Stanley F. Slater (1990), "The Effect of a Market Orientation on Business Profitability," *Journal of Marketing*, 54 (October), 20-35.
- National Institute of Standards and Technology (1994), *Malcolm Baldrige National Quality Award: 1994 Award Criteria*, Gaithersburg.
- Nunally, Jum C. (1978), *Psychometric Theory*, New York: McGraw-Hill Book Company.
- Oliva, Terence A., Richard L. Oliver, and Ian C. MacMillan (1992), "A Catastrophe Model for Developing Service Satisfaction Strategies," *Journal of Marketing*, 56 (July), 83-95.
- Oliver, Richard L. (1980), "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions," *Journal of Marketing Research*, 17 (November), 406-69.
- (1981), "Measurement and Evaluation of Satisfaction Process in Retail Settings," *Journal of Retailing*, 57 (Fall), 25-48.
- (1993), "A Conceptual Model of Service Quality and Service Satisfaction: Compatible Goals, Different Concepts," *Advances in Services Marketing and Management*, 2, 65-85.
- (1996), *Satisfaction: A Behavioral Perspective on the Consumer*, New York: McGraw-Hill Book Company.
- and Gerald Linda (1981), "Effect of Satisfaction and Its Antecedents on Consumer Preference and Intention," in *Advances in Consumer Research*, Vol. 8, ed. Kent B. Monroe, Ann Arbor, MI: Association for Consumer Research, 88-93.
- and Wayne S. DeSarbo (1988), "Response Determinants in Satisfaction Judgements," *Journal of Consumer Research*, 14 (March), 495-507.
- Olson, Jerry C. and Philip Dover (1979), "Disconfirmation of Consumer Expectations through Product Trial," *Journal of Applied Psychology*, 64 (April), 179-89.
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1988), "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality," *Journal of Retailing*, 64 (Spring), 12-40.
- , ———, and ——— (1991), "Refinement and Reassessment of the SERVQUAL Scale," *Journal of Retailing*, 67 (Winter), 420-50.
- , ———, and ——— (1994), "Reassessment of Expectations as Comparison Standard in Measuring Service Qualiy: Implications for Future Research", *Journal of Marketing*, 58 (January), 111-124.

- Perreault, William D. and Frederick A. Russ (1976), "Physical Distribution Service in Industrial Purchase Decisions," *Journal of Marketing*, 40 (April), 3-10.
- Peter, J. Paul, Gilbert A. Churchill, Jr., and Tom J. Brown (1993), "Caution in the Use of Difference Scores in Consumer Research," *Journal of Consumer Research*, 19 (March), 655-62.
- Phillips, Lynn W. (1981), "Assessing Measurement Error in Key Informants Reports: A Methodological Note on Organizational Analysis in Marketing," *Journal of Marketing Research*, 18 (November), 395-415.
- Qualls, William J. and José Antonia Rosa (1995), "Assessing Industrial Buyers Perceptions of Quality and Their Effects on Satisfaction," *Industrial Marketing Management*, 24, 359-68.
- Reve, Torger and Egil Johansen (1982), "Organizational Buying in the Offshore Oil Industry," *Industrial Marketing Management*, 11, 275-82.
- Robinson, Patrick, Charles Faris, and Yoram Wind (1967), *Industrial Buying and Creative Marketing*, Boston: Allyn and Bacon.
- Ruekert, Robert W. and Gilbert Churchill, Jr. (1984), "Reliability and Validity of Alternative Measures of Channel Member Satisfaction," *Journal of Marketing Research*, 21 (May), 226-33.
- Saxe, Robert and Barton A. Weitz (1982), "The SOCO Scale: A Measure of the Customer Orientation of Salespeople," *Journal of Marketing Research*, 19 (August), 343-51.
- Schul, Patrick L., Taylor E. Little, Jr., and William M. Pride (1985), "Channel Climate: Its Impact on Channel Members' Satisfaction," *Journal of Retailing*, 61 (Summer), 9-37.
- Seidler, John (1974), "On Using Informants: A Technique for Collecting Quantitative Data and Controlling for Measurement Error in Organizational Analysis," *American Sociological Review*, 39, 816-31.
- Shapiro, Benson P., V. Kasturi Rangan, and John J. Sviokla (1992), "Staple Yourself to an Order," *Harvard Business Review*, 70 (July-August), 113-22.
- Sheth, Jagdish N. (1973), "A Model of Industrial Buyer Behavior," *Journal of Marketing*, 37 (October), 50-6.
- Silk, Alvin J. and Manohar U. Kalwani (1982), "Measuring Influence in Organizational Purchase Decisions," *Journal of Marketing Research*, 19 (May), 165-81.
- Singh, Jagdip (1991), "Understanding the Structure of Consumers' Satisfaction Evaluations of Service Delivery," *Journal of the Academy of Marketing Science*, 19, 3, 223-44.
- Spekman, Robert E. and Louis W. Stern (1979), "Environmental Uncertainty and Buying Group Structure: An Empirical Investigation," *Journal of Marketing*, 43 (Spring), 54-64.
- \_\_\_\_\_, David W. Stewart and Wesley J. Johnston (1995), "An Empirical Investigation of the Formation and Implications of the Organizational Buyer's Strategic and Tactical Roles," *Journal of Business-to-Business Marketing*, 2, 4, 37-63.
- Spreng, Richard A., and Richard W. Olshavsky (1992), "A Desires-As-Standard Model of Consumer Satisfaction: Implications for Measuring Satisfaction," *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, 5, 45-54.
- \_\_\_\_\_, Scott B. MacKenzie, and Richard W. Olshavsky (1996), "A Reexamination of the Determinants of Consumer Satisfaction," *Journal of Marketing*, 60, 3 (July), 15-32.
- Steiger, J. (1990), "Structural Model Evaluation and Modification: An Interval Estimation Approach," *Multivariate Behavioral Research*, 25, 173-80.
- Swan, John E. and Warren S. Martin (1981), "Testing Comparison Level and Predictive Expectations Model of Satisfaction," in *Advances in Consumer Research*, Vol. 8, ed. Kent B. Monroe, Ann Arbor, MI: Association for Consumer Research, 77-82.
- Tanner, John F., Jr. (1996), "Buyer Perceptions of the Purchase Process and Its Effect on Customer Satisfaction," *Industrial Marketing Management*, 25, 125-33.
- Teas, R. Kenneth (1993), "Expectations, Performance Evaluation, and Consumers' Perceptions of Quality," *Journal of Marketing*, 57 (October), 18-34.
- \_\_\_\_\_(1994), "Expectations as a Comparison Standard in Measuring Service Quality: An Assessment of a Reassessment," *Journal of Marketing*, 58 (January), 132-9.

- Trawick, I. Frederick and John E. Swan (1981), "A Model of Industrial Satisfaction/Complaining Behavior," *Industrial Marketing Management*, 10, 23-30.
- Tse, David K. and Peter C. Wilton (1988), "Models of Consumer Satisfaction Formation: An Extension," *Journal of Marketing Research*, 15 (May), 204-12.
- Turnbull, Peter and David Wilson (1989), "Developing and Protecting Profitable Customer Relationships", *Industrial Marketing Management*, 18, 233-38.
- Webster, Frederick (1991), *Industrial Marketing Strategy*, New York: John Wiley and Sons.
- and Yoram Wind (1972a), "A General Model for Understanding Organizational Buying Behavior," *Journal of Marketing*, 36 (April), 12-9.
- and ——— (1972b), *Organizational Buying Behavior*, Englewood Cliffs: Prentice-Hall, Inc.
- Westbrook, Robert A. (1981), "Sources of Consumer Satisfaction with Retail Outlets," *Journal of Retailing*, 57, 68-72.
- Williams, Robert and Victor Gray (1978), "Dissatisfaction and Complaint Behavior of the Industrial Buyer," in *Proceedings: Southern Marketing Association*, 343-46.
- Wilson, Elisabeth J. and Gary L. Lilien (1992), "Using Single Informants to Study Group Choice: An Examination of Research Practice in Organizational Buying," *Marketing Letters*, 3, 3, 297-305.
- and Arch G. Woodside (1995), "The Relative Importance of Choice Criteria in Organizational Buying: Implications for Adaptive Selling," *Journal of Business-to-Business Marketing*, 2, 1, 33-57.
- Wind, Yoram, P. E. Green and Patrick E. Robinson (1968), "The Determinants of Vendor Selection: The Evaluation Function Approach," *Journal of Purchasing and Materials Management*, August, 29-41.

**Table 1**  
**SAMPLE PROFILE**

	<i>Surveys sent out</i>	<i>Surveys returned</i>	<i>Response rate (%)</i>
<i>Sample 1</i>			
Germany	2576	873	33.9
<i>Sample 2</i>			
Austria	218	120	55.1
Belgium	602	195	32.4
Denmark	82	34	41.5
Great Britain	123	57	46.3
France	1092	198	18.1
Italy	1037	157	15.1
Netherlands	733	381	52.0
Portugal	152	46	30.3
Spain	1017	226	22.2
Switzerland	149	108	72.5
Sweden	244	156	63.9
<i>Total (Sample 2)</i>	5449	1679	30.8

**Table 2**  
**CONFIRMATORY FACTOR ANALYSIS RESULTS (SAMPLE 1)**

Factor/Item	Individual Item Reliability	t-values of factor loadings	Construct Reliability	Average Variance Extracted	Coefficient Alpha
<i>INDSAT1 (Satisfaction with Products)</i>			.90	.64	.85
INDSAT1-1	.64	62.34			
INDSAT1-2	.65	62.79			
INDSAT1-3	.50	57.12			
INDSAT1-4	.70	64.58			
INDSAT1-5	.72	65.43			
<i>INDSAT2 (Satisfaction with Salespeople)</i>			.94	.69	.90
INDSAT2-1	.71	69.50			
INDSAT2-2	.75	71.24			
INDSAT2-2	.75	71.41			
INDSAT2-4	.75	71.38			
INDSAT2-5	.63	66.25			
INDSAT2-6	.66	67.45			
INDSAT2-7	.59	64.42			
<i>INDSAT3 (Satisfaction with Product-Related Information)</i>			.93	.78	.91
INDSAT3-1	.73	62.43			
INDSAT3-2	.80	64.50			
INDSAT3-3	.84	65.88			
INDSAT3-4	.74	63.37			
<i>INDSAT4 (Satisfaction with Order Handling and Processing)</i>			.89	.67	.85
INDSAT4-1	.76	61.97			
INDSAT4-2	.81	63.49			
INDSAT4-3	.57	56.60			
INDSAT4-4	.55	55.92			
<i>INDSAT5 (Satisfaction with Technical Services)</i>			.88	.72	.84
INDSAT5-1	.62	50.16			
INDSAT5-2	.76	52.61			
INDSAT5-3	.78	53.69			
<i>INDSAT6 (Satisfaction with Communication with Internal Staff)</i>			.93	.83	.90
INDSAT6-1	.74	59.16			
INDSAT6-2	.89	61.21			
INDSAT6-3	.85	61.21			
<i>INDSAT7 (Satisfaction with Complaint Handling)</i>			.95	.85	.91
INDSAT7-1	.85	62.62			
INDSAT7-2	.83	62.49			
INDSAT7-3	.88	62.89			

**Table 3**  
**CORRELATION MATRIX OF THE SEVEN INDSAT FACTORS (SAMPLE 1)**

	<i>INDSAT1</i>	<i>INDSAT2</i>	<i>INDSAT3</i>	<i>INDSAT4</i>	<i>INDSAT5</i>	<i>INDSAT6</i>	<i>INDSAT7</i>
<i>INDSAT1</i>	1.00						
<i>INDSAT2</i>	.25***	1.00					
<i>INDSAT3</i>	.30***	.29***	1.00				
<i>INDSAT4</i>	.34***	.27***	.32***	1.00			
<i>INDSAT5</i>	.34***	.21***	.27***	.22***	1.00		
<i>INDSAT6</i>	.35***	.28***	.26***	.45***	.32***	1.00	
<i>INDSAT7</i>	.44***	.31***	.26***	.41***	.30***	.37***	1.00

\*\*\* indicates significance at the .01 level

**Table 4**  
**CONFIRMATORY FACTOR ANALYSIS RESULTS (SAMPLE 2)**

Factor/Item	Individual Item Reliability	t-values of factor loadings	Construct Reliability	Average Variance Extracted	Coefficient Alpha
<i>INDSAT1 (Satisfaction with Products)</i>			.89	.61	.84
INDSAT1-1	.60	82.14			
INDSAT1-2	.64	84.81			
INDSAT1-3	.47	76.61			
INDSAT1-4	.65	85.86			
INDSAT1-5	.68	88.12			
<i>INDSAT2 (Satisfaction with Salespeople)</i>			.93	.66	.90
INDSAT2-1	.68	100.47			
INDSAT2-2	.65	98.35			
INDSAT2-2	.69	101.22			
INDSAT2-4	.69	100.97			
INDSAT2-5	.72	102.75			
INDSAT2-6	.66	99.47			
INDSAT2-7	.53	90.44			
<i>INDSAT3 (Satisfaction with Product-Related Information)</i>			.94	.80	.92
INDSAT3-1	.73	89.18			
INDSAT3-2	.85	91.59			
INDSAT3-3	.83	91.04			
INDSAT3-4	.74	87.62			
<i>INDSAT4 (Satisfaction with Order Handling and Processing)</i>			.90	.69	.86
INDSAT4-1	.72	85.94			
INDSAT4-2	.84	89.94			
INDSAT4-3	.57	79.35			
INDSAT4-4	.61	81.21			
<i>INDSAT5 (Satisfaction with Technical Services)</i>			.89	.72	.85
INDSAT5-1	.68	76.26			
INDSAT5-2	.77	78.11			
INDSAT5-3	.72	77.20			
<i>INDSAT6 (Satisfaction with Communication with Internal Staff)</i>			.93	.82	.91
INDSAT6-1	.73	78.81			
INDSAT6-2	.86	81.50			
INDSAT6-3	.86	81.87			
<i>INDSAT7 (Satisfaction with Complaint Handling)</i>			.95	.87	.93
INDSAT7-1	.86	87.55			
INDSAT7-2	.89	88.58			
INDSAT7-3	.85	87.08			

**Table 5**  
**IMPACT OF SATISFACTION FACTORS ON OVERALL CUSTOMER  
SATISFACTION**

<i>Factor</i>	<i>Purchasing</i>	<i>Engineering</i>	<i>Manufacturing</i>
INDSAT1(Satisfaction with Products)	.09*	.16***	.31***
INDSAT2(Satisfaction with Salespeople)	.33***	.19***	.29***
INDSAT3(Satisfaction with Product-Related Information)	.00	.11***	.09
INDSAT4(Satisfaction with Order Handling and Processing)	.37***	.11***	.19**
INDSAT5(Satisfaction with Technical Services)	.10**	.15***	-.15**
INDSAT6(Satisfaction with Communication with Internal Staff)	.00	.01	.03
INDSAT7(Satisfaction with Complaint Handling)	.17***	.33***	.27***
<i>latent variable model R</i> <sup>2</sup>	.70	.71	.81

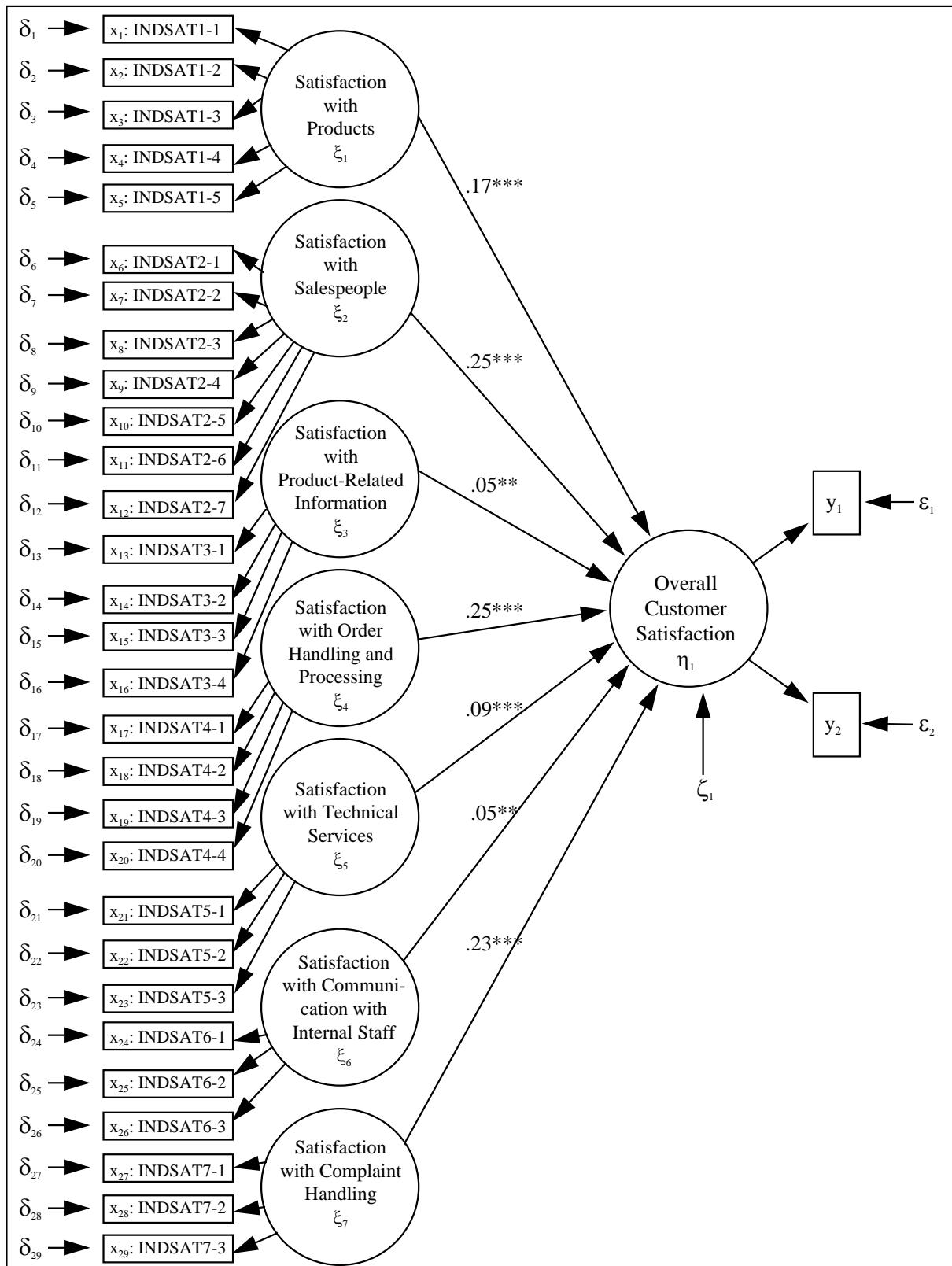
Completely Standardized Solution

\*\*\* Parameter estimates are significant at the .01 level.

\*\* Parameter estimates are significant at the .05 level.

\* Parameter estimates are significant at the .1 level.

**Figure 1**  
**CAUSAL MODEL RELATING INDSAT FACTORS TO OVERALL CUSTOMER SATISFACTION**  
(including parameter estimates for sample 1)



Completely Standardized Solution

\*\*\* Parameter estimates are significant at the .01 level.

\*\* Parameter estimates are significant at the .05 level.