DISTRIBUTION SERVICE

COMPETITION WITHIN AND AMONG RETAIL FORMATS

K. KOELEMEIJER

Distribution Service

Competition Within and Among Retail Formats

Promotor: Dr. ir. M.T.G. Meulenberg
Hoogleraar Marktkunde en Consumentengedrag

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Kitty Koelemeijer

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To my parents

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Chapter 1

Introduction

1.1 Availability as distribution channel output

Creation of availability constitutes the core of marketing. Every marketing practitioner is involved in making goods and/or services available to customers. Availability refers to the possibility for buyers to obtain products that possess desired characteristics at an acceptable cost. In a broad sense creation of availability involves virtually all activities that a firm could possibly undertake, including technical product development, production, distribution, and communication. Manufacturers add value particularly through product transformations, wholesale and retail traders are almost exclusively concerned with service delivery through their distribution and selling efforts.

This book considers the availability of finished products, given their intrinsic characteristics resulting from successful production according to specifications and given consumer perceptions of these characteristics resulting from advertising and other mass-media information. The goods considered could be semifinal or final provided their production process has been completed[1]. Creation of availability of finished products comprises adjustment of differences between the quantity and quality of the product(s) at the point and time of production and the time and place

[1] Products exist with intrinsic characteristics that undergo intended changes during physical distribution, e.g. cheese and wine. For these products physical distribution activities, such as storage, are an integral part of the production process and will therefore not be considered.

at which the final consumer buys the product(s), the quantity in which she or he buys it (them), and the quality of the product(s) at the time and point of usage or consumption. This is done largely through distribution channels or marketing channels. Stern, El-Ansary and Coughlan (1996, p.1) describe marketing channels as "*... sets of interdependent organizations involved in the process of making a product or service available for consumption or use*," and as encompassing "*... the value-added benefits that members of the commercial, or selling, channel provide to end-users in the form of time, place, possession, and form utilities for end-users*"[2].

Distribution services are the outputs of the distribution functions, performed by vertically and/or horizontally related distribution channel members, that are instrumental in creating availability. Chapter 2 illustrates and discusses many possible interpretations of the role of distribution organizations in the creation of availability. The focal point is that through facilitation of a customer's shopping or procurement process and product use, whether by lowering implicit shopping cost, contributing to the pleasure of shopping, or assisting consumers in making better decisions, a distributive organization can attract buyers and consequently increase its profits[3]. Important distribution service elements include offering a product assortment, information provision, accessibility of the supplier's organization, product delivery, quality maintenance, and ambience[4].

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[2] The terms "marketing channel" and "distribution channel" are often used interchangeably, although Stern, El-Ansary, and Coughlan (1996) do recognize the differential meaning of the two channels. One key distinction, implicitly suggested by Stern et al., is that distribution channels satisfy consumer demand through product delivery, while marketing channels in addition stimulate demand, for example through promotional activities. In this view marketing channels perform more functions than distribution channels. Corey, Cespedes, and Rangan (1989) avoid this distinction and define a distribution channel from the perspective of the organizations involved as "The product distribution system, including the producer's salesforce, independent distributors, agents, broker, and captive distributors". Both channel types exclude production. For the purpose of conceptual clarity this book uses the term distribution channels as systems designed to create availability through physical distribution processes.

[3] The term distribution services will be used throughout this book. Other related expressions, such as customer services, product services, logistic services, value-added services, or (marketing) channel services, are widely used in literature. Although these terms often are, at least to a certain extent applicable to, or even encompassing distribution services, the term distribution services remains central and will be used throughout the text.

[4] Although so-called pure services are not the focus of this book, a large part of its discussion applies not only to goods but to pure services as well. With respect to many services however no clear distinction exists between production and distribution processes, mainly because service

Every individual experiences a need for availability and consequently values a seller's efforts with respect to creation thereof, i.e., the provision of distribution service. Availability is a subjective concept; consumers differ in their demand for distribution service, i.e., their needs, wants, and desires with respect to where and when a certain (combination of) product(s) can be obtained, and the quantity and quality of these products. Consequently, consumers will have differential perceptions of a distribution channel's performance and the value created through it. Consumer demand for distribution service is driven by several factors, both economic, psychological, and social, enduring as well as situational. Arbitrary examples include the intrinsic need for variety (cf. McAllister and Pessemier 1982) by which individuals cannot but adopt a varied consumption pattern, time constraints with respect to shopping, and the purpose for which shopping is done.

The assortment is an important, if not the most important, distribution service element that is related to many other distribution service elements and enables delivery of many potential customer benefits resulting from supplier distribution service provision. Distribution service elements such as product quality and ambience are inextricably linked to customers' assortment perceptions, whereas service elements related to product delivery follow largely from assortment size and composition, at least in a retail environment. Assortments can be considered as collections from which one or more items can be chosen, either simultaneously or consecutively, in order to satisfy certain needs, wants, and/or desires. Assortments exist at different levels of aggregation and hierarchy. At a low level of aggregation assortments are collections of goods consumers keep at home. Every day a consumer makes multiple choices from in-home assortments, including the clothes he or she will wear during daytime, food that will be prepared for meals, and television programs that will be watched. At a higher level of aggregation an assortment is the joint offering of goods and/or services by a retail outlet. A collection of multiple retail outlets in a shopping centre constitutes an assortment of stores. When shopping for groceries a consumer chooses whether to visit a large-scale supermarket or a number of smaller specialized stores. Once a store has been selected the consumer chooses from multiple product categories and multiple

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production and distribution require supplier-customer interactions, production and consumption occur simultaneously, and consequently production and distribution may coincide.

brands within each category. On an even higher level a consumer considers a collection of different shopping centres in a geographical region as an assortment, and so on. A similar reasoning applies to wholesale and manufacturer assortments. A retailer selects her supplier(s) from multiple wholesalers who in turn face decision making from product offerings by assortments consisting of multiple intermediaries and/or manufacturers, each carrying their own assortment of goods and services.

Creation of availability through offering an interrelated collection of items adds surplus value, exceeding the sum of individual items' values, for a decision maker. Consumers' preference for basket shopping constitutes a strong force that justifies and explains among other things the existence of middlemen in marketing channels and the emergence of retail conglomerates. Together with distribution cost efficiency, in particular with respect to time, inventory, and transportation, consumer preference for assortments is a force that supports the existence of multiple retail outlets that carry to a large extent overlapping merchandise. The assortment carried by a trading organization is strongly connected with other distribution service elements, such as information provision, and delivery at the right time and place. In addition, assortments are a marketing instrument that can be used to influence purchase behavior through the particular combination of items carried. Because of their central and influential role in distribution service provision and creation of consumer demand, assortments - in particular assortments carried by retail outlets - form an important topic in a number of chapters of this book. In spite of the specific attention for assortments in certain chapters, these chapters also investigate other distribution service elements, depending on the research question discussed.

1.2 Evolution of distribution service

During the last decades much attention has been devoted to customer behavior with respect to goods and services. The last two or three decades, more specifically since Bucklin's (1965, 1966) theory and analysis, distribution services have been more or less overlooked as a concept by economic theory and marketing scientists, despite their impact on consumer behavior and their important role in the innovation of

trade institutions. This section briefly introduces a number of developments that justify the increasing focus on distribution service in theory and in management practice.

In the old days, when agricultural domestic production and non-monetary exchange of goods dominated the economy, producers created availability by getting together and forming marketplaces in order to facilitate comparison and trade with other producers who were also potential buyers. Nowadays, a huge variety of products exists and due to multiple reasons a large and complex variety of marketing channels has emerged. Technological developments with respect to (agricultural) production and distribution have led to the emergence and growth of organizations that specialized in one or more distributive functions. In 1900, 62.0% of total US labor force was employed in goods-producing industries (including agriculture, mining, construction, and manufacturing), and only 8.2% were engaged in goods distribution (including wholesale and retail trade, transportation, and storage). By 1980 these percentages were 26.5 and 25.5, respectively (Oi 1992). In The Netherlands about 18% of total labor force was employed in goods-producing industries in 1997, and approximately 25% was employed in goods distribution (CBS 1999). In 1960 these percentages were approximately 42 and 22, respectively (CBS 1971). Wholesale and retail trade generally perform many distributive functions and exist by virtue of their role in creating availability through establishing successful transactions with their customers. They allocate their resources in such a way as to effectively and efficiently assist (potential) customers in searching the right product at a fair price, arranging delivery and receipt, etc. Several distributive functions, such as transportation and storage, are performed by specialized middlemen that service manufacturers, retail or wholesale traders, and their respective customers with respect to for example delivery.

The evolution of distribution services relates to developments in both the demand and the supply-side of markets. From the 1960's on attention for distribution service focused on practical problems with respect to the delivery of goods, including inventory management, transportation, routing, etc. Until the late 1970's cost minimization under service constraints was the objective of most scientific research and management efforts. Now that individual organizations' physical distribution cost reductions have reached their lower limits, the significance of demand side factors has been increasingly recognized. Continuously

changing market factors, including technological innovations, prices of inputs, and demographics, interact and urge trade organizations towards more or less drastic adjustments of their service outputs in order to survive in the long run. In the near future new and fast growing service sectors, in particular information technology services, will offer technologically advanced products that extend the possibilities with respect to the provision of distribution services. Consider, for example, the potentially enormous impact of widespread internet shopping (cf. Alba et al. 1997).

In most developed real-world markets the number of goods and services that are available for consumers to satisfy similar needs, wants, and desires is growing steadily, making it increasingly difficult for producers and trade to differentiate their offerings in the consumer's mind. Since the possibilities for product differentiation on the basis of intrinsic product characteristics are limited, offering excellent distribution services has become an increasingly important source of product and organization differentiation. Price competition requires retailers carry carefully designed assortments and offer matching services, such as has been done by several discounters. Many organizations sell identical products to different consumer segments at different prices using different, customized, distribution service packages. For example, supermarkets may offer differential personal service on different time-periods during the day.

Changes in economic and demographic characteristics of households have changed demand for distribution service (Betancourt 1991; Oi 1992). In developed economies in today's society most consumers' have the means to fulfill their basic needs and desires. This encourages the tendency to seek variety (cf. McAllister and Pessemier 1982) and stimulates consumers' desire to obtain products with higher added value, such as quality and convenience, for which they are willing to pay extra. Also, in economically advanced countries the total number of households increases, while the average size of households diminishes. This implies an increase in demand for goods and services that are associated with the mere existence of households, imposing higher demands on distribution system output. Higher car ownership - which has lowered the cost of visiting a distant store - and a decrease in home inventory costs - mainly through affordable refrigerators - have lead to an increase in the size of shopping baskets and to an increase in consumers' willingness to visit relatively distant stores, albeit less frequently. An important demographic development concerns the rapid growth of the proportion of the population

consisting of elderly consumers in certain Western European and US regions. This will positively influence the demand for effort-saving distribution service, offering new possibilities for market segmentation and subsequent retail and product positioning.

Long-term wage increase has not only increased cost of labor to retailers but has also increased the opportunity cost of time - or value of time - of nonmarket labor activities, including purchasing, to consumers. This in turn has increased demand for certain distribution service elements, such as large assortments, and has reduced demand for other distribution service elements, such as personal service. In addition, the growth in the number of multiple earner households has increased households' free income. The higher labor force participation rate of women and the resulting higher opportunity cost of female time has lead among other things to an increase in consumer demand for longer store hours and a rise in male shopping (Pashigian and Bowen 1994). Pashigian and Bowen explain the observed increase in demand for brand names from the combined facts that shoppers economize on time while the number and frequency of male shoppers, who generally still have a higher income than women, increases. They use the same rationale to explain the observed increase in advertising by consumer goods manufacturers and the observed decrease in personal services at retail stores, which they view as substitution of information supplied at the point of sale by retailers with information supplied by manufacturers through brand names.

The increasing cost of consumers' time has put a pressure on traditional retailing formats, such as service-intensive department stores, and has led to the emergence of supermarkets and convenience stores. Demand-side developments drive retail stores, for example grocery stores, towards larger assortments through expansion of the breadth of product lines carried as well as the number of product lines carried, and increasing scale of operations. Broader assortments and lower home inventory costs allow larger shopping basket sizes and less frequent shopping trips, consequently reducing monetary as well as nonmonetary shopping cost. Not only does a larger store attract more demand than a smaller store through offering the possibility for one-stop shopping, it also allows more efficient utilization of equipment and a higher labor productivity of in-store personnel (cf. Oi 1992)[5].

[5] Oi (1992) explains retail firms' cost functions with increasing returns through the economies of massed reserves. This can be seen when considering a store's operations as the repaiman's problem

Together with the emergence of new technological possibilities demand-side developments will favor new, less service-intensive formulas, including discount stores, mail-order firms, and e-commerce.

Although many retailers are driven towards larger assortments that allow one-stop shopping, other retailers may find it profitable to specialize, i.e., narrow their product line. Oi (1992) mentions gasoline service stations as an example of stores that used to offer additional services, including repair service, and later on narrowed their product line while their sizes increased. Apparently, consumer savings in shopping time resulting from one-stop shopping of gasoline and repairs did not lead to a sufficient increase in demand, i.e., larger baskets and economies of massed reserves, to outweigh the extra costs associated with a product line expansion that were incurred by the retailer. Consequently, specialized gasoline stores on one hand and specialized repair and other service stores on the other hand emerged that imply higher value for both consumers and retailers. The combination of gasoline and groceries on the other hand appears to be very successful. Several gasoline outlets in The Netherlands have teamed up with supermarket chains and sell a variety of food items and other fast-moving products that are complementary to consumers' gasoline purchase trips.

1.3 Aim of the research

The distribution decisions that each firm must make concern strategy, location, logistics, and management (cf. Stern, El-Ansary, and Coughlan 1996). Strategic distribution decisions, such as choice of channel structure and location decisions, depend on but also determine the service levels an organization chooses to offer in the future. Because of the complex interrelationships between the components of distribution decisions the issues of distribution service provision and consumption touch upon many fields of interest, including logistics, consumer behavior, and organizational behavior, as well as different research perspectives. The focus of the

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(cf. Oi 1992): a firm has M machines (checkout counters), with breakdown probability p, R repairmen (employees) with mean service time μ, and customer arrival rate λ. If M and R increase, the mean length of the customer queue falls and the sum of idle checkout counters and waiting employees decreases.

book is on behavioral antecedents and consequences of the creation of availability through distribution service provision. It puts the decision maker, particularly consumer and retailer, in a central place instead of the distribution or logistics system that facilitates distribution service provision. Given the many research topics with respect to distribution services that deserve to be studied from this perspective, only a few of them have been selected within the context of this book.

The central focus of the book is discussion of distribution services as instruments for non-price competition. It analyzes forces that influence distribution service provision by firms - predominantly retailers - in distribution channels, as well as the effects of distribution service provision on consumer behavior. This is expressed in the three central parts of the book. Two of these parts (parts II and III) concern consumer behavior, in particular analysis of the role of distribution service in consumer choice behavior, and the role of distribution service provision and its determinants in consumer post-purchase evaluation, respectively. Part IV addresses the determinants of retailer distribution service provision and its relationship with distribution channel structure. Since channel member competition is an important determinant of distribution service provision, strategic interactions between channel members are the focal point. Knowledge of the role of distribution service is an important prerequisite with respect to implementation of programs for distribution channel optimization. The research discussed in this and the following chapters is aimed at contributing insight into the role of service in channel competition and provides approaches that can be used to quantify, explain, and ultimately control distribution channel service provision.

Research on distribution services has suffered from a lack of theoretical conceptualization. In order to gain full insight into the potential of distribution services as a marketing instrument sound conceptual definition as well as assessment of its relationships with other behavior concepts is required. Chapter 2 addresses this issue. From the perspective of consumer behavior there are several challenging areas for research. The previous section already indicated that the assortment is an important distribution service element due to its huge significance for consumers and suppliers, as well as its impact on the organization of distribution channels. Chapters 3 and 4 consider retail assortments. Theoretical development with respect to relationships between distribution service and consumer choice involves analysis of the factors driving consumer need for assortment, preference

formation, and ultimately choice between and within assortments. Little work has been done sofar with respect to the effects of assortment composition on consumer perceptions of product substitutability and complementarity, and the role of distribution services other than assortment in consumer assortment evaluation and choice. Also, several methodological issues arise, for example with respect to modeling consumer choice processes. Consumer post-purchase evaluation of an entire purchase and shopping experience, involving a retailer's total distribution service package is discussed in chapter 5.

The role of distribution services in channel structure and coordination has deserved special attention since the early days of marketing. Early theories on the relationship between distribution services and channel structure include for example Alderson's (1954) concept of sorting, and Bucklin's (1966) postponement-speculation theory, which have proven to be of value ever since. Because of its relevance in non-price competition distribution service constitutes an important factor in channel members 'strategic interactions and is therefore an important determinant of store competition and of the emergence of new retail formulas. Also, the role of distribution service in channel coordination has remained underexposed. Since distribution channel service output at the final consumer stage involves every channel member's efforts, provision of optimal service levels requires some form of channel coordination. Chapter 6 discusses these issues, while chapter 7 models a particular example of retail competition and its effects on distribution service provision as well as market structure.

1.4 Outline of the book

This book's research on distribution service consists of four major parts that are based on the theoretical framework presented in chapter 2. The first part discusses and defines distribution services. The second part analyzes the effect of distribution services, in particular assortment and ambience, on consumer store and item choice. In the third part retailer distribution service provision and its determinants are modeled as antecedents of consumer post-purchase evaluation processes. The fourth part of the book analyzes the effects of retailer strategic interactions, in particular with respect to price and service competition, on the coexistence of different retail

formats in markets for fast-moving consumer goods. Each part is introduced briefly hereafter.

Part I: Distribution service as a concept

Based on a review of the literature in marketing and related fields, such as organizational behavior, operations research, and economics, distribution services are defined and conceptualized from a marketing perspective in chapter 2. The chapter concludes with a research framework that puts into perspective the research discussed in parts II to IV.

Part II: Consumer choice within and among retail assortments

The second part of this book analyzes the joint effects of price and distribution service competition on consumer purchase behavior. Chapter 3 discusses consumer demand for assortment and models consumer assortment evaluation and choice. It gives an overview of the theory on consumer decision processes and presents formal models of choice processes that explain substitutability and complementarity. Several propositions on the effects of distribution services with respect to assortment evaluation and choice are formulated, a number of which are rendered into testable hypotheses in chapter 4. An empirical study has been done in order to investigate and quantify the role of distribution service, in particular assortment and store ambience, in consumer choice from and among retail assortments. The study consisted of a large-scale multiple choice consumer experiment. Chapter 4 reports the methodology and results of the analyses of the experimental data, tests the relevant hypotheses, and simulates the consequences of different merchandise strategies with respect to consumer demand.

Part III: Retailer distribution service provision and consumer satisfaction/ dissatisfaction formation

Chapter 5 analyzes the role of distribution services in consumer postpurchase evaluation and satisfaction/dissatisfaction formation, with an emphasis on the significance of determinants of distribution provision by retailers and actual distribution service performance by retailers. The influence of retailer and consumer-level variables on consumer satisfaction/dissatisfaction are modeled and subsequently analyzed using data collected from multiple consumer-retailer dyads.

Part IV: Strategic channel service interactions and retail format competition

Distribution services are produced by multiple actors, predominantly traders, in the distribution channel. At each channel stage distribution activities are produced that

add value to the product. It seems evident that demand for distribution services will affect channel structure through the emergence of actors at different channel stages and that, given channel structure, competition between channel members will affect distribution service provision. The fourth part of the book focuses in particular on the role of distribution services in competitive distribution channels. In chapter 6 theory on distribution channel structure and coordination is discussed from the perspective of both price and distribution service competition. Chapter 7 develops a game-theoretic model of strategic competitive interactions at the retail level and their effect on retailers' decisions regarding distribution service and price and the emergence of differentiated retail formats.

Part V: Conclusions and discussion

Chapter 8 discusses conclusions and findings resulting from conceptual and methodological issues related to the research. Finally, the chapter suggests directions for future research and implications for management.

Part I
Distribution Service as a Concept

Chapter 2

Distribution Service

2.1 Introduction

The introduction to this book argued that channel distribution processes create availability through adjustment of differences that exist with respect to time, place, quantity and quality of goods between their point of origin and the final consumer. In bridging these gaps between production and final consumption physical distribution processes create utility for consumers. Early marketing theories focused on the role of distribution channels as instruments for making goods available to geographically distant consumer markets and explained the existence of differently structured distribution channels. Despite recognition of distribution service as channel output marketing theory has generally left distribution service unconsidered as a concept. Until recently, the role of distribution services in channel relationships, channel structure, and channel coordination has remained largely ignored. On the other hand, marketing has developed comprehensive service concepts and marketing research generally focuses on individual customers' behavioral consequences of service provision, in particular quality perceptions and feelings of satisfaction/dissatisfaction. Operationalization of a service concept often reveals distribution service elements, but does not refer to the particular origin and characteristics of these services. Consequently solid conceptualization of distribution service is lacking.

The previous chapter already mentioned other fields than marketing that have contributed to understanding distribution service, among the most important of which are logistics management, management science, economics, and behavioral

science. This chapter investigates different, sometimes preliminary, definitions and conceptualizations of distribution services resulting from research published in different fields. Elaboration of these findings results in a definition of distribution service and formation of an integrated framework of the antecedents and consequences of distribution service provision that serves as a general model for the research discussed in subsequent chapters. The last section places the research questions that are subject of this book in the perspective of the framework.

2.2 Views on distribution service

Distribution service touches upon many fields of interest and has consequently been discussed and analyzed from different perspectives. This section identifies three dominant approaches to distribution service that represent distinct interpretations and conceptualizations. They have been conveniently named as logistics, economic, and behavioral approach, respectively. These approaches differ with respect to the scientific field(s) from which they originate, their research object, and their strategic or operational focus. Since this book adopts a marketing perspective on distribution service the characteristics of the three approaches to distribution service will be classified according to the marketing schools of thought that have been distinguished by Sheth, Gardner, and Garrett (1988).

The logistics approach considers outbound logistics system performance and aims at system optimization either from a strategic or a tactical point of view. Consequently this approach has been based on techniques developed in management science. From the perspective of logistics the order cycle forms the interface between an organization's logistics system and its customers and thus seems a natural starting point for analysis of distribution service. Logistics service output is represented through the individual components of the order cycle and their performance levels. Economic theory focuses on the relationship between distribution service provision by a trader, usually a retailer, and (aggregate) consumer demand, and considers its implications for retailer strategic decision making and associated retail productivity and profitability. The interaction between the efforts distributive traders undertake in providing distribution service and customers' implicit costs associated with product acquisition and use yields insight

into structural developments in the distributive trades. Services marketing and consumer behavior theory generally consider distribution service as part of the total service package offered by a supplier to her customers and analyze the psychological and behavioral consequences of service provision to individual customers. The interrelationships between the three approaches to distribution service lead to a new definition of distribution service and an integrative framework for analysis of distribution service.

2.2.1 Order cycle activities and logistics system performance

Each channel member involved in making goods available to consumers, manufacturers as well as distributive traders, performs one or more physical distribution functions, such as transportation, storage, and delivery. Since physical distribution functions are carried out using a logistics system and many organizations employ separately designated logistics managers that are responsible for logistics system costs and performance, the (extended) order cycle seems a natural basis for analysis of distribution service.

The definitions by Perreault and Russ (1976) and Wagner and LaGarce (1981) as shown in table 2.1 are exemplary for the focus on order cycle *activities*. Physical distribution activities create availability (cf. Bowersox, Closs, and Helfferich 1986), for example through order cycle related activities, i.e., customer order transmittal, credit approval and order processing, inventory availability or order fulfillment, transportation, and invoicing and delivery, as well as distribution system flexibility, such as responsiveness to special shipping requests, distribution system information support, for example through fast provision of order status information or inventory levels, the ability for distribution system malfunction recovery, and post-sale product support, including complaint handling. The interested reader is referred to LaLonde, Cooper, and Noordewier (1988), who wrote a comprehensive overview of customer service from a logistics management perspective, which includes many more references to early publications that mention customer service as physical distribution related activities.

Recognition that the organization-customer interface extends beyond single logistics order cycle activities has led several authors to consider logistics service

processes and non-logistics service processes that may affect buyer-seller relationships and long-term sales. For example, LaLonde and Zinszer (1976, table 2.1) define customer service as generic customer contact. Other authors distinguish between customer service and generic customer contact, where the former emphasizes physical distribution processes with respect to the creation of availability, and the latter includes any interaction between a customer and the organization (e.g. Hutchison and Stolle 1968). Mentzer, Gomez, and Krapfel (1989) recognize the interactive nature of service provision and distinguish between "marketing customer service" and "physical distribution service". Ballou (1978), LaLonde and Zinszer (1976), and LaLonde, Cooper and Noordewier (1988) adopt a both generic and strategic perspective on distribution service provision. They discuss managerial issues related to long-term tradeoffs between distribution channel costs and revenues associated with service provision.

LaLonde and Zinszer (1976, table 2.2) classify service elements into three categories based on their process view on distribution service provision: pretransaction, transaction, and posttransaction service elements. Pretransaction elements serve to establish a good atmosphere for service delivery, and include a written statement of policy, handing the statement to customers, a suitable organizational structure, physical distribution system flexibility, and technical services. Transaction service elements relate directly to the order cycle and thus include the individual elements of the order cycle, stockout level, the ability to backorder, order convenience, time, transshipment, system accuracy, and product substitution. Posttransaction elements concern after-sales product support and customer protection against defected products, including installation, warranty alterations, repairs and spare parts, product tracking, handling of customer claims and complaints, product packaging, and temporary replacement of product during repairs.

Among other physical distribution related classifications of elements of distribution services that are more generic in nature, shown in table 2.2, are the distinction between (a) "customer service action functions" that are designed and offered by an organization in order to complement the existing product offering, and (b) "reaction functions" that are provided at the customer's request (Wagner 1977); convenience services that reduce buyer's workload with respect to purchasing and improve the fit of supplier's offerings to customer needs (Cunningham and Roberts

1974); and an empirically-based classification of distribution service according to the marketing functions physical possession, ownership, promotion, negotiation, financing, risk taking, ordering, and payment (Levy 1981a). Other publications that mention often large numbers of service activities, not all of them order-cycle related, include Gilmour (1977), who mentions 35 service elements and Levy (1981a), who found 71 service elements, and also Jackson, Keith, and Burdick (1984), Levy (1981b,c), Sharma and Lambert (1990), Uhr, Houck, and Rogers (1981), and Willett and Stephenson (1969).

The goal underlying most logistics research involving distribution service elements is optimal allocation of physical distribution efforts so as to create (maximum) product availability, i.e., to generate specific service outputs for specific markets and market segments, at minimum cost. Identification of the role of individual order cycle activities in creation of availability is clearly not sufficient to assure efficient and effective service delivery. For the purpose of determination of the service level that should be offered, as well as measurement and control of the service level provided, distribution service has been defined from the perspective of logistics system performance (see table 2.1, e.g., Lambert and Zemke 1982; Heskett 1994[1]). Measures of *performance* of a physical distribution system all intend to capture the extent to which the system succeeds in creating availability. Objective measures of physical distribution performance levels that are indicators of logistics system performance, so-called logistics performance indicators can apply to different levels of aggregation both with respect to the number of customers involved, and time. They may refer to service offered with respect to a single transaction with a single customer, on a single day with respect to all customers, as well as over a one-year period with respect to one or more customers. Logistics performance indicators provide feedback on the order cycle or, more broadly, performance of the organization's physical distribution system with respect to the creation of availability. Logistics performance indicators that are generally considered in operations research models of physical distribution concern mainly time and place utility, e.g., fillrate, backorders, leadtime, and frequency of delivery. A specific line of research considers inventory management for perishable products

[1] Other definitions of distribution service have been developed from a logistics perspective. Recent publications in the field still refer to most of the definitions mentioned in table 2.1.

(cf. Cohen, Pierskalla, and Yen 1981; Nahmias 1982; Schmidt and Nahmias 1985; Weiss 1980), and incorporates service elements with respect to quality maintenance, such as durability. The relationship between logistics service service performance and costs is not always obvious. For example storage levels do not only affect storage costs, but also affect costs of lost sales.

Occasional publications have analyzed the direct relationship between logistics performance indicators and customer demand. For early research on the relationship between distribution service provision and demand, using logistics service elements, see Stephenson and Willett (1974) who estimated an S-curve with the effect of leadtime relative to industry average, Schary and Becker (1973) who estimated the Vidale and Wolfe model with advertising expenditures replaced by logistics expenditures, and Ozment and Chard (1986) who regressed price, promotion expenditures, average leadtime, leadtime variation, average backorder leadtime, percentage out-of-stock, and the monthly value of incorrect shipments on monthly sales. More recently, the relationship between logistics service and sales has been assessed by Pisharodi and Langley (1991). Customer utility associated with different lead times and fill rates has been modeled by Bookbinder and Lynch (1997). See Chow, Heaver, and Henriksson (1994) for an overview of logistics performance indicators and their measurement.

A number of studies report assessment of individual channel member demand as a function of logistics service elements, using trade-off analysis. Levy, Webster, and Kerin (1983) investigated the relationship between (distribution) service provision and individual industrial customer's purchases using conjoint analysis (Green and Srinivasan 1978, 1990). Frequency and cost of manufacturer-supported advertising, frequency of couponing in local newspapers, financial terms of trade, and the percentage of items ordered that was shipped were varied systematically and combined to form hypothetical service packages. Purchase managers indicated for each package their purchases relative to the volume purchased by them currently. Other applications of conjoint analysis include Christopher, Schary, and Skjott-Larsen (1979), Perreault, Jr. and Russ (1976, 1977), Levy (1981b), and Wetzels et al. (1995). Levy included services such as average leadtime, leadtime variation, fillrate, and credit terms, and found diminishing returns for the first variable. Overall, the importance of individual distribution service elements differs across industries, products, channel stages, and purchase situations. Trade-off

analysis has in addition been used to determine the optimal service package by e.g., Tyagi (1997), and Rangan (1987).

Attempts have been made to arrive at a conceptualization of distribution service that extend beyond the identification of distribution service elements, such as order cycle activities, more generic customer contact services, and logistics system performance indicators. Leading authors in the field of logistics agree that physical distribution processes create time and place utility, and maintenance of form utility. The predominant conceptualization of distribution service generating time, place and form utility has led to various classifications of distribution service elements as shown in table 2.2. Note that the literature mentioned in tables 2.2 and 2.3 is still much referred to in more recent publications on logistics service (e.g., Manrodt and Davis, Jr. 1994; Mentzer, Rutner, and Matsuno 1997).

Bowersox (1978) distinguishes between physical distribution system *availability*, *capability*, and *quality*, and refined measurement of these distribution service dimensions in Bowersox, Closs, and Helfferich (1986, table 2.2). Availability refers to a physical distribution system's ability to predictably provide goods, as a result of safety stock policy. It is measured for example as the percentage of items out of stock to total items carried in stock, average number of items out of stock per order, back-order frequency, or back-order recovery rate. Capability refers to delivery speed and consistency, resulting from design and dependability of each of the order cycle components, including system flexibility. It is measured as the time distribution of each of the order cycle elements, resulting in performance indicators such as average delivery time, standard deviation of delivery time, the distribution of orders or sales within time intervals, and the percentage of orders or sales value delivered within predetermined time intervals. Quality relates to the efficiency of the logistics operation. It includes mainly information and product support related service elements, such as repair, and handling of mistakes and damage caused by distribution. Performance indicators of quality are for example the frequency of incorrect items on an order, percentage of products damaged, damage incidence, average number of damage claims per shipment, and frequency of shipments to improper locations. A related classification of service dimensions is Mentzer, Gomez and Krapfel's (1989) *timeliness*, *availability*, and *quality*, with quality referring to the condition, or extent of quality maintenance, of the products delivered. For an empirical test of this dimensionality see Emerson and

Grimm (1996). Both Bowersox and Mentzer, Gomez, and Krapfel build their classification on the three utilities affected by physical distribution: time, place, and form, where availability refers to place utility, capability and timeliness refer to time utility, and quality refers to form utility. Not all researchers explicitly acknowledge maintenance of form utility as a benefit that can be created by distribution channels. Maintenance of form applies to virtually all goods since physical distribution processes can affect product quality in a variety of ways. Many products are sensitive to deterioration due to long storage and/or harmful circumstances with respect to temperature, humidity, and pressure. In addition, handling and transportation may cause damage to products.

The practical and managerial orientation of the field of logistics has emphasized strategic and operational problems with respect to service delivery. Consequently, distribution service has played an important role, both as a variable in mathematical models for distribution system optimization, and as a marketing instrument. Research questions that have been asked with respect to distribution system design have been formulated as optimization problems that involve cost-service tradeoffs for which operations research models are developed. For example, which ordering system minimizes inventory cost subject to out-of-stock constraints, or what routing minimizes transportation cost given maximum leadtime requirements. Many studies provide solutions that support operational decisions, such as transportation routing (e.g., Burns et al. 1985), whereas others focus on more strategic problems, such as warehouse location or allocation of inventories across different channel stages. The latter issue requires so-called multi-echelon models (e.g., Cohen and Lee 1988; Deuermeyer and Schwartz 1981; Federgruen and Zipkin 1984; Lee and Whang 1999; Rosenbaum 1981; Schwartz, Deuermeyer and Badinelli 1985; Vorst, Beulens, and Van Beek 2000). The systems perspective on logistics has incorporated distribution service in advanced modeling and analysis of distribution problems using management science techniques, resulting in implementable decision support systems.

Logistics models of allocation of physical distribution efforts generally do not consider strategic interactions between channel members' decisions, nor do they explicitly recognize the effect of distribution services on final demand. From a marketing perspective understanding of the effect of distribution services on consumer demand is a prerequisite for distribution system design. Since it is the

trade-off between distribution costs and service revenues that matters in this respect, the effect of distribution service provision on consumer behavior should be analyzed and used as input for distribution channel models.

The logistics approach to distribution services discussed in this subsection argues that through performance of different channel functions every channel organization generates service outputs that provide its customers, and ultimately end-users, with time, place, and possession utilities, as well as maintenance of form utility. This classification of utility and its emphasis on economic interactivity with respect to the role of individual distribution channel members in performing distribution-related functions is characteristic of the institutional school that dominated the early days of marketing theory (cf. Sheth, Gardner, and Garrett 1988).

Many studies have been done that recognize the relevance of logistics service performance for consumer behavior. These studies generally asses customer perceptions of distribution service quality as a measure of logistics system effectivity in building customer relationships and generating customer demand, using subjective measures of distribution service performance (e.g., Bienstock, Mentzer, and Bird 1997). The research still suffers from lack of conceptual clarity and often blends service resulting from the physical distribution system with services from other origins. The field of logistics has not succeeded in developing a strong theoretical model of distribution services as the purely economic approach to distribution services that will be discussed next. Consequently much research on customer behavior with respect to distribution service has limited practical and scientific value. Linking supply side variables (i.e., logistics performance indicators) to customer response in mathematical models of distribution systems remains a challenge for the future.

Table 2.1 *Distribution service conceptualizations in logistics.*

No.	Author(s):	Distribution service definition:
	(Extended) order cycle activities:	
1.	LaLonde & Zinszer (1976)	- Customer service is "... those activities that occur at the interface between the customer and the corporation which enhance or facilitate the sale and use of the corporations products or services."
2.	Perreault & Russ (1976)	- "Physical distribution service is the interrelated package of activities provided by a supplier which creates utility of time and place for a buyer, and insures form maintenance."
3.	Wagner & LaGarce (1981)	- "Customer service in distribution encompasses all activities involved in organization and administration of order fulfillment so customer orders are delivered completely, accurately, in good condition, in the optimal characteristic unit of use for distribution purposes, within cost constraints in the time frame required."
	Physical distribution system effectiveness:	
4.	Christopher, Schary & Skjott-Larsen (1979)	- Customer service is "... a system, organized to assure a continuing link in time between ordering and goods receipt, with the goal of meeting long-term customer needs."
5.	Lambert & Zemke (1982)	- "Customer service is a measure of the effectiveness with which the physical distribution system creates time and place utility."
	Strategic channel value:	
6.	LaLonde & Zinszer (1976)	- Customer service is "...a customer oriented philosophy which integrates all elements of the customer interface with a predetermined optimum cost-service mix."
7.	Ballou (1978)	- Customer service is "... the net result of all logistical efforts engaged in by the firm."
8.	LaLonde, Cooper & Noordewier (1988)	- "Customer service is a process for providing significant value-added benefits to the supply chain in a cost-effective way."

Table 2.2 *Physical distribution-based classifications of distribution service elements.*

No.	Author(s):	View:	Service elements:
1.	LaLonde and Zinszer (1976)	Exchange functions	Pretransaction Transaction Posttransaction
2.	Wagner (1977)	Exchange functions	action reaction
3.	Levy (1981a)	Marketing flows	physical possession, ownership, promotion, negotiation, financing, risk taking, ordering, payment
4.	Bowersox (1978), Bowersox et al. (1986)	Order cycle performance	Availability Capability Quality
5.	Mentzer et al. (1989)	Order cycle performance	Availability Timeliness Quality

2.2.2 Economic theory on distribution service

Economic theory argues that distributive traders exist because they have an advantage over manufacturers, and possibly other traders, in the performance of channel functions related to the effectuation of, preferably recurrent, transactions. The effectiveness and efficiency with which distribution functions are performed determine the value added by the channel to its end-users. In this view all channel functions contribute to a channel's service output and the cost of providing it, and consequently to end-user value. Shifting of functions between different members of the distribution channel differentially influences costs and benefits for channel members and ultimately a channel structure will emerge in which only channel members who are relatively efficient and effective will perform specific channel functions.

Bucklin (1966) was among the first to argue that in order to survive in the long run channel members must meet demand for service outputs through adequate organization and performance of channel functions. Channel functions can be shifted between channel members, and new intermediaries can enter a channel in order to increase the effectiveness of service output and/or to lower channel cost associated with service provision. Consequently, consumer demand for distribution services influences channel structure. For example, cost-arguments can favor a short channel with few intermediaries, but an improved competitive position and an associated increase in revenues through excellent service provision may favor addition of intermediaries that are specialized in performing specific channel functions. Illustrative in this respect is Bucklin's (1965) postponement-speculation paradigm, which argues that the cost associated with certain distribution service, i.e., leadtime, should be balanced against the cost of speculative inventory, and consequently leads to a specific channel structure.

Economic conceptualizations of distribution service all argue that channel members enhance customer value through reduction of costs associated with product purchase and possibly use. Time costs are one of the most often referred to cost categories with respect to distribution services. Becker (1965) already mentioned that implicit time cost is related to all kinds of consumer behavior and argued that "*Thus, not only would a rise in earnings induce a substitution away from earnings-intensive commodities but also a substitution away from time and towards goods in the production of each commodity*" (italics added). He illustrates this by a comparison of store-bought and home-delivered milk. "*...the cost of inputs into the commodity "milk consumption at home" is either the sum of the price of milk in the store and the foregone value of the time used to carry it home or simply the price of delivered milk.*" A central assumption in Becker's theory is that households not only consume but also produce commodities through combining goods and time inputs according to cost-minimization rules, while maximizing a utility function associated with these commodities, subject to prices and constraints on resources, such as time and income. Becker's notion was captured and elaborated upon by many economic researchers who defined the *implicit shopper cost* as the effort undertaken by customers in establishing a successful transaction (Ehrlich and Fisher 1982; Ratchford and Stoops 1988, 1992). The implicit shopper cost consists of time and other costs associated with shopping at a particular retail

or wholesale trader, and can be extended to include all sorts of costs associated with acquisition, use, and disposal of goods. The so-called *full price* of a shopping basket is set to equal the sum of retail prices of the goods purchased plus an implicit shopper cost.

The role of retail services with respect to reduction of implicit shopping costs explains several drastic developments with respect to buying behavior and market structure. For example, the introduction of affordable refrigerators and the widespread use of cars for shopping have caused an increase in both purchase volume and the number of different products bought in one shopping trip, and a decrease in shopping frequency (cf. Betancourt and Gautschi 1990; Oi 1992; Pashigian and Bowen 1994, see also chapter 1). Pashigian and Bowen (1994) analyze the effect of time cost on information acquisition behavior as expressed through product choice (branded versus unbranded products) and advertising versus in-store labor. Increasing store assortment size and the emergence of new retail formulas are perhaps the most notable consequences of structural changes in implicit shopping costs. Assortments offer the possibility for one-stop hassle-free shopping, while creating economic benefits and reducing consumers' psychological strain. Although prices are relatively high in specialty stores, for specific infrequently purchased goods that require particular service efforts, such as quality maintenance, the sum of retail price and shopping trip costs incurred by a consumer may be lowest for a purchase at a specialty store. For purchase of a large basket of frequently purchased goods a consumer's full price will be lowest when shopping at a supermarket. Messinger and Narasimhan (1997) find that the growth in one-stop shopping in the period 1961-1986 cannot or only insufficiently be explained by economies of scale, technological improvements that make store operations more effective, store monopoly power, or addition of higher margin items to the assortment. Instead, consumer demand for time-saving shopping convenience has increased because of reduced cost of travel and reduced inventory cost in addition to increased opportunity cost of time.

From a purely economic perspective distribution services are services offered by suppliers, mainly traders, that reduce customers' costs associated with acquisition and use of (a basket of) products. This leads to broad definitions of distribution service that include all economically relevant channel outputs, including logistics as well as other channel service outputs. Several researchers

have elaborated on the conceptualization of distribution service and developed classifications for service elements. Table 2.3 presents a number of significant economic conceptualizations of distribution service that will be discussed in the following and table 2.4 shows related classifications of distribution service elements. Most researchers consider retailer-consumer service provision and use the household production model to incorporate consumer costs in which the consumer household decides on purchase of products in two stages. First the household minimizes the full price of a (basket of) good(s) and next chooses the optimal (basket of) good(s) given the full price. Implicit in these models is the assumption that the implicit shopping cost can be shifted between retailer and consumer. Economic analysis of distribution service has generally elaborated on Becker's (1965) ideas. The models that were developed have generally be used to analyze retail margin or profitability at different levels of aggregation, including industry-level or for individual retail outlets, and channel structure. This chapter continues with a discussion of economic thinking on distribution service and increasingly advanced elaboration of the consequences of Becker's concept of implicit shopper cost.

The concept of full price being the sum of retail price and time costs was used by Ehrlich and Fischer (1982) to model retail decisions on provision of time-saving informational services, in particular in-store selling effort and advertising. Information has been recognized since long as a rationale for consumer search (Stigler 1951) and as an input into consumers' decision-making processes (e.g. Nelson 1974). Consumers seek information in order to complete a transaction on terms that are appropriate to their needs. In Ehrlich and Fischer's (1982) model consumers' time costs are mainly costs of information acquisition and reduction of uncertainty, caused by buyers' imperfect knowledge, through search, adjustment and transaction. Ehrlich and Fischer use a household production model of the demand and supply of distribution services. In the model retailers provide retail price, advertising, and other sales support (i.e., labor staffing) that minimizes their customers' full price, consisting of retail price plus information costs, and maximizes retailer profit. Competitive forces subsequently determine optimal price and service output. The retailer's margin contains an implicit payment for the distribution services he provides. Ehrlich and Fischer showed that when consumers are heterogeneous with respect to their acquisition costs, in a competitive market a

continuum of retail firms will emerge that differ in terms of service provision. Clearly, a retailer's decisions on service provision are not only based on her own cost structure, but also on the distribution of consumer acquisition costs in the market. See Ratchford and Stoops (1988) for an extension of Ehrlich and Fischer's model. They empirically assessed the significance of scale economies and labor productivity on retail-level aggregate consumer demand (Ratchford and Stoops 1992)[2].

Although time costs make up a large part of the implicit costs associated with product acquisition and use, other costs categories, in particular costs of transportation and storage, have been recognized to play an important role with respect to distribution service provision and customer behavior. While economic research on distribution service agrees on the exchange-related nature of costs associated with service delivery and consumption, the conceptualization of distribution-related costs ranges from time costs (e.g., Becker 1965; Ehrlich and Fischer 1982), to transaction costs as conceptualized by Williamson (1975, 1979) and (Oi 1992), and may even include psychic costs (e.g., Betancourt and Gautschi 1990, 1992a).

Bucklin (1966, 1972) was among the first to develop a classification of distribution services while recognizing the role of distribution services in reducing customers' costs. The four major service outputs he identified are shown in table 2.4. They are (1) *spatial convenience* through decentralization of (retail or wholesale) outlets, which has led to the emergence of for example neighborhood stores, gas stations, and vending machines, (2) *lot size*, which affects the discrepancy between purchasing and consumption patterns, (3) *product variety* through assortment breadth and depth, and (4) *waiting time* which affects consumer convenience through the discrepancy between purchase and consumption and relates to the emergence of direct-response channels, such as electronic retailing by computer manufacturers through the Internet. These four generic service outputs can be viewed broadly to include provision of credit, maintenance of product

[2] The productivity of trading organizations was explained by an additional rationale that was developed by Oi (1992). Since services cannot be stored many service suppliers suffer from excess capacity in quiet times and shortage in busy times. Large firms have an advantage with respect to the coordination and synchronization of service-related activities that differ from economies of scale. Economies of massed reserves result in lower unit costs with increasing firm size, due to increased occupation rates when the size of retail operations and the number of customers increase.

quality, availability of information, stability of supply, availability of personal service and attention, and risk reduction. Spatial convenience and product variety reduce consumers' transportation and search costs, small lot sizes reduce inventory and maintenance costs, and waiting time relates to consumer's cost of time. In addition, Bucklin emphasized the linkage between channel service outputs and the economic elements of logistical activity by arguing that channel members incur costs in service provision, for example through carrying inventory associated with a broad assortment. Because of consumer cost reduction and distributor cost increase associated with service provision consumers usually have to pay higher prices for additional service and are compensated for relatively low service levels through lower prices. At a later stage, Bucklin, Ramaswamy, and Rajumdar (1993) refined and extended Bucklin's former (1966) classification of channel service outputs into two key service bundles. They distinguish among *logistics services* that are associated with time and place utilities - Bucklin's original service outputs -, and *information services* that reduce buyer uncertainty as well as costs associated with goods acquisition and consumption.

Betancourt and Gautschi (1988, 1990, 1992a, 1993a) built on the ideas of Bucklin, Ehrlich and Fischer, and others with strong focus on the assortment. They start from well-known efficiency rationales for the existence of assortments in marketing channels (discussed in detail in chapter 6). These rationales trade off costs, for example, associated with consumer search underlying the benefits of one-stop shopping against the costs associated with offering an assortment, e.g., adding a middleman to the distribution channel. Consumer desire for one-stop shopping of a basket of goods resulting from efficiency gains "binds" together the items in an assortment for a particular retailer, and thus generates complementarity. The same applies to (the items in) the assortments of different retailers that are located in the same retail agglomeration.

Table 2.3 *Economic distribution service conceptualizations.*

No.	Author(s):	Distribution service definition
1	Ehrlich & Fischer (1982)	- Informational retail services (retail labour and advertising) reduce the time price of consumption, i.e., search, transaction, and adjustment costs associated with acquisition and ultimate use of the market itself.
2	Betancourt & Gautschi (1990)	- Distribution services are outputs of retail firms that create demand by shifting consumers' distribution-related costs that are inherent in patronage of retail establishments to the retailer.
3	Oi (1992)	- Retail services reduce transaction costs.

In line with the above Betancourt and Gautschi conceptualize distribution services as outputs of retailing organizations that create a potential reduction in customers' implicit shopping costs, which they renamed into distribution-related costs. They explicitly model the shifting of distribution-related costs, inherent in consumers' patronage of retail establishments, to the retailer they visit. The model treats distribution services as outputs of retail organizations that act as fixed inputs into the household production function of consumers. Betancourt and Gautschi emphasize that distribution services are so-called nonmarket services that cannot be bought or offered at an explicit price, often are consumed together with purchased goods, and sometimes are consumed even without purchase, for example through comparison shopping. The implicit character of the costs associated with service provision are largely reflected in prices charged for products in a an assortment, while the cost savings associated with service consumption generally cannot be assigned to individual products.

Using their formalization of consumer demand Betancourt and Gautschi explain strategic interactions between retailers and resulting structural developments in distribution channels, such as the emergence of retail agglomerations. They classify distribution services into five categories - assortment, accessibility of location, availability of information, assurance of product delivery at desired time and in desired form, and ambience -, that relate to one or more of six distribution-related cost categories - costs of direct time, direct transportation,

information acquisition, storage, adjustment, and psychic costs - (see table 2.4). Betancourt and Gautschi's classification of distribution services relates to the previously mentioned classification of channel service output by Bucklin (1966) and Bucklin, Ramaswamy, and Rajumdar (1993). *Assortment* strongly resembles product variety, *assurance of product delivery at desired time* relates to waiting time, *assurance of product delivery in desired form* can be seen as similar to lot size, and *availability of information* relates to the information component of channel service output. Oi (1992) mentions five distribution service elements (1) *product line* that relates to assortment and jointly provided information, (2) *convenience* by means of location and opening hours is similar to assurance of product delivery at desired time, (3) *production* involves all activities such as packaging and processing to put products in a more suitable form for the consumer, and can be compared to assurance of product delivery at desired form, (4) *ancillary services* that include delivery, credit, and implicit warranties, and (5) *exchange* by which they mean completion of transactions through transfer of property rights.

Betancourt and Gautschi's classification benefits from its connection of distribution services to distribution-related costs. In addition, it is more detailed and comprehensive than Bucklin's classification and is theoretically as well as practically more thought-out than Oi's classification. Betancourt and Gautschi explicitly include a classification of distribution- related cost categories that encompasses service elements that are not, or not entirely, logistical or economic in nature, such as personal attention and ambience. This is particularly so for ambience, which is more a generic supplier service output than a physical distribution service output, and affects psychic costs. Ambience is affected by store layout and assortment, but also by supplier personnel and the other customers that are present.

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Table 2.4 *Classifications of distribution service elements as channel output.*

No.	Author(s):	View:	Service elements:
1.	Bucklin (1966)	Channel output	Spatial convenience/ market decentralization Lot size Product variety/ assortment depth & breadth Waiting time
2.	Betancourt & Gautschi (1990)	Retail output	Assortment Availability of information Accessibility of location Delivery at right time Delivery in right time Ambience
3.	Oi (1992)	Retail services	Exchange Product line Convenience Ancillary services Production
4.	Rangan et al. (1992)	Channel function Performance	Product information, Product customization, Lot size, quality, assurance, Assortment, availability, after-sales service, logistics
5.	Bucklin et al. (1993)	Channel output	Logistic services (Bucklin 1966), information services

distribution service output, and affects psychic costs. Ambience is affected by store layout and assortment, but also by supplier personnel and the other customers that are present.

Even more than is the case with Bucklin's classification of service elements, Betancourt and Gautschi's services and cost categories should be interpreted broadly. For example, adjustment costs result when a customer encounters an out-of-stock situation and must either substitute a different form for the exact form

of the product he or she desires, abstain from consuming the product, wait until the desired form is available, or patronize another retailer who has the exact form of the product he or she desires. Also, adjustment costs refer to cost of money (interest) caused by loans and credits, costs of changing money, and costs associated with using alternative ways of payment. Psychic costs "stem from what consumers consider disagreeable in the retail environment" and therefore do not relate entirely to the physical distribution process.

Betancourt and Gautschi add to understanding of distribution service not only by developing separate classifications of distribution-related services and costs, but also by mentioning a number of particular characteristics of distribution service. They argue for example that every channel member offers a certain level of distribution services by its existence alone, and always incur costs in doing so. Furthermore, some services are produced jointly, such as assortment and ambience, while others are not. Finally, distribution services are either general, i.e., they apply to all items in an assortment, such as accessibility of location, or they are specific and apply to one specific item in the assortment, such as information, or assurance of delivery of the product in the form desired by the final customer.

Betancourt and Gautschi (1992b, 1993b) analyzed store-level relationships between distribution service provision and retail margins for different retail sectors in France and in the U.S. They measured accessibility of location by the number of establishments in each different retail sector. Average inventory levels indicated assurance of product delivery. The measure developed for assortment breadth was the percentage of sales for a product line divided by total sales in the sector. The advertising expenditures per establishment were used as indicators for the availability of information, and the expenditures for new construction per establishment were used for measuring ambience. Item-specific service was indicated by the size of the payroll per establishment, indicating better service performance by higher educated personnel. Betancourt and Gautschi found convincing evidence for a positive relationship between distribution service level and retail margin. They also found that, under the assumption of monopolistic competition, the retailers in their study show neither quantity setting nor price setting behavior. Based on this finding the authors suggest development of models of oligopolistic behavior for retailing, and recognize that the assumption of short-run profit maximization may be challenged.

Following Betancourt and Gautschi, Nooteboom (1985), Nooteboom and Thurik (1987), Nooteboom, Kleijweg, and Thurik (1989), and Bode (1990) analyzed relationships between retail service output and retail margins using a mark-up model. In their models the retail margin at store level is operationalized as the price charged by the store for products offered. Bode discovered among other things a negative relationship between sales per store and percentage retail margin across all products sold, and a positive relationship between advertising expenditures and percentage retail margin. Results for assortment and personnel service were ambiguous, possibly because of differential measurement of these variables across different models.

Recently, a number of game-theoretic models have been developed that analyze retailer- consumer strategic interactions and discuss service-related rationales for the existence of different competing retail formats or positionings and are often based on the economic theory of distribution service. For example, the emergence of the pricing strategy Everyday Low Pricing (EDLP) compared to emphasizing price deals for individual goods (PROMO or Hi-Lo) in a competitive market was analyzed by Lal and Rao (1997). The PROMO store offers a higher service level than the EDLP store, attracting mainly consumers who value time highly in addition to deal-prone consumers who value the price deals. The EDLP store attracts largely deal-prone consumers as well as time-constrained consumers through advertising its low basket prices. Chapter 6 provides a detailed discussion of game-theoretic models of retailer distribution service provision and chapter 7 presents a new model of retailer service decisions.

The previous review suggests that research on distribution service focuses predominantly on retail and final consumer channel levels. However, the relevance of the concept of implicit shopper cost is not limited to consumer marketing and applies equally well to industrial purchase, although time cost should be replaced by the more comprehensive transaction cost concept. Rangan, Menezes, and Maier (1992) investigated the literature on channel outputs in industrial relationships and summarized their findings in a classification of distribution services that contains a mixture of logistics and economic service elements that have been discussed so far. Since the purpose of their research was to identify criteria of channel function performance that influence channel selection, no clear conceptualization of distribution service was developed.

Betancourt and Gautschi (1998) extended their model to industrial markets and analyzed service provision by members in a vertical distribution channel. They argue that channel power relationships affect the allocation of service efforts. The most powerful channel member, i.e., the Stackelberg price leader, can afford to provide relatively less service. In addition, given channel price leadership, service provision generates channel power. Research on identifying and analyzing the determinants of channel structure touches upon the concept of distribution services. Channel structure and coordination are therefore important issues with respect to service delivery. In chapter 6 the role of distribution service, cost, and other determinants of channel structure will be discussed in greater detail.

Betancourt and Gautschi's solid and comprehensive economic theory of distribution services as retail output can be considered as leading in the field. With respect to economic analyses of distribution service a number of issues can be identified that deserve attention. These concern the exclusive focus on customer cost reduction through distribution service provision, and the lack of conceptualization and measurement of distribution service with respect to individual channel member behavior. The inclusion of service elements that go beyond the physical distribution process in Betancourt and Gautschi's conceptualization of distribution service constitutes both a strength and a drawback in this respect. While economic research on distribution service generally does not aim at conceptualization and measurement of distribution services with respect to behavior of individual consumers or organizations, Betancourt and Gautschi's conceptualization of distribution service as retail outputs goes one step further and allows interpretation with respect to individual consumers. Operationalization of their model, however, remains a challenge.

Several of the measures used in their empirical research are only weak proxies for distribution service provision on a less aggregated level. For example, advertisement expenditures undoubtedly can be used to convey direct information, for example on price and quality (cf. Dorfman and Steiner 1954; Grossman and Shapiro 1984; Schmalensee 1972), but this is not always the case and advertisements do not necessarily represent all utilitarian information as intended by Betancourt and Gautschi. Although advertising expenditures have been extensively used in economic research as a measure of information provision, better measures should be developed for analysis of customer behavior, even at an aggregate level.

Examples are information content of advertisements, information on product packaging, information content of brochures that accompany products, the level of salesperson education, or toll-free customer service numbers. In addition, average inventory levels could indicate differences in efficiency instead of product availability. The behavioral approach to distribution service that is discussed next offers additional suggestions with respect to conceptualization and measurement of distribution service.

As a second issue, one may argue that the utility created by distribution services goes beyond the cost reductions mentioned by Betancourt and Gautschi and other economic researchers. The strict utilitarian approach to shopping as the conscious pursuit of purchase as an intended consequence that was described in the former section foregoes the fact that many consumers value comparison shopping as a hedonic experience (e.g., Babin, Darden, and Griffin 1994). It has been recognized that experiental and emotional reasons may underlie consumer shopping behavior. Holbrook and Hirschman (1982) argued that "The purchase of goods may be incidental to the experience of shopping. People buy so they can shop, NOT shop so they can buy" and "The activity of shopping is part of the experience of the product." Distribution services such as assortment composition, delivery of information, store layout, and ambience influence the extent to which a shopping experience is entertaining and emotionally rewarding. Presentation of new product combinations and salespersons communicating innovative ideas not only reduce costs of search and information acquisition, but also assist consumers in making better decisions by pointing out important new or unknown attributes and the benefits associated with new or unknown attribute-levels.

2.2.3 Distribution service from a behavioral perspective

A consumer's motivation to purchase is first and foremost driven by the need, want, or desire to acquire certain good(s) and/or service(s), rather than the distribution service surrounding these products. Distribution service may be a critical factor with respect to product and/or store choice. Distribution service provision adds time, place, and form utility, and reduces customers' implicit cost associated with shopping, purchase, product use or even product disposal, which causes customers

to experience convenience as well as higher product quality. Behavioral research on distribution service tries to explain the effects of service provision on consumer demand using psychological and possibly sociological processes underlying actual behavior of individual customers in the marketplace.

In services marketing no separate conceptualization has been developed for distribution service. Uhl and Upah (1983, p. 236) define a service as "... any task (work) performed by another or the provision of any facility, or activity for another's use and not ownership, which arises from an exchange transaction. It is intangible and incapable of being stored or transported. There may be an accompanying sale of a product." From a service marketing perspective distribution service elements belong either to the so-called facilitative services that are required in order to deliver goods or services, for example transportation, or to so-called supportive services that are not required for product delivery, but provide additional benefits to customers whose perceptions of value are increased accordingly, for example a cup of coffee served while waiting, as opposed to so-called core services, such as the work done by a bank or a hairdresser (cf. Grönroos 1990). Specific elements of distribution service that have been analyzed in behavioral studies include store atmosphere and consumers' emotional shopping experience. Perceived quality comprises maintenance of form utility, but most studies on perceived quality adopted a more general focus and analyzed consumers' pre-purchase expectations and/or postpurchase experiences with a good or pure service. Research on perceived distribution service quality will be discussed further on in this section.

Distribution service provision may influence a customer's emotional shopping experience. For example, a consumer may enjoy shopping at a particular retail store, some of which have especially been designed to entertain consumers (funshopping), a store may convey prestige to its customers, or give its customers a sense of belonging to a certain social class. In addition, information gathering is not necessarily utilitarian in nature, people may find it emotionally rewarding to compare different products in order to assure a correct purchase decision, or to mirror themselves to other people present in the store. Since shopping involves social behavior it may evoke emotions resulting from social interaction, for example irritation through waiting or bold personnel. The effect of distribution service on shopping behavior has been elaborated in past research for store environment, and ambience in particular. Environmental psychologists showed that store environment

and atmosphere influence shopping and purchase behavior (i.e., approach or avoid the store) (Donovan and Rossiter 1982; Mehrabian 1980; Mehrabian and Russell 1974; Russell and Pratt 1980) through effects on mood or emotions. For other work on store atmosphere see e.g., Grewall and Baker (1994) and McGrath (1989). It is hardly speculative to assume similar processes apply to store personnel appearance and behavior, store layout, and presentation.

Conceptualization and operationalization of distribution service requires knowledge of the concept's relationships with other behavioral concepts. Customer experience with distribution service has a number of behavioral consequences, whether distribution service has been conceptualized according to a logistics or to an economic perspective. Direct consequences of distribution service provision include perceived quality and perceived (monetary and nonmonetary) cost. Through perceived quality and perceived cost consumer experience with distribution service indirectly affects higher-order behavioral concepts, such as perceived value, attitude, satisfaction/dissatisfaction, relationship quality, and choice, including supplier selection, purchase incidence, and purchase quantity. From these the concepts that are directly related to distribution service provision will be discussed, with particular emphasis on perceived quality, while other relevant, but more remote, higher order concepts will be touched upon only briefly.

Perceived quality comprises a customer's perceptions of the benefits obtained from a performance of a good or service, relative to a standard formed by this consumer's expectations (Parasuraman, Zeithaml, and Berry 1988). According to Uhl and Upah's (1983) definition of services mentioned earlier, they are not only intangible, but also ephemeral, and experiental in nature (cf. Lovelock 1991, p. 21), and possess relatively few search characteristics and relatively many experience and possibly credence characteristics compared to goods (Zeithaml 1981). The distinction between perceived quality with respect to goods and services centers around the intangible and experiental nature of services. Due to the fact that services possess few search characteristics consumers generally have difficulty forming clear prior expectations and consequently prepurchase quality evaluation is much more difficult for services than for goods. In addition, inexperienced consumers lack prior expectations and must rely to a greater extent on search attributes that serve as extrinsic cues (Zeithaml 1981, 1988), such as price and the service environment or servicescapes (Bitner 1992) in order to form expectations.

Quality evaluation is especially difficult with respect to services that are high in credence attributes, for which consumers find it difficult to evaluate performance as such. Due to services' intangibility and resulting simultaneousness of service production and consumption perceived service quality has been operationalized as post-experience consumer evaluation of a service compared to pre-consumption expectations that serve as a standard. For goods perceived quality has been studied mainly as a prepurchase concept (e.g., Steenkamp 1989).

Distribution service is part of an organization's total service offering. Different dimensionalities that have been found with respect to perceived service quality (e.g., Lovelock 1991; Parasuraman, Zeithaml, and Berry 1985, 1988, 1991, 1993) show that with respect to evaluation of a retailer's service performance consumers do not distinguish service elements originating from the channel's physical distribution system performance from other service elements, and that performance on certain elements of service delivery may be compensated for by performance with respect to other elements (e.g., Grönroos 1990). This justifies consideration of service elements that do not only relate to logistics. On the other hand, suchlike broad perspective on distribution service complicates investigation of the relationship between logistics operations and resulting service output.

The conceptualization, operationalization, and measurement of perceived service quality (Parasuraman, Zeithaml, and Berry 1985, 1988, 1991, 1993, 1994) have had an enormous impact in both marketing theory and practice. Perceived service quality has been conceptualized as a multidimensional construct consisting of five generic dimensions, i.e., tangibles, reliability, responsiveness, empathy, and assurance (Parasuraman, Zeithaml, and Berry, 1985). The construct has been operationalized as the difference between customers' expectations and perceptions regarding service performance and is measured accordingly, using the SERVQUAL scale, as the summated difference score between expectations and perceptions on twenty-six items (Parasuraman, Zeithaml, and Berry 1988, 1991, 1993, 1994). The dimensionality of perceived service quality developed by Parasuraman, Zeithaml, and Berry and measurement of the construct using SERVQUAL are generally considered valid across service industries. Despite the methodological problems associated with the measurement instrument (Brown, Churchill, and Peter 1993) SERVQUAL remains widely used across different service sectors. Conjoint analysis can be used as a complementary approach to SERVQUAL-based quality

measurement for determining quality perceptions associated with service levels (DeSarbo et al. 1994; Narasimhan and Sen 1992). Wetzels et al. (1995) used conjoint analysis to analyze customer quality perceptions associated with provision of different distribution service levels.

Note that SERVQUAL emphasizes personal interaction as the main component of service provision, which does not apply to an equal extent to all retailer service provision. For certain types of services straightforward application of SERVQUAL is considered insufficiently adequate and specific scales based on SERVQUAL have been developed, for goods retailing (e.g., Babakus and Boller, 1992; Babakus and Mangold 1992; Carman 1990: Cronin and Taylor 1992; Finn and Lamb 1991) resulting in the dimensions personnel, assortment, ambience, and complaint handling, for professional services (e.g., Mishra, Singh, and Wood 1991), and physical distribution services in an industrial context (Bienstock, Mentzer, and Bird 1997; Kasper and Lemmink 1989). Bienstock, Metzer, and Bird (1997) developed a SERVQUAL-based 15-item measurement instrument for perceived physical distribution service quality based on Mentzer, Gomes and Krapfel's (1989) timeliness, availability, and quality dimensions. Betancourt and Gautschi's (1990) service elements relate to Parasuraman, Zeithaml, and Berry's reliability and assurance (assurance of delivery, assortment, accessibility of location, availability of information), responsiveness (assurance of delivery, availability of information) and to a lesser extent empathy (assurance of delivery, availability of information). More specific, total order cycle length, mean leadtime or delivery time, and flexibility of the distribution system (e.g., rush orders) will affect perceptions of responsiveness and assurance, while variation in leadtime or delivery time will affect perceptions of reliability.

Perceived quality and perceived service quality are concepts spanned up by so-called "get" attributes, they represent the benefits inherent in consumption of a good or service. Perceptions of *value* result from confrontation of perceived benefits (i.e., perceived quality) with perceived monetary and nonmonetary sacrifices (e.g., Zeithaml 1989). Consumer *satisfaction/dissatisfaction* is a higher-order concept that is generally modeled as the subjective comparison of perceived costs and benefits with a standard, such as prior expectations (e.g., Oliver 1980). Perceived disconfirmation of expectations has been recognized as a separate concept - representing consumers' subjective assessment of the discrepancy between

performance and expectations - that both intermediates and adds to the effect of expectations and perceptions of performance on satisfaction/dissatisfaction. Consumer satisfaction/dissatisfaction has been described as cognitive-based affect; the concept is not entirely cognitive in nature, nor does it equal affect. Consumer satisfaction/dissatisfaction with transactions affects *attitude* and ultimately *choice* behavior such as store choice, and choice of a particular product. In the long run feelings of trust and long-term satisfaction/dissatisfaction underlie relationship quality. In the literature it is generally recognized that the customer's subjective evaluation of the excellence of the product, including distribution service, offered is related to customer satisfaction, purchase intention, loyalty, and ultimately profitability. For example, Lemmink, Wetzels, and Koelemeijer (1996) found that the quality of physical distribution service is related positively to relationship quality. See also Kyj (1987), and Innis and LaLonde (1994).

Behavioral research on distribution service classifies under the buyer behavior school of marketing thought (cf. Sheth, Gardner, and Garrett 1988). This approach implies use of for example psychological and sociological theories for explaining purchase decisions in addition to economics. Accordingly, the cost concepts used in this approach will not be exclusively economic. Time, such as waiting time, has psychological as well as economic meaning, and other non-economic cost concepts, such as psychic and social costs come into perspective. The behavioral approach to distribution service is valuable since it offers possibilities for subjective measurement of consequences of distribution service provision that can be linked to distribution system output.

The buyer behavior approach to distribution service is generally noninteractive in nature; it analyzes unilaterally how customers react to service provided by suppliers. Recent technological developments, such as the Internet require development of interactive models of service provision by intermediaries and customer decision making (Sheth and Sisodia 1999). A somewhat more interactive perspective can be found in research on channel member relationships, including concepts such as trust, power, control, conflict, and cooperation, as represented by the organizational dynamics school in marketing (cf. Sheth, Gardner, and Garrett 1988). Although distribution services have been mentioned, behavioral research on channel power has only exceptionally considered distribution service as a source of power (Etgar 1978a).

2.2.4 An integrative conceptualization of distribution service

Each of the three approaches discussed previously contributes to a better understanding of distribution service but each also represents a limited conceptual perspective. Logistics research on distribution service is characterized by a practical orientation in which it adopts either a system perspective or a behavioral focus and analyzes operational as well as strategic problems. It has identified numerous logistics performance indicators that communicate distribution system performance and have been incorporated into mathematical models that provide decision support. It has recognized that channel physical distribution processes create time and place utility as well as maintenance of form utility but has failed to develop a solid theoretical distribution service conceptualization. Consequently, logistics research has not succeeded in relating physical distribution system performance to customer demand and ultimately supplier profitability.

The economic approach distinguishes itself from the logistics approach by its emphasis on all economically relevant channel output and its strategic focus. The concept of implicit shopping cost has been used to develop a sound conceptualization of distribution service and has given rise to high quality, often game-theoretic, research on the strategic interrelationships between retail distribution service provision, consumer demand, and retail profitability. The major drawback with respect to the economic approach is its exclusive focus on retailer cost of service provision and customer transaction cost reduction associated with service consumption.

The behavioral approach, although it has hardly devoted any research effort to distribution service, offers possibilities for conceptualization of distribution service that include both implicit cost and nonmonetary benefits associated with distribution service and allows subjective measurement of these benefits. The most important nonmonetary benefits associated with service consumption concern hedonistic shopping value and improved decision making. Hedonic shopping value refers to the pleasure a consumer derives from shopping and purchase. Decision making quality refers to the role of distribution service in educating consumers concerning product attributes and their instrumental and/or psycho-social benefits so that consumers can better match product purchase and use with their needs. The behavioral approach to service provision however has resulted in a rather general

theory and measurement regarding service performance that emphasizes personal interaction, but has not recognized the particular characteristics of distribution service.

The work by Betancourt and Gautschi (1990, 1992, 1993a) forms a first step towards integration since it provides a logistics, economic, and behavioral cost-related classification of service elements, that can be linked to both strategic and tactical channel member behavior, and physical distribution performance. Based on Betancourt and Gautschi's conceptualization of distribution service an integrative perspective on distribution service has been developed. The following definition of distribution service integrates different views on distribution service and delimits the focus of the remaining of the book:

Distribution service is supporting or facilitating service output of a distribution channel's physical distribution process that

- *reduces customer cost of product acquisition and/or use, through creation of time and place utility and maintenance of form utility, and/or*
- *improves consumer decision making effectiveness and/or*
- *increases customers' hedonic shopping value.*

The above definition distinguishes three types of benefits resulting from distribution service consumption, summarized as convenience, decision effectiveness, and pleasure. In this definition a customer is an individual who or an organization which considers purchase from a particular supplier and has established some sort of contact with that supplier's organization. The distribution service categories or elements that fit this definition and will be used in the research reported in this book are Betancourt and Gautschi's (1990) assortment, information, delivery at the right time and in the right form, accessibility of location, and ambience. These distribution service elements all affect to some extent consumers' distribution-related cost and also potentially influence emotional experience of the shopping trip and product purchase as well as decision making quality. The distribution service elements match Bucklin's (1966), Bucklin, Ramaswamy and Majumdar's (1993) channel outputs, except for lot size which is production-related, as well as other economic and logistics based classifications of distribution service elements.

Chapter 1 argues that availability implies the possibility for buyers to obtain products with desired characteristics at an acceptable cost. Distribution services as defined here are instrumental in creating availability. Convenience relates to the implicit cost of product acquisition and use, while shopping pleasure reduces psychological strain and evokes feelings of pleasantness, information provision increases the likelihood that the consumer buys the product whose characteristics match his or her desires best, maintenance of form utility positively affects physical product quality.

Assortment, or the joint offering of goods and/or services is an important, if not the most important distribution service element. The assortment is the one distribution service element that is strongly connected with other distribution service elements and delivers all three distribution service benefits mentioned in the definition. Assortments create convenience through reduction of search costs, they assist the consumer in making better decisions (see also chapter 3), and may contribute to hedonistic shopping value. Assortment composition even influences purchase behavior through the particular combination of items that is presented to a store's patrons. Consumer preference for assortments is a force that supports the existence of multiple retail outlets that carry to a large extent overlapping merchandise. In addition, it justifies and explains the existence of middlemen in marketing channels, and the emergence of retail conglomerates.

Distribution services that are the focus of this book are, although essential to the total package offered by a supplier, facilitative or supportive to the physical goods or services that an organization offers for sale. Distribution services possess a number of typical characteristics. They are nonmarket services that are often not offered as a separate service at a market price, but instead are offered mostly as extricably linked to a seller's offering of physical goods and/or pure services. A change in one or more of the characteristics of distribution service mentioned in the definition inevitably alters the nature of this service. For example, when a supplier offers a distribution-related service, such as transportation, separately and at an explicit price, it falls beyond the scope of the distribution service concept. In this case the physical distribution function transportation has been detached from the other distribution functions and is no longer exclusively facilitative or supportive to the goods and non-distributive services sold by the organization. Distribution services can be identified that decrease a customer's cost associated with acquisition

and use of this professionalized transportation service, including provision of an assortment of differential transportation services and information on these services' characteristics. However, while the nature of the service has altered, the logistics relevance of professionalized distribution services, such as transportation, remains unchanged. Note that the implicit pricing of distribution service is emphasized in economic analysis of distribution service. In practice distribution service provision is often implicitly priced in the goods and pure services sold by an organization, but it can also be sold for example at or below cost price, which is the case for many optional services, such as delivery at home. In addition, the concept does not require that a selling firm provides all distribution service herself, consider in this respect contracting out of technical assistance.

Figure 2.1 integrates the three different perspectives on distribution service and their interrelationships as antecedents and consequences of distribution service provision from the perspective of consumer decision making. The figure adopts a retail-consumer perspective but can be applied to for example wholesaler-retailers relationships as well. Distribution service provision results from strategic channel member decisions with respect to marketing which determine distribution strategy, location, logistics, and management decisions following from it, and ultimately distribution service offered. Underlying these strategic decisions are choices with respect to the market segment(s) the channel delivers and the service sensitivities thereof. Depending on the organization of the distribution channel these decisions are made independently by the consecutive channel members, or in cooperation with each other. Strategic decisions with respect to other fields, such as information technology, also determine physical distribution system performance. Distribution channel physical distribution system performance should be viewed broadly as the performance of all logistics efforts undertaken by channel members in order to deliver the product. Retailer service output provides diagnostic value on physical distribution performance through logistics performance indicators, and can be used to adjust logistics operations.

Direct consequences of distribution service provision include perceived product quality, perceived hedonic shopping value, and perceived nonmonetary cost. Consumer perceptions of distribution service refer to the five elements shown in the figure, based on Betancourt and Gautschi (1990). Convenience resulting from distribution service consumption - the first benefit mentioned in the definition of

distribution service - is reflected through higher perceived service quality and hedonic shopping value is included as a separate consequence in the figure. Provision of informational services - the second distribution service benefit - that allow consumers to improve their decision making influences consumer desires and expectations and consequently affects quality perceptions. Of course the goods and services sold by the retailer exert a separate influence on quality perceptions. For reasons of clarity the figure does not depict the influence of product offerings and consumer expectations. Consumer perceptions of product and service quality and costs have affective consequences, and ultimately influence purchase behavior. The figure does not show the impact of distribution service provision on postpurchase processes for reasons of plainness. Consumer satisfaction/dissatisfaction processes are discussed in chapter 5. Finally, distribution services affect retail demand, together with price and other aspects of a retailer's offerings. Retailer profits are the outcome of retail demand minus retail costs, both of which are affected by service provision.

2.3 Research framework

Distribution service is an important instrument in the competitive environment in which many retailers operate today. The specific characteristics of distribution service, in particular their coherence with the goods and pure services that are offered for sale, suggest analysis of the role of distribution service in retail competition, which is the major purpose of this book. Competition occurs within assortments, i.e., between individual items in an assortment, as well as between assortments, i.e., between suppliers, and between distribution channels. In order to compete successfully retailers should have insight into the relationship between the distribution service they provide and consumer behavior.

The research reported in the following chapters of this book focuses on the determinants and consequences of supplier distribution service provision, in particular the relationship between supplier distribution service provision and customer decision making. The relationship between distribution service and channel member behavior can be addressed in a variety of ways, using a variety of research methodologies. The remaining chapters of this book focus on the retailer

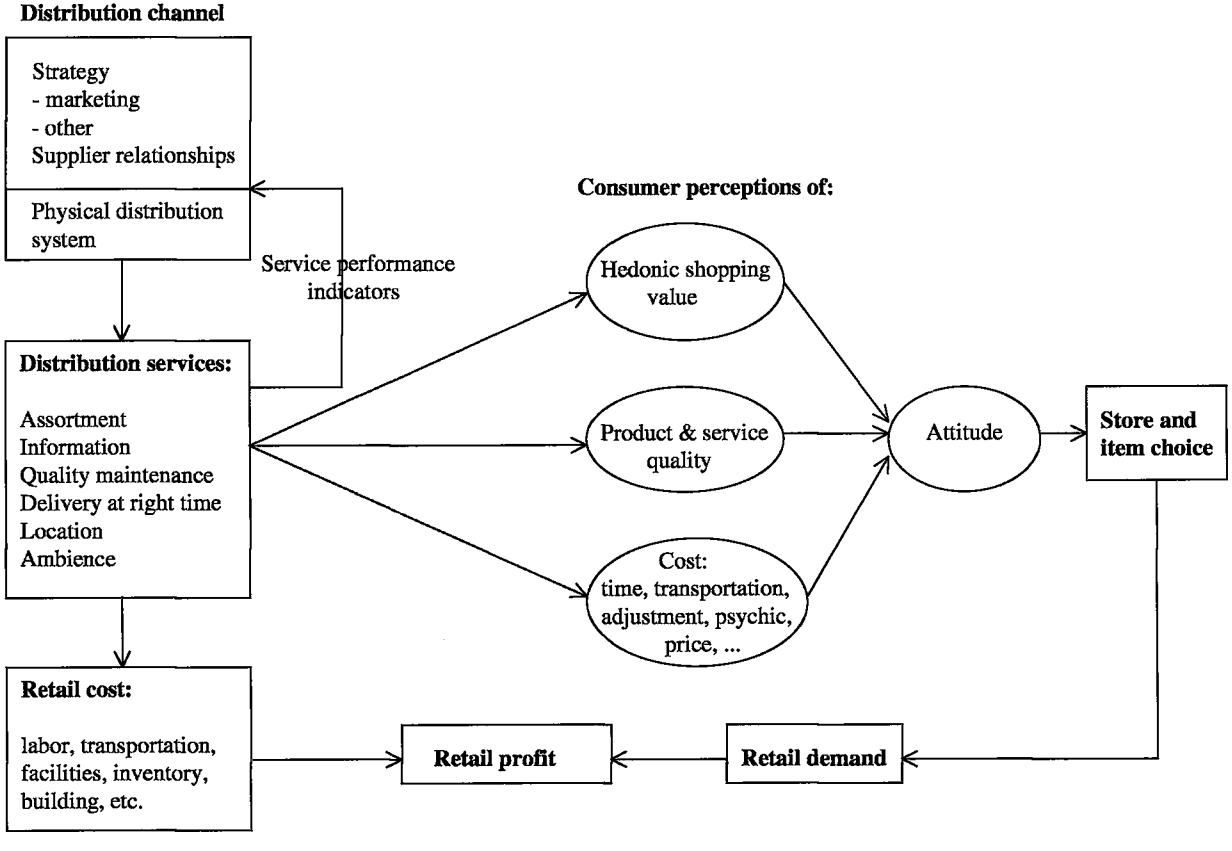

Figure 2.1 *An integrated framework of distribution service in consumer marketing.*

and final consumer channel stages, specifically on retailer decisions concerning distribution service provision, and consumer evaluation processes and purchase decisions.

Retailer distribution service provision and consumer choice behavior. Chapters 3 and 4 focus on individual consumer choice behavior among and within retail assortments. The research reported in these chapters analyzes how assortment composition and other retail distribution services influence consumer evaluation and ultimately store choice and item selection. Substitution and complementarity relationships between products and the degree of complementarity between products and distribution service depend on purchase and usage situations in addition to individual product characteristics. The approach followed in chapters 3 and 4 focuses at assortment analysis and optimization as one further step towards improvement of channel decisions.

Retailer distribution service provision and consumer postpurchase evaluation. Chapter 5 investigates the role of retailer distribution service provision in consumer postpurchase evaluation and satisfaction/dissatisfaction formation. More specifically, it relates determinants of retailer distribution service provision and actual distribution service performance to consumer evaluation processes of the shopping experience and of the products purchased (see figure 2.1).

Strategic retailer decision making and channel structure. Distribution channel structure is the resultant of strategic decision making by all members in the channel. Chapters 6 and 7 focus on retailer decision making with respect to distribution service and consequences for channel structure. Chapter 6 identifies forces that drive channel members' strategic decisions particularly with respect to distribution service in a competitive market and discusses implications for channel structure. In terms of figure 2.1 retailer decision variables are distribution service provision, that brings about costs, and price, that affect consumer demand, which is in turn dependent on the level of distribution service and price. Chapter 7 develops a model that considers retailer decisions on assortment, other distribution service, and price, and explains the co-existence of multiple retailer formats in a competitive consumer market.

The framework shown in figure 2.1 summarizes and integrates the research presented in the following chapters of this book. For reasons of clarity the figure has been kept static and incomplete in the sense that it concerns only one single

exchange episode and does not explicitly show competition between retailers. Chapters 3 and 4 analyze the relationships between distribution service, in particular assortment and ambience, and store and item choice (the right block in figure 2.1). Chapter 5 concerns the relationship between the upper two left blocks of the figure and consumer evaluations shown in the ellipses. Chapters 6 and 7 analyze the relationships between retailer distribution service provision, consumer demand, cost and profits in a competitive environment (the two lower left blocks, the remaining two blocks at the bottom of the figure, and the right block in figure 2.1). The relationships indicated will be discussed in more detail in the respective chapters.

Part II
Consumer Choice Within and Among Retail Assortments

Chapter 3

Retail Assortments and Consumer Choice

3.1 Introduction

Assortments, in particular retail and wholesale assortments, are among the essentials of today's marketplace. It is virtually impossible to think of a situation in which a consumer can purchase a product that is not offered together with other products in an assortment. Alderson (1957, 1965) was among the first to recognize the central role of marketing in the intermediate sortings of goods needed to match the collections of goods at the point of production and desired collections of goods at the point of consumption. He described the marketing process as the process matching heterogeneous supplies with heterogeneous demands where " *the basic economic process is the gradual differentiation of goods up to the point at which they pass into the hands of consumers.*" In order to bridge the gap between production and consumption a sequence of sorts and transformations is done in distribution channels, which Alderson called the sorting principle. The sorting process and associated assortment formation by channel members implies postponement of goods differentiation, a concept that has been elaborated by Bucklin (1965) and is still very valuable today.

Retailers play a key role in the sorting process by composing assortments that they offer to consumers, and consequently face important and difficult decisions concerning their assortment that are crucial for their long-term survival. These decisions all come down to deciding which items should be included or eliminated from the assortment. More specifically, will a new item cannibalize on existing items in the assortment, or will it add just enough choice possibilities for consumers

to increase retailer profits? Is a new item too different from existing items in the assortment or will it draw more customers to the store that value one-stop-shopping and consequently increase sales of other items? In addition to assortment decisions, a retailer has to decide on provision of the other distribution service elements and on price, each affecting the store's positioning.

In order to be able to answer the questions raised here more fundamental insight is needed into the behavior of consumers with respect to assortments. The introduction to this book already observed that assortments can be viewed from many perspectives and on many levels of aggregation. This chapter focuses predominantly on consumer behavior with respect to assortments as collections of goods and pure services offered by retailers. Retail assortments have been defined in retail textbooks as, e.g., "the number of different items in a merchandise category," (Levy and Weitz 1995, p. 30). This chapter as well as the remaining of the book adopt a broader view on retail assortments as the size and composition of the available choice range offered by a retailer. Assortment size refers to the number of different items carried by a retailer. Assortment composition refers to the specific set of items of which the choice range consists and their characteristics. Given this definition of retail assortments, this chapter tries to gain understanding of consumers' motives underlying demand for, evaluation of, and choice from retail assortments. Relevant questions include the following. Why do people value collections of goods and services, both at home and in stores? Why do people want to have the opportunity to choose from multiple shopping centers? Why do consumers want to be able to choose from multiple stores whose assortments overlap? Why do they want to be able to compare and choose from multiple, more or less similar items? Stated more generally, what determinants underlie consumer evaluation of and choice from a particular collection of alternatives.

An important determinant of consumer appreciation of retail assortments concerns consumers' preferences with respect to formation of their own assortments. Consumers save monetary as well as nonmonetary cost by stocking up goods. Alderson (1957) argued that households accumulate goods in order to sustain expected patterns of future behavior as well as protection against unpleasant surprises. The latter refers to inventory holding as an insurance against unexpected and/or unpleasant contingencies, such as strikes and price increases. Many purchases are done for the purpose of refilling or maintaining household inventory

of fast movers or perishables, e.g., coffee, sugar, milk, bread, or as an addition to existing collections of goods, e.g., clothing, furniture. Forward buying is in addition done for goods that are occasionally promoted at low prices (see Kahn and McAlister 1997). Note that the widespread use of refrigerators and cars has not only lead to one-stop shopping, but also to an increase in home inventories.

Consumer need for assortment represents the need for two essential assortment characteristics, namely complementarity and substitutability. Section 3.2 discusses psychological and economic determinants of consumer need for retail assortments. Retail assortments can be considered both as a derivative from and an influence on consumers' own assortments. Three important influences on consumer retail assortment evaluation and choice are identified, i.e., the consumption goal, the purchase situation, and the decision context. Section 3.3 investigates the psychological process of consumers' own assortment formation and retail assortment choice. Contextual influences, in particular the composition and presentation of retail assortments, constitute and important determinant of consumer retail assortment evaluation and choice and are discussed in section 3.4. Section 3.5 investigates consumer retail assortment evaluation. Finally, section 3.6 presents a more complete theoretical framework that explains consumers' choice from and among retail assortments by assuming their judgments are first and foremost driven by the consumption goals they pursue, given their preference structures, and also depend on other situational and contextual influences. The propositions formulated in this section are the basis for the empirical research on consumer choice from retail assortments reported in the next chapter, as well as for future research.

3.2 Determinants of consumer need for retail assortments

Consumers often face an overwhelming number of alternatives to choose from in a retail environment, even in light of the various objectives they pursue. From this abundance of alternatives a consumer must select the particular alternative that matches an existing assortment, either their own, or other people's. Apparently, consumers value retailers' prestructured collections of goods and/or services. The need for assortment is ubiquitous and touches upon virtually every aspect of human behavior, not only with respect to choice of consumption goods, but also with

respect to investment decisions, employee choice, even romantic engagement, and so on. This section discusses general motives underlying individual consumers' appreciation of assortments, with particular emphasis on retail assortments, based on economic and psychological theory on consumer decision making[1].

Consumers appreciate retail assortments mainly because demand interdependencies exist between products. These demand interdependencies - or substitutability and complementarity - between items in retail assortments are situationally determined subjective concepts that depend not only on individual preferences and usage goals, but also on retailer input, particularly provision of distribution service other than assortment. By offering collections of items retailers create economic, psychic, or social benefits to consumers, many of which are closely related to the benefits resulting from distribution service provision that were discussed in chapter 2. Section 3.2.1 discusses several important consumer-based rationales for the existence of retail assortments. One particularly relevant consumer-based economic rationale for the existence of retail assortments, i.e., reduction in consumer distribution-related cost while purchasing multiple products during one shopping trip, will be discussed in 3.2.2. This rationale has been modeled comprehensively by Betancourt and Gautschi (1990, 1992) who analyze the role of consumption goals and retailer distribution service provision in complementarity and substitutability relationships between the items in a retail assortment.

3.2.1 Consumer-based rationales for the existence of retail assortments

It is common knowledge that consumers' preferences for products differ. An obvious explanation for the need for retail assortments would be that consumers are heterogeneous with respect to their intrinsic preferences for products (e.g., Kotler 1980). By offering an assortment that consists of multiple products a retailer appeals to multiple consumer segments. In practice, however, consumers' preferences vary over different consumption goals and different purchase situations. Furthermore,

[1] Purely economic rationales underlying the emergence of middlemen in distribution channels will be discussed in chapter 6.

consumers may be uncertain about their preferences for product characteristics and may be imperfectly informed about existing products.

Individual consumers generally do not have the cognitive capability nor the physical opportunity to collect information about and to compare all available alternatives. Accordingly, they value prestructured collections of alternatives that allow relatively simple comparisons between alternatives (cf. Shugan 1980) many of which, at least to a certain extent, meet their needs, wants, or desires, that are often associated with the particular consumption goal they pursue. Such a collection of goods and services offered by a retailer should contain alternatives that are somewhat different, providing the decision maker with enough information to make inferences concerning the market offerings and reduce his perception of risk induced by the awareness of his own bounded rationality in the presence of many alternatives.

Well-composed assortments enable consumers to make better purchase decisions at lower mental and physical cost associated with search and comparison. Rationales underlying consumer valuation of assortments can be classified according to the benefits resulting from distribution service provision that were identified in chapter 2, i.e., lower distribution-related cost of product acquisition and/or use (C), improved decision making (D), and increased hedonic shopping value (H). Table 3.1 classifies well-recognized rationales underlying consumer shopping behavior - i.e., comparison of items in retail assortments as well as multiple retail outlets, possibly in multiple shopping centres - that have been mentioned in the literature, according to these three distribution service benefits.

Consumer efficiency with respect to distribution-related costs constitutes an important rationale for the existence of retail assortments; assortments offer the possibility for one-stop shopping and consequently allow time savings with respect to search and transportation. Section 3.2.2 elaborates on Betancourt and Gautschi's model that has been developed around this economic motive. The next two rationales relate to the quality of consumer decision making. Even if only a small number of alternatives exists in the real-world market a decision maker wants to compare several options. Retail assortments provide information and may induce a consumer to infer information about the available alternatives (Johnson 1984; Huber and McCann 1982; Ross and Creyer 1992). The presence of multiple alternatives allows a decision maker to compare and learn about products and thus

reduce uncertainty about the importance of selection criteria. The availability of retail assortments of alternatives thus may provide justification for one's choice. Assortments thus form an important context for consumer decision making (e.g., Simonson and Tversky 1992) and a retailer can design and present her assortment so as to influence consumer choice, as will be discussed in section 4 of this chapter.

Table 3.1 *Consumer-based rationales for the existence of retail assortments.*

	Behavioral rationale	Assortment benefit
1.	Consumer efficiency associated with purchasing multiple items (one-stop shopping) with respect to distribution-related costs, such as search, comparison, travel, time, and adaptation cost of desired item is out-of-stock (e.g., Betancourt and Gautschi 1990, 1992; see also chapter 2);	C
2.	Reduction of consumer uncertainty and perception of risk associated with purchase (e.g., Jacoby et al. 1994) and facilitation of inferential belief formation (e.g., Johnson 1984; Huber and McCann 1982; Ross and Cryer 1992) through comparison shopping;	C
3.	Non-purchase reasons for shopping and comparing products. For example, seeking social interaction, learning about new trends (e.g., Bellenger and Karkaongar 1990; Tauber 1972), novelty seeking (Hirschman 1980);	C, H
4.	Hedonistic value of shopping to consumers (e.g., Babin, Darden and Griffin 1994).	H

Comparison shopping and search are forms of information seeking, a major component of so-called problem-focused coping. Information seeking enhances the predictability of a situation and thus helps individuals avoid future difficulties, deal with present ones, and increase their sense of control and confidence. Tauber (1972) sees shopping as an arena where consumers derive satisfaction from finding exactly what they have been looking for, and that satisfaction serves two types of motivations, namely a sense of achievement and mastery over the choice environment. The motivation to identify with culturally prescribed roles regarding the conduct of shopping activity has been referred to as emotion-focused coping.

These roles prescribe normative behavior, such as careful product and price comparisons, searching for optimum value, etc. Thus, shoppers seek ego-enhancement by adding satisfying shopping roles to existing self-concepts (Westbrook and Black 1985).

Non-purchase reasons for shopping can relate to general decision making effectiveness, the pleasure derived from shopping as such, and ego-enhancement. Other, related non-purchase reasons for shopping that have not been mentioned in the table include diversion from routine activities, exercise, sensory stimulation, and acquiring interpersonal power (see also Bellenger and Korkaonkar 1990; Tauber 1972).

The rationales mentioned in table 3.1 can be seen as differential explanations of demand interdependencies that exist within and among retail assortments, in particular complementarity and substitutability relationships. Two products are generally considered substitutes if both can satisfy the same consumer need and two products are considered complements if they are consumed jointly in order to satisfy a particular need (Henderson and Quandt 1958). More generally, given the concept of composite needs, Lattin and McAlister (1985) argue that substitute products share so-called want-satisfying features and thus fulfill the same component of a consumer's composite need and complementary products have differently valued features and thus meet different components of the composite need. If the different components of a composite need can only be fulfilled by variety-seeking behavior over time substitute products can be complements in time.

The degree to which consumers value each of the benefits associated with retail assortments, and perceive substitutability and complementarity relationships, depends on a number of factors that combine individual, situational, and contextual characteristics. Below a number of these have been described:

i Consumer intrinsic need for variety or variety-seeking through composite need (e.g., Lattin and McAlister 1985; McAlister 1979, 1982; McAllister and Pessemier 1982);

ii Consumer heterogeneity in preferences due to different consumption goals over time (e.g., Barsalou 1983, 1985; Bettman 1988);

iii Consumer heterogeneity in preferences and decision making process due to situational variables, such as time pressure (e.g., Isenberg 1981; Park, Iyer, and

Smith 1989), and retail environment (e.g., Bitner 1992; Ward, Bitner, and Barnes 1992).

Individuals experience an intrinsic or situation-induced need for variety (e.g., McAlister and Pessemier 1982) that motivates them to seek variety in consumption. Consistent switching among products in time may be a way of satisfying wants and needs that are not fulfilled completely by consuming one product only. In addition, many wants and needs are satisfied best by a portfolio of products (McAlister 1979). Variety seeking is a form of exploratory behavior. The optimum stimulation level (OSL) and personality traits such as locus of control have been shown to affect consumer exploratory behavior (Joachimsthaler and Lastovicka 1984). Hirschman (1980) suggests that novelty seeking serves as a means of self-preservation; the individual may find it useful to create a bank of potentially useful knowledge. In addition, novelty seeking may function to improve problem-solving skills. Individuals with high stimulation ideals may seek information because of a genuine desire to explore something unfamiliar, while individuals with low stimulation needs may seek information to reduce the risk of trying an unfamiliar product (cf. Raju 1980). Consumer need for variety is a force driving consumers to prefer larger and more varied assortments, both in their homes and in shopping centres.

Consumers' shopping goals are both individually and situationally determined and affect consumers' preferences for assortment and for individual products. As will be illustrated in greater detail in the next sections, the substitutability and complementarity relationships between items in an assortment depend on consumers' consumption goals. Situational variables in general constitute an additional important determinant of the degree of external search consumers are willing to undertake. For example, time pressure and the difficulty of the choice task influence the cost-benefit tradeoffs associated with information seeking. Consumers experience continuous tension between limited time, mental capability, energy, and money, their information needs, and their consumption goals, that differentially impact their desires concerning retail assortment size and composition. In addition, individual differences with respect to decision making, such as in-store processing vs. prior processing of information, abilities, and concern with optimality of the choice, affect the degree of external search (Bettman 1979) and will consequently influence consumers' need for assortment.

Retail assortments are on the one hand a derivative of consumers' desired own assortments, and on the other hand facilitate as well as influence formation of these own or in-home assortments. Section 3 discusses influences of consumption goals on consumer assortment formation and choice; contextual influences of retail assortments on consumer decision making are the topic of section 4. First, this section continues with a discussion of two consumer-based rationales for the existence of retail assortments, i.e., distribution cost efficiency and consumers' differing consumption goals, and their implications for substitutability and complementarity between items in retail assortments as modeled by Betancourt and Gautschi (1990, 1992).

3.2.2 Distribution service and consumer demand for assortment

Betancourt and Gautschi (1990, 1992) developed a comprehensive economic model that emphasizes the role of distribution service in relationships between retail assortments and between items in a retail assortment. They view assortments as "collections of market goods and services and nonmarket services" (see also chapter 2) in which not only goods and services that are offered at an explicit price are important in terms of competing for the consumer's monetary and nonmonetary means, but also certain nonmarket services, i.e., distribution services. They develop a formal model of the interrelationships between the items in a retail assortment, and between retail assortment items and other distribution service elements, and show that provision of distribution service drives items in an assortment towards complementarity. An important concept in their model is the consumption goal, or the aim a buyer wants to achieve by using the goods purchased and the distribution service consumed. For example, two seemingly unrelated products, such as milk and gasoline can be complements because the consumer is on his way to a picnic (consumption goal). Another important reason for one-stop shopping concerns efficiency. Betancourt and Gautschi argue in their seminal papers that the main issue with respect to assortments is that they allow one-stop shopping, i.e., they "permit the consumer to purchase a basket of goods that are complements, at least in some sense." A consumer saves time in purchasing both products on one occasion (distribution service). Below a concise interpretation is given of

Betancourt and Gautschi's household production model of retail demand. Their analysis has lead to a new and clear definition of product complementarity and substitutability, as well as assortment breadth and depth.

The model assumes a household undertakes consumption activities in order to generate outputs or commodities that yield satisfaction or utility. The outputs are generated through a household technology that uses as input among other things (1) time, (2) capital services from the fixed stock of durables available within the household, (3) market goods and services, and (4) distribution service provided by the retailers the household patronizes. The shifting of distribution costs between households and retailers (see also chapter 2) is captured formally by modeling the distribution service provided by a retailer as fixed inputs to the household production activities. In addition, various environmental characteristics may be relevant to the production process. For example, when baking a cake, which takes a certain amount of time, a person will use a food processor, the oven, and the refrigerator, and he or she will buy ingredients for the cake, such as butter, flour, and sugar, probably from a supermarket, together with other things he or she needs for the household. Alternatively, this person may buy a ready-made cake in a supermarket or a specialized bakery. If it rains heavily or if (s)he expects no visitors (s)he may decide to postpone the visit to the store and consequently postpone preparation of the cake, or have it delivered at home.

An essential assumption in the model is that a household optimizes its production process in two stages. The first stage represents a *direct production effect*: what quantities of what items should be bought in order to generate certain outputs at minimum cost, given household input constraints, prices, distribution services, and desired outputs. In the second stage the household decides what levels of outputs it will produce in order to maximize utility, given its full income: the *consumption effect*. The direct production effect and the consumption effect are central to Betancourt and Gautschi's subsequent reasoning since they decompose price-, cross-price, and service elasticities of demand into these two effects. The direct production effect represents the change in quantity demanded of a particular item as a consequence of a change in the price of the item itself, the price of another item (cross-price elasticity), or the level of a particular distribution service provided by the retailer (service elasticity), given the desired levels of the household outputs. For example, a price increase for gasoline may cause a consumer to drive more

carefully or buy an economy car. The consumption effect represents the effect of a price change on demand for an item through the effect of this change on the desired levels of household outputs. For example, a price increase for gasoline may reduce demand for gasoline because families make less weekend trips by car due to this price increase.

Betancourt and Gautschi define relationships between items in an assortment, as well as between items and distribution services, in terms of net and gross complementarity and substitutability. Two items in an assortment are defined to be *net complements* or *net substitutes* if the production effect is negative or positive, respectively[2]. Two items are *gross complements* if their cross-price elasticity, or the sum of the production effect and the consumption effect, is negative and *gross substitutes* if their cross-price elasticity is positive[3]. The tendency towards negativity of the consumption effect is a force that drives items towards complementarity. Gross effects thus take into account the change in desired outputs as a consequence of price changes *and* the change in item demand as a consequence of change in desired output; they consider item-relationships over relevant consumption activities. Complementarity and substitutability are thus subjective concepts that are conditional on the consumption activities that are undertaken. Even when two items are net substitutes, e.g., lamb chops and hamburger, they can be complements, for example for the consumption goal "having a barbecue".

An item in an assortment and a retailer distribution service will be net complements in most situations, e.g., an item is chosen more often as a consequence of an increase in retailer distribution service provision over desired outputs and the associated decrease in consumer cost of producing the outputs. Net substitutability occurs for example, when an assortment is enlarged with respect to a certain product category, e.g., meat. As a consequence of the greater range of choice at least some items in the assortment will be chosen less. Betancourt and Gautschi (1987) show that, because of the consumption effect, distribution services that apply to all items in an assortment, such as ambience, tend to be gross complements with every item in the retailer's assortment. An increase in distribution service tends to increase demand for certain household outputs, which in turn increases demand for

[2] Two items are *net independents* if the production effect is zero.

[3] Two items are *gross independents* if their cross-price elasticity is zero.

particular items. Even so-called item-specific distribution service, such as quality maintenance or specific information that apply to specific items in an assortment, tend to be gross complements with many seemingly unrelated items in a retailer's assortment because of a positive consumption effect.

By explicitly considering the role of consumption goal and distribution service provided by retailers Betancourt and Gautschi's work represents a clear contribution to economic thinking about assortments. The distinction between production and consumption effects on consumer decision making is not new, but its translation to net and gross complementarity and substitutability provides new insights into the role of consumption goals as an important force that affects consumer demand for retail assortments. In practice marketers often use rigid and indistinct consumption-related definitions of complementarity and substitutability. For example, two alternatives from one predefined product category, such as tea and coffee, are generally considered substitutes, while alternatives that often are consumed together, such as coffee and coffeecreamer, are considered complements. According to standard economic theory two items with positive cross-price elasticity are considered substitutes and two products with negative cross-price elasticity are considered complements. In Betancourt and Gautschi's view cross-price elasticities indicate gross substitutability or complementarity, since they depend on the consumption goals pursued by consumers and associated household outputs[4]. Net substitutability and complementarity give a more straightforward impression of interitem relationships that can be particularly useful for retail management.

Based on the idea of net complementarity and substitutability Betancourt and Gautschi have developed unambiguous, albeit very general, definitions for retail assortment breadth and depth. They define the *depth* of an assortment from the point of a representative household as "the extent to which items in a retail assortment are net substitutes" and the *breadth* of an assortment as "the extent to which items in a retail assortment are net independents." Although these definitions

[4] As a consequence of the significance of household outputs to gross item relationships measurement and/or interpretation of cross-price elasticity is problematic. Development of conditional elasticities, similar to the cross-consumption response, developed by Lattin and McAlister (1985), which defines changes in choice probabilities conditional on previous variety-seeking behavior, deserves attention in this respect.

apply to entire retail assortments, many retail outlets, such as supermarkets, carry very sizeable assortments consisting over 10,000 items, which make consumer assessment of assortment breadth and depth virtually impossible. Existing retail assortments are generally classified into different categories. Retailing practice considers the number of categories indicative of assortment breadth and the number of different alternatives within each particular category indicates assortment depth. In addition, assortment classification into assortment categories provides cues consumers can use for assessment of the degree of item complementarity and substitutability desired with respect to their particular consumption goals. Examples of such cues include the number of available product categories, the number of shelf facings, and square meters selling space devoted to one assortment category.

While Betancourt and Gautschi's definitions of assortment depth and breadth adopt a retailer view on assortments, the remaining of this book adopts a consumer perspective and elaborates on the view that alternatives within and across product categories can be substitutes or complements, depending on the desired household outputs and associated consumption activities. Based on their model Betancourt and Gautschi derive implications for retail management and retail competitive structure, but they ignore the psychological processes underlying consumer choice, including the role of distribution services in consumer decision making processes. Despite this apparent lack of psychological content Betancourt and Gautschi's approach, in particular their conceptualization of consumption activities that are undertaken to generate desired levels of household outputs, matches recent psychological insights on the predominant role of consumption goals in consumer choice remarkably well.

3.3 The role of consumption goals in consumer assortment choice

Consumers buy products for roughly three purposes. Either they purchase the product(s) for direct consumption, such as is the case for most pure services, they intend to give the product to someone, or they take the product somewhere, often home, and consume it there. Home consumption of the product may take a short (e.g., fresh food) or longer (e.g., furniture) length of time and generates in-home inventories and associated in-home assortments. Several types of consumers' own

or in-home assortments can be distinguished, formation of which is driven by different rationales.

In addition to economic and functional rationales underlying in-home assortment formation, including reducing distribution-related cost, speculative buying, and protecting oneself against contingencies, psychological rationales exist that explain consumer formation of collections of complementary goods, so-called product constellations. Insight into the process underlying consumers' mental representation of complementarity and substitutability between different products is crucial for understanding consumer evaluation of and choice of and from retail assortments. This section discusses the psychological processes underlying consumer assortment formation and specifically elaborates on the role of consumption goals and situational factors. Contextual influences are the topic of section 4. This section briefly mentions relationships with consumer retail assortment evaluation and choice, which will be discussed in greater detail in sections 5 and 6.

The organization of product knowledge in memory is considered a critical factor in consumer decision making. Several organizing principles for consumer knowledge have been identified and labeled by cognitive psychologists, including schemata, scripts, explicit rules, and categories (cf. Sujan 1985). These structures have in common that they enable the
consumer to create meaningful representations of information that will enable him or her to simplify, to impose order on, and to control decision processes. A popular and undisputed way of describing generalized knowledge structures is through categories. Classifying nonequivalent stimuli from the environment into categories so that they can be treated as equivalent is "one of the most basic functions of all organisms" (Rosch et al. 1976). Consumer category structures pertain to the manner in which product knowledge is represented and organized in memory so as to permit classification and differentiation (e.g., Alba and Hutchinson 1987; Cohen and Basu 1987). The purpose of categorization is to reduce cognitive and behavioral effort needed for storing and retrieving information. Consumers combine cognitive concepts into categories at different levels of abstraction and with differing levels of hierarchy. Several hierarchical levels of categorization can be distinguished, including superordinate, basic, and subordinate categorization (Rosch et al. 1976).

Basic categorization represents "the most general and inclusive level at which categories can delineate real-world correlational structures."

Consumers may develop different types of categories for different purposes. For example, for judgment and choice, i.e., perceptual judgment and preference tasks, consumers may develop different category types. A number of studies found that products that are perceived by consumers to be highly similar need not be preferred accordingly. For example, Lefkoff-Hagius and Mason (1993) found that physical product attributes that can be assessed objectively and represent utilitarian value relate to similarity judgments, while so-called beneficial and imagery attributes that are more subjective and abstract and represent psychosocial, respectively hedonic aspects of product usage relate more to preference judgments (see also Creusen and Schoormans 1997).

A category should be differentiated to a degree that is suited for a certain purpose. A large number of categories implies refinement but contains a degree of differentiation that is probably irrelevant for respective purposes. A balance has thus to be found between refinement and robustness of categories. Expertise, or prior knowledge is associated with richer, more complete, and more detailed representations of a category in memory (Alba and Hutchinson 1987; Murphy and Wright 1984). Experts in a product category should have readily accessible knowledge about a wide range of products in that category. Furthermore, experts are less likely than novices to rely on less relevant surface features in making judgments. Experts' categories are richer and more semantically-based versus more syntactically or surface-based for novices (Chi, Glaser and Farr 1988; Celsi and Olson 1988). The actual category level used by consumers is very likely to depend on their goals as well as on their expertise.

Most contemporary theories of category structure involve two closely related constructs, *similarity* and *prototypicality*, that explain category membership (Loken and Ward 1990; Murphy and Medin 1985; Smith and Medin 1981). People perceive exemplars of a category to vary in the degree to which they are representative, or typical, of a category. Typicality is generally defined as "the degree to which an item is perceived to represent a category" (Loken and Ward 1990). In order to be perceived as substitutes items should possess a certain degree of similarity with respect to fulfillment of needs, desires or wants, and in order to be considered items should be to some degree typical for the category that is evoked. Item similarity is

obviously inadequate as the basic construct for categorical structure; it considers object properties only and ignores the relational nature of object concepts in category formation (e.g., form vs. function, attributes vs. core meaning), relationships with the context in which the objects occur, and variability in relevant subject level characteristics such as human interests, needs and goals (Murphy and Medin 1985; Ratneshwar and Shocker 1988). Barsalou (1983, 1985) argued that it is items' goal-connectedness that determines whether or not they are in the same category. In support of this argument Ratneshwar (1987, in Ratneshwar and Shocker) found that prototypicality correlated highly with the extent to which a product shared usages in common with all other category members. A similar emphasis on situation can be found in consumer-oriented approaches to determining market definition and structure. Srivastava's (1981) usage-situation influence (SIU) approach states that the anticipated use, the functions to be served, and the consumption context of a product influence consumers' choices among alternatives. Consumers' category structures are thus inferred on the basis of their judgments of product substitutability across a set of usage contexts (see also Day, Shocker, and Srivastava 1979; Srivastava, Alpert and Shocker 1984).

Goals are generally seen as the most important factor in motivation and direction of consumer information acquisition, information encoding and choice (Bettman 1979). Barsalou (1983, 1985) distinguished between a "perceptual" class of memory structures or common *taxonomic categories*, based on the consumer's general knowledge of a product class, and *goal-derived categories* or representations created in order to make a choice. Goal-derived categories are established in memory, or created ad hoc, to fulfill certain goals or ideals, which may be prompted by specific situations. Examples of goal-derived categories are, "something to make me feel better", "something to drink on a hot day", or "brand XYZ nailpolish that matches my new clothes". Such a category may include noncomparable alternatives, for example "ways to get a quick food-item" may include a visit to the vending machine around the corner, calling a pizza delivery service, or a quick walk to the fast-food restaurant across the street (Sindra 1994). Product categories that are generally distinguished in retail assortments seem to have characteristics of both goal-derived and taxonomic categories (Loken and Ward 1990).

Common taxonomic categories can be characterized by the central tendency of the frequency distribution of features or attribute levels over instances, i.e., the more a product's features are similar to a category's modal values the more likely it is perceived as an item of that category. The proximity of an item's contextually-dependent perceived features to goal-dependent ideal levels predicts its likelihood to belong to a certain goal-derived category. Items in goal-derived categories may thus share few features and be complements, rather than substitutes for one another. Goal-derived categories provide a theoretical foundation for the inclusion of alternatives from different product categories or "noncomparable" alternatives in consumers' consideration sets (Bettman and Sujan 1987; Ratneshwar, Pechmann, and Shocker 1996).

Schemata represent the *organization* of knowledge structures, or categories, in memory. Like categories, schemata are cognitive tools, based on past experiences, that help an individual to cope with new experiences (Bartlett 1932), and have been shown to have a profound effect on the processing of new information (Sujan and Bettman 1989). A schema is a cognitive structure that represents an individual's expectations about a particular domain (Bettman 1979). Expectations may include hypotheses about attributes, importance weights, and variability across brands. The domain may include, for example with respect to assortment formation, a product category, a consumption goal, or a specific product already in the consumer's home assortment. Schemata are often conceptualized as complex and dynamic associative semantic networks in which related concepts are located closer than more distant concepts. A commonly accepted theory holds that activation of a concept, represented by a node of the network, results in subsequent activation of other concepts along the paths of the network. This notion of spreading activation (Collins and Loftins 1975) is useful for understanding the interrelatedness of products in consumers' minds and the role of the consumption goal as an important determinant of product interrelationships, whether complementarity or substitutability.

A consumption system (Boyd and Levy 1963) refers to the constellation of products that are needed by the consumer to perform desired consumption activities that lead to certain household outputs. Consumers may develop or acquire cognitive structures that refer to these product constellations, so-called *consumption schemata* (Lai 1994). Consumption schemata organize and represent information about

interrelationships among complementary products, the sequence of the consumption activity in time, the cultural value and meanings of the goods involved, and personal preferences and affective associations. The formation of a consumption schema is thus driven by a particular consumption goal. The concept of consumption schemata implies consumers do not only form expectations with respect to product categories, i.e., product types or brands, but they are also likely to form expectations about a product constellation with respect to the consumption goal they pursue.

A consumption schema can be partitioned into several subschemata that refer to the functions that are to be fulfilled in the consumption process. A specific function in the consumption process can usually be fulfilled in different ways or by multiple alternatives (products), e.g., several brands of butter can be used in baking a cake. Each alternative is called a mode for the particular subschema. The different modes for a particular consumption subschema can be said to represent substitutes. If a consumer finds the product collection, or product constellation, in his or her home to be out-of-coherence or unsatisfactory, the need to replace the "obsolete" items in it, or add to the existing items emerges and one or more criteria are used to make the collection more complete. Based on his idea of consumers who select according to consumption (sub)schemata Lai (1994) suggests possible dimensions of compatibility and complementarity that are critical in product choice:

1. Functional exhaustivity: products are chosen and combined in such a way that the required functions of a consumption activity are completely fulfilled;
2. Operational connectivity: the operation of a subschema is in coherence with other subschemata and facilitates the consumption process;
3. Aestethic coherence: the consumer's subjective and idiosyncratic preference for a product constellation based on sense of beauty or personal expression;
4. Meaning-role consistency: perceived coherence between the cultural or symbolic meanings of complementary products and the social roles which consumers assume or global consumption activities;
5. Hedonistic value of the product combination to the consumer;
6. Memorial symbolism: the symbolism associated with use of product constellation resulting from past experiences;
7. Affective association with certain product combinations.

The importance of the above mentioned dimensions in product choice depends on the consumption goal that is pursued and on the consumer's expectations about the product constellation. One might argue that consumers evaluate retail assortments depending on the composition of their consumption schemata. Whereas several of them are highly idiosyncratic, a few criteria relate directly to the rationales underlying the existence of retail assortments mentioned in the previous subsection. Retail assortments play an important role in facilitating the consumption process through increasing operational connectivity and meeting functional exhaustivity requirements. The first relates mainly to distribution cost reduction, the latter to the quality of consumer decision making. In addition, retailers can offer product combinations that increase hedonistic value to consumers. These three dimensions underlying consumer choice are particularly relevant with respect to consumer purchase of fast moving consumer goods that are relatively low in expressive value, such as groceries. Other dimensions, including aesthetic coherence, meaning-role consistency, and memorial symbolism become increasingly important with increasing expressive value of products and have led to the emergence of specific store formats. For example, antique stores may among other things appeal to consumers' sense of the past and associated memorial symbolism, interior decoration stores selling designer furniture and associated home decorations appeal to consumers' desire for aesthetic coherence, and so-called ethnic stores may appeal to meaning-role consistency.

Formation of consumers' in-home assortments obviously relates to the composition of their consumption schemata as well. Set aside home storage of products for reasons such as insurance, speculation, and convenience, several of the dimensions mentioned earlier underly consumer formation of product constellations. For example, home furnishing reflects among other things aesthetic coherence and memorial symbolism. Belk (1995) mentions several motives underlying consumer collecting of non-utilitarian objects, including gaining a feeling of mastery, competence, or success; the chance to stand out as being unique by virtue of possessing rare, valued, and unique possessions; symbolic self completion, including contributing to the collector's sense of past - or memorial symbolism -; the thrill of the hunt, which relates back to accomplishment, mastery, and success; experiencing sense of community with other collectors; and finally as

the perhaps most important rationale, providing contact with self-transcending sacredness or magic in collectors' lives.

Although consumption goals include a situational component, other situational variables and contextual variables exist that affect consumer behavior with respect to assortment choice. Early experimental research already indicated that a person's choice is highly dependent on the situation (e.g., Bishop and Witt 1970; Belk 1974a,b). Situational variables are commonly conceptualized as being related to the situation in which the actual decision making is done, such as time pressure, and influence among others the effort a consumer is willing and/or able to devote to decision making. Sindra (1994) defines situations as "an agglomeration of ecological factors, such as time, place, social setting, and task objectives, that are relatively transient both in nature and effect and thus distinct from enduring individual and brand characteristics, and that affect subject behavior either by themselves or in conjunction with other, personal and object, factors." Belk (1975) specifically defined any situation on five constituent factors: (1) a *physical* context consisting of geographic and institutional location, sights, sounds, and aroma; (2) a *social* context defined by interpersonal roles and expectations, (3) a *temporal* context defined by e.g., time of day, day of week, season; (4) a *task* definition described by overall subject intentions; and by (5) the *antecedent conditions* subsuming miscellaneous residual or "carried-over" effects from a prior state, such as mood.

In the remaining of this chapter and in subsequent chapters a distinction is made between purchase situation and purchase context. The purchase situation refers to Belk's temporal, task, physical, antecedent, and social conditions to the extent that they do not concern the retailer's offerings, while the purchase context refers to retailer distribution service provision, including assortment provision, other customers in the store, etc., i.e., Belk's physical and social context. Consumption goals are interpreted broadly henceforth, including the outputs a household aims to achieve, given known characteristics of the usage situation and purchase task. The purchase situation constitutes a separate factor including external, unforeseen, occurrences.

Both the consumption goal, and other situational and contextual factors mentioned here can heavily affect organization and/or activation of consumers' knowledge structures. They may lead to highly specific expectations for a product,

shift the focus to specific brands, or even reorganize the entire typicality structure based upon constraints imposed by the context (Rosch and Shoben 1983). Like different consumption goals, different purchase situations will in general lead to activation of different modes in consumption (sub)schemata and associated goal-derived categories, adaptation of existing categories, or even construction of new categories. Different decision making contexts, in particular retail assortments, can be designed to as to change consumers' existing knowledge structures. The next section discusses retail contextual influences on consumer choice, with particular emphasis on retail assortment composition.

3.4 Retail assortment composition effects on consumer choice

In the previous section it has already been mentioned that the consumer's decision process and its outcomes may differ depending on consumption goal, other situational factors, and context factors. In a retail application context factors include all elements of distribution service provision by a retailer, including the alternatives presented in the assortment, shelf layout, ambience, and personal service. Retailers have different possibilities to influence consumer decision making and distribution service provision is an important source of possible impacts on product judgment and choice. The context effects that are specifically discussed in this section concern the influence of assortment composition, including the availability and features of the individual items and as their presentation, on consumer preference, choice incidence, as well as the actual item chosen from the assortment. For example, consumers have higher perceptions of assortment size when the shelf is organized congruent to their mental representation of the product category (Broniarczyk and McAlister 1995; Broniarczyck, Hoyer, and McAlister 1998).

Context effects have been found with respect to consideration set formation (Ratneshwar, Pechmann, and Shocker 1996) and choice strategies and outcomes (e.g., Ariely and Wallsten 1995; Bettman 1988; Dhar and Sherman 1996; Houston and Sherman 1995; Huber, Payne and Puto 1982; Huber and Puto 1983; Johnson and Meyer 1984; Klein and Yadav 1989; Payne, Bettman and Johnson 1988; Simonson and Tversky 1992; Tversky and Simonson 1993). They influence framing and the role of reference points on consumer decision-making processes (Klein and

Oglethorpe 1987; Monroe and Chapman 1987; Rowe and Puto 1987) and influence judgments of similarity, distinctiveness, ad informativeness, and polarization of attitudes as found by Sujan and Deklava (1987) who studied the effects of comparative versus noncomparative advertising.

All context effects represent deviations of the theory of rational choice. A consumer who makes a so-called rational, or value maximizing, choice will choose the most preferred alternative from a choice set or an assortment, independent of the presence or absence of other alternatives and the characteristics of those alternatives. Consumers' actual choices do not always match the predictions that are based on the theory of rational choice. Instead, consumers make seemingly irrational choices that violate the basic postulates of rationality in a variety of ways. A number of context effects violate the so-called independence of irrelevant alternatives (IIA) principle, which assumes the decision maker has a complete preference order of all options and always selects the alternative that is highest in that order from an available product set (Tversky and Simonson 1993). The IIA axiom or proportionality effect assumes addition of a new item to an assortment takes away market share from the other items in proportion to their original shares[5].

The IIA principle was applied in early models of aggregate choice, originally developed by Luce (1959), that have become the basis for many marketing applications (e.g., Batsell and Lodish 1981; Gensch and Recker 1979; Green and Srinivasan 1978; Punj and Staelin 1983). Models that assume proportionality generally show theoretical elegance and mathematical tractability and are successful in predicting choice probabilities across different sets of alternatives (Luce 1977). Huber and Puto (1983) suggest that the apparent robustness of the Luce model is not due to its "universal applicability" or the primacy of the IIA assumption, but may be due to two conflicting context effects, similarity (also called substitution) and attraction, that cancel out and thus may be well approximated by proportionality. Section 3.4.2 discusses these effects.

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[5] One consequence of value maximization implied by the IIA axiom is the betweenness equality, as suggested by Tversky and Simonson (1993). The betweenness inequality states that when an extreme alternative z is added to the set $\{x,y\}$ the middle alternative y loses relatively more than the extreme alternative x from the introduction of another extreme alternative z (for a proof of the betweenness inequality the reader is referred to Tversky and Simonson 1993).

Context-effects have been extensively argued to be examples of non-rational choice. However, recent studies (e.g., Wernerfelt 1995) suggest that context effects may be consistent with rational economic behavior, but violate regularity implied by random utility models. New developments in psychological theory have generated insights in the psychological processes behind context effects. For example, Wernerfelt (1995) refers to consumer contingent inferential information processing as a rationale for specific context effects. The present section discusses both how and when a number of well-known context effects occur with respect to consumer choice of and from retail assortments, i.e. it applies context effects to in-store decision making, and briefly touches upon the rationales behind these effects[6].

3.4.1 Availability of preferred alternatives

Many final purchase decisions by consumers are made in-store, when facing a retailer's assortment. It appears that the availability of alternatives influences consumer decision making. The availability of a preferred alternative may greatly influence assortment evaluation and choice. Broniarczyk, Hoyer, and McAlister (1998) showed that both assortment perceptions and choice incidence from an assortment are influenced significantly by the availability of a favorite brand in the assortment. Elimination of alternatives from an assortment may have no consequences for consumers' perceptions of assortment size and variety as long as their favorite brand is available. On the other hand, scarcity may increase or decrease product desirability through several behavioral mechanisms (e.g., Cialdini 1984). The IIA axiom and the associated regularity hypothesis hold that adding or deleting an alternative from a choice set or retail assortment should not influence choice probabilities. However, manipulation of availability can greatly influence human decision making processes.

When one or more of the most preferred alternatives has been removed from an assortment, consumers tend to resume their decision process without

[6] For a detailed overview of context effects see e.g., Huber and Puto (1983) and Simonson and Tversky (1992).

reconsideration of the options they already eliminated. It is certainly possible that one of the alternatives a consumer already eliminated is preferred over the remaining alternatives and consequently consumer choice is affected and rational choice behavior violated. Seidl and Traub (1996) demonstrated this effect using so-called irrelevant or phantom alternatives. A phantom alternative is "an option that looks real but for some reason is unavailable at the time the decision is made" (Farquhar and Pratkanis 1993).

With respect to retail assortments the availability effect particularly applies to situations in which during a consumer's purchase process the consumer finds, or salespersonnel claim, that a certain product with desired characteristics, such as color or size, is suddenly unavailable. In that case it is likely that the consumer continues his or her decision process without consideration of already eliminated alternatives, in case he or she may end up with a suboptimal purchase[7]. Apparently, consumers tend to avoid iterative formation of consideration and choice sets. The effort they are willing to undertake in order to be informed about existing alternatives in the marketplace is limited. Considerations with respect to efficiency and risk likely play an important role. For example, one can assume that consumers' will be less inclined to resume their decision process without considering changes in the choice set for more significant choices.

3.4.2 Substitution and attraction

It is a commonly accepted idea that items in a retail assortment cannibalize, i.e., they draw market share disproportionally from, similar items. Adding alternatives to a retail assortment would decrease the existing items' probability of being chosen. An well-known explanation is that consumers buy alternatives with similar characteristics for satisfying similar needs and therefore similar alternatives are close in the consumer's preference ordering. This *substitution* or cannibalization effect has also been referred to as a negative similarity effect (Huber and Puto

[7] The amount that is chosen from an alternative is influenced by the available quantity of that alternative. For example, Wansink (1996) showed that consumers tend to use more of a product when relatively more is left of a product in its packaging. This effect is not discussed any further here since it does not specifically relate to assortment composition.

1993). The opposite effect, i.e., adding a similar item to an existing retail assortment enhances preferences for similar items within that assortment, is the *attraction* or *asymmetric dominance* effect (Huber, Payne and Puto 1982; Huber and Puto 1983; Ratneshwar, Shocker and Stewart 1987; Sattath 1989; Simonson 1989; Simonson and Tversky 1992; Tversky 1988; Tversky and Simonson 1993). The attraction effect has also been referred to as a positive similarity effect.

The IIA principle, upon which many choice models have been based, assumes that a new alternative that is added to a choice set or assortment draws share proportionally from the other alternatives. The existence of both positive and negative similarity effects provides an explanation for the fact that adding similarity judgments to the Luce model resulted in only modest improvements in prediction of consumer choice[8]. Although many context effects have been observed, the attraction effect clearly is the most important and counterintuitive violation of the IIA axiom. Simonson (1989) concludes on the basis of several experiments where subjects were confronted with choice sets of highly familiar products and were motivated to choose the alternative with highest utility (such as gambles) that "...the attraction effect is real, rather than an artefact of any particular experimental stimuli or manipulation."

Based on the regularity property one would say that adding items to a choice set cannot increase an existing item's probability of being chosen. Huber, Payne and Puto (1982) found that an attraction effect occurs when a third alternative, a so-called decoy, that is dominated by only one of the original alternatives, is added to an existing assortment of two alternatives. An alternative is dominated by, or inferior to, another alternative in the set if this other alternative has an equal or greater value on every attribute (Klein and Yadav 1989). As an illustration of the attraction effect, consider two alternatives, A and B, that are together in a retail assortment, with two relevant attributes, price and quality. Alternative A has attribute levels low price, low quality, and B, has attribute levels low price, and high quality. Adding an item C, with high price and high quality, that is dominated by B

[8] Tversky (1972) introduced the similarity hypothesis in the elimination by aspects (EBA) model, which models choice as a hierarchical decision process. Other model representations that include hierarchical decision making as well as substitutability are generalized PROBIT models, direct spatial adjustment to logit type models that generate choice probabilities (e.g., Batsell 1980; Huber and Seewall 1982). Extensive discussion of these models is beyond the scope of this chapter. See Currim (1982) for more details.

but not by A, will increase the attractiveness and choice probability of B, the so-called asymmetrically dominating alternative. The attraction effect has clear implications for presentation of retail assortments, whether in advertisements or during a sale. Presentation of three alternatives, one of which is a decoy, favors consumer choice of the superior alternative.

A generalized version of the attraction effect is Simonson and Tversky's *trade-off contrast* hypothesis. The idea behind trade-off contrast is that consumers' evaluations are conditional on previous experiences as well as available information with respect to the decision, such as knowledge in memory from previous experiences and external information provided during decision making. The available information serves as an anchor for future decisions. The alternatives and their characteristics observed in previous assortments by consumers, i.e., the background context defined by options encountered in the past, influence consumer decision making in the local context defined by the offered set, the current assortment.

Assume the decision between two products depends on price and quality differences. The consumer's decision is influenced by available information on quality-price trade-offs in previous choices as well as available information in the current assortment. The *local contrast* hypothesis is similar to the attraction effect mentioned earlier and states that adding a third alternative that is inferior to only one of two existing alternatives results in regularity violation. The *background context* effect occurs when a decision maker uses information from a previous choice situation to evaluate a current trade-off. For example, when prior quality-price tradeoffs involved a relatively high price for an extra "unit" of quality and in the current choice situation an additional "unit" of quality is cheaper, the trade-off contrast hypothesis predicts that in current choice there will be a tendency to prefer the high quality-high price product over the low quality-low price product. The background effect explains why retailers benefit from comparisons with other retailers' offerings and tend to emphasize improvements in product quality relative to price.

Several other psychological determinants of the attraction effect have been suggested, including difficulty of choice, and related uncertainty and inferential belief formation. Here the most appealing explanations of the attraction effect are briefly referred to. To start with, apparently the contrast effects mentioned above

originate from some sort of comparison process that is more or less difficult. Choice between two alternatives is relatively easy when one alternative dominates the other and relatively difficult when the alternatives are equally attractive, but not identical. Tversky and Shafir (1992) argue that choice between two equally attractive, but different alternatives evokes conflict. They show that for difficult decisions people are more likely to search for other options and defer choice. Although from the perspective of value maximization deferring choice is "just another option to be selected whenever its subjective value exceeds that of the available alternatives," the difficulty of choosing is a determinant of choice deferral and evokes violation of regularity. In their experiment, Tversky and Safir ruled out the possibility that the tendency to defer the choice was caused by the enlargement of the offered set as such.

It is generally agreed that uncertainty may play a significant role with respect to the attraction effect. Uncertainty can be caused by lack of meaningfulness of the attributes or attribute values used in the experiment or lack of familiarity with the product categories used (Ratneshwar, Shocker, and Stewart 1987). Consumers may experience difficulty in choosing due to uncertainty about their own preferences or about preferences of others, attributes that are perceived as equally important, or a trade-off analysis that does not provide strong support for one item. Consequently, they may infer information from the relative characteristics of different items in the offered set. Simonson (1989) argues that in case of uncertainty the presence of a relatively inferior or asymmetrically dominated alternative can provide an additional justification for selecting the dominating alternative. When others are involved in evaluating the consumer's choice the uncertainty about other people's preferences may be greater than the uncertainty about the consumer's own preferences. The superiority of one alternative based on more or less objective criteria may be supportive or convincing. In addition, because other people's criteria are unknown the salience of the dominance relationship might lead a consumer to believe that this aspect will dominate the judgments of others who will evaluate that choice set. Tversky and Safir (1992) mention that decision makers might infer from the introduction of an equally attractive, but different alternative that other attractive products might be available and consequently engage in further search.

Social judgment theory (Sherif and Hovland 1961) has also used uncertainty to explain attraction effects. It states that the extremity of a judgment with respect to

a so-called target depends partly on the available reference point or standard of comparison. Manipulation of the standard of comparison may change the judgments elicited on aspects of a stimulus. Assume each consumer has categorized existing knowledge in memory and each category contains a so-called prototype or typical exemplar of a category. Different collections of exemplars may differentially influence judgments on a specific alternative in a retail assortment. In an assortment with items that are more or less typical for a certain goal-derived category a less typical item tends to be evaluated as not suitable for the specific usage purpose, while the same item can be evaluated as quite suitable for the purpose in an assortment containing only items that are even less typical for the category. Uncertainty with respect to product characteristics, attribute importance, or preference coincides with unstable category structures in memory that are easily adapted. Huffman, Loken, and Ward (1990) found results consistent with the previous.

A similar reasoning is provided by adaptation-level theory (e.g., Helson 1964, who was among the first to study context effects; Parducci, Calfee, and Marshall 1960). This theory argues that contrast effects derive from comparison of an alternative with the "central tendency" of the individual's internal representation of the category under evaluation. Range theory argues that consumer judgments are determined by the location of the stimulus to be evaluated within the range that is established by the most extremes of the relevant contextual stimuli (Smith, Diener, and Wedell 1989; Wernerfelt 1995).

Mishra, Umesh, and Stem (1993) developed and empirically tested a causal model of the antecedents of the attraction effect. They included several concepts that relate to characteristics of the task, i.e., uncertainty, task-decision maker interactions, and the product-decoy combination. They argue that if the information is perceived by the decision maker as relevant, i.e., the product stimulus information is useful in distinguishing between objects in the offered set (Ratneshwar, Shocker, and Stewart 1987), the decision process is facilitated and it is less likely that inferences will be made and a possible attraction effect will be less explicit. Strength of preference is related negatively to the extent to which the attraction effect occurs. A decision maker's degree of involvement in the task or related activities determines the extent to which (s)he is prepared to spend effort into decision making and consequently make consistent decisions. Similarity of the

added decoy alternative to other alternatives already in the assortment is related positively to the attraction effect. Finally, the belief that a decoy is popular increases the attraction effect as persons tend to comply to the majority, compare Simonson's (1989) "need to justify" explanation. Mishra et al. found that preference strength had the strongest influence on the attraction effect. This finding implies introduction of a decoy brand is useful to retailers particularly if consumers show uncertainty and/or low relative brand preference.

3.4.3 Extremeness aversion

Simonson and Tversky (1992) and Tversky and Simonson (1993) elaborated on Simonson's (1989) findings and developed the *extremeness aversion* hypothesis, that involves two effects, compromise and polarization. The extremeness aversion hypothesis holds that alternatives with extreme values within an offered assortment will be relatively less attractive than alternatives with intermediate values. In the example that was used to illustrate the attraction effect in the previous subsection, alternative B can be seen as a *compromise* choice between A and the relatively inferior alternative C (Simonson 1989). Extremeness aversion can occur with respect to one or multiple attributes in choice situations involving at least three alternatives. Whereas compromise effects refer to symmetric extremeness aversion *polarization* implies asymmetric extremeness aversion with respect to one of the poles of the attribute(s) involved in choice. For example in price-quality trade-offs high quality-high price may be less aversive than low quality-low price (see Simonson and Tversky 1992, for a more complete discussion and illustration).

The principle of loss aversion offers an explanation for extremeness aversion. It states that losses are weighed more heavily than gains relative to a neutral reference point, generally a decision maker's status quo or current aptitude (Kahneman, Knetsch, and Thaler 1991; Tversky and Kahnemann 1991). Therefore, losses are to a greater extent avoided than gains are pursued. Simonson and Tversky elaborate on the loss aversion principle and argue that when decision makers evaluate alternatives in terms of their relative advantages and disadvantages alternatives with intermediate values represent relatively little losses relative to more extreme alternatives while extreme alternatives represent relatively high losses

relative to each other. The proposed effects have been observed in many experiments. Another explanation for extremeness aversion is provided by range-frequency theory of perception (Smith, Diener, and Wedell 1989), that states that the perceived distance between two ordered objects decreases if a third, more extreme object is introduced, and increases if an intermediate object is added.

Uncertainty has been mentioned as a determinant of extremeness aversion. Wernerfelt (1995) claims that uncertain decision makers, who only know the relative value of their tastes or needs relative to others' tastes or needs instead of absolute values might use information from the offered set of alternatives to infer their right choice, assuming the offered set represents the distribution of needs in the population. Their position in the ordered set of products determines their choice. When this so-called rank-ordered decision rule applies, decision makers may show violation of regularity when confronted with different sets of alternatives. Wernerfelt gives an example of wine purchasing. Suppose you consider yourself an average person when it comes to wines, with poorer than average tasting ability, and you are uncertain about the price that corresponds to average preference. If in a store you see prices ranging from $4 to $30 and a prominent display that has a $14 bottle and a $20 bottle, you will be inclined to buy the $14 bottle. If a third bottle of $26 is added to the display, the $20 bottle may look more "average" than the $14 bottle. So, you display a compromise effect if in an experimental setting you select the $14 bottle from the ($14, $20) set, and the $20 bottle from the ($14, $20, $26) set. Wernerfelt extends his argument to the attraction effect, that was discussed in the previous subsection, where inference may concern attribute weights from market offerings instead of absolute product utilities.

3.4.4 Cancellation and focus

The cancellation and focus, or the feature matching model (Dhar and Sherman 1996; Houston and Sherman 1995; Houston, Sherman, and Baker 1989, 1991) states that in preference formation features that are shared by alternatives cancel out, while the decision maker focuses on the remaining (unique) features of the alternative that serves as the standard of comparison. The model thus implies that

the uniqueness of features can make the choice set more or less attractive, and consequently influences choice, given other characteristics of the choice situation.

The model and the underlying psychological processes can be best illustrated with two extreme cases: the case where two products share bad features and have unique good features vs. the case where two products share good features and have unique bad features. Houston and Sherman (1995) argue that choice between pairs with shared bad features and unique good features (unique good pairs) will be relatively easy and pleasant because it is psychologically analogous to approach-approach conflicts, characterized by attraction to the item focused on, finding its unique features appealing, and choosing it for its merits. On the other hand, choice between unique bad pairs will be difficult and unpleasant, because it is analogous to avoidance-avoidance conflict, and is characterized by elimination of one item on the basis of its unique detriments, and choosing the alternative by default. Dhar and Sherman (1996) found that in the unique bad context choice incidence is lower and, after initial choice, the preference for switching to a new alternative with both unique good and unique bad features is greater than in the unique good context. They found that the relative preference for an alternative can be increased by introducing a new alternative that makes the first alternative's good features appear unique and its bad features appear common. The difference between the two contexts implies that the very same item is evaluated differently, depending on the features it shares with the other alternatives in the offered set. The direction of comparison determines which alternative's unique features will be the focus of the comparison process. The so-called focusing component increases the influence of the unique features of the subject of comparison, while decreasing the influence of the unique features of the referent product. A seller can thus influence the buyer's decision making process through the particular combination of alternatives and the order in which he presents the alternatives.

The cancellation and focus model adds to existing knowledge because it shows that context effects pertain to the set of relevant features that are considered in addition to the set of relevant items. With respect to similarity judgment, or in decisions about the degree to which an object has changed, both shared and unique features play a significant role. In defining characteristics features of a category unique features will be cancelled out and only shared features need be considered. Note that the model has been based on arguments provided by Tversky (1972) but is

not similar to the elimination by aspects (EBA) model since feature matching does not apply to elimination of alternatives from a large choice set, but to dealing with a dichotomous choice. Findings from the model have implications for assortment presentation and personal selling efforts. The potential implications for post-purchase evaluation processes could be considerable as well.

3.5 Retail assortment evaluation

The theory discussed in the preceding section of this chapter provides background for understanding consumer assortment evaluation. Retail assortment evaluation implies judgment of the degree to which an offered set of alternatives meets the consumer's desire for completion of his or her own assortment, i.e., the situational need for substitutability and complementarity relative to the products he or she already possesses or has experienced. Consumer retail assortment evaluation is influenced by the characteristics of the consumer, the purchase situation, and the assortment under focus. Composition of the focal assortment in particular refers to consumer perceptions of substitutability and complementarity with respect to the salient consumption goal and extrinsic cues, such as provided by the store environment, including provision of other distribution service elements, and other contingencies.

Not much has been written to date about assortment evaluation and its role in consumer decision making. Broniarczyk, Hoyer, and McAlister (1998) investigated consumer assortment perceptions of size and composition, not evaluations thereof. Broniarczyk, Hoyer, and McAlister (1988) proposed that and tested whether the perception of the retail assortment in a particular product category is determined by the number of items, or stockkeeping units, in the assortment, the presence or absence of the consumer's favorite item, and by the available space for the particular product category. They found that consumers perceive larger assortments as more varied, and that assortment reduction may not be noticed when their favorite alternative is present. Despite its merits, the study provides only a weakly elaborated theoretic foundation behind formation of consumer assortment perceptions. In addition, the scale used for measuring consumer assortment

perceptions is indistinct since it contains a perceptive lower pole ("Very little variety") and an evaluative ("Excellent variety") upper pole.

Assortment evaluations are one step further than assortment perceptions. They are the result of stimulus processing, in addition to stimulus perception, which implies a judgment task. Evaluation can be a difficult task, especially when an assortment consists of many alternatives with overlapping characteristics. Consumers try to reduce cognitive effort whenever it is required from them. With respect to retail assortment evaluation it is likely that consumers only consider those alternatives that potentially meet their needs, i.e., only the alternatives in the consumers' consideration set receive further processing (Hauser and Wernerfelt 1990). Assortment evaluation will therefore depend on the degree that the best available alternative meets the category ideal. Accordingly, consumers will scan the assortment for the availability of a typical or ideal goal-derived category alternative. Compare "availability of favorite product" as a determinant of assortment perception and choice incidence that was used in the study by Broniarczyk, Hoyer, and McAlister (1998). From the number of alternatives in the assortment (with an upper bound due to the increasing cost of thinking, Shugan 1980) consumers will infer the likelihood that a suitable alternative is present in the assortment. With a larger number of items the assortment will be more likely to contain items that match the consumer's goal-derived category. Retail assortment size has been positively related to consumer assortment perceptions (Broniarczyk, Hoyer, and McAlister 1998) and consumer choice incidence (Kahn and Lehmann 1991), and is extended here to consumer retail assortment evaluation. Other variables that correlate with assortment evaluation are individual item preference, and an additional item's uniqueness relative to the existing assortment (Kahn and Lehmann 1991).

Proposition 1 *Consumer retail assortment evaluations are positively related to retail assortment size.*

This chapter already argued that consumers categorize products according to their potential substitutability with respect to attaining salient purchase and consumption goals (Barsalou 1983, 1985, 1993; Ratneshwar and Shocker 1991). Consumers thus activate or construct different goal-derived categories for different

consumption goals, that contain products that are to a certain degree substitutes, given the consumption goal. As a consequence, the consumption goal a consumer pursues affects product expectations, category structure, and associated typicalities. Even in Betancourt and Gautschi's economic model, a focal point is that in order for two products to be net substitutes it is essential that a particular consumer perceives them as delivering similar benefits *for the particular consumption goal* the consumer pursues. Consumption goals may differ in degree of abstractness and detail. Highly detailed consumption goals leave less latitude for alternatives in order to satisfy the associated need than less specific consumption goals. The following propositions summarize and underline the focal role of consumption goals in consumer assortment evaluation.

Proposition 2 *A consumer's perception of retail assortment breadth and depth differs depending on the consumption goal that consumer pursues.*

Proposition 3 *A consumer's evaluation of a retail assortment differs depending on the consumption goal that consumer pursues.*

Given the consumption goal pursued, a higher level of involvement or situational self-relevance (e.g., Zaichkowsky 1985) will coincide with greater importance of finding an alternative that meets the category ideal. Involvement with a product or product category is likely to be enduring, while task involvement is more likely to be situational. Experts in a certain product category have more detailed categorizations of alternatives in that product category and will also have a relatively high level of enduring involvement with the product category. A highly involved consumer thinks it more important that an alternative closely meets the criteria associated with the goal-derived category ideal than a lowly involved consumer. The relevant goal-derived category will therefore include only alternatives that are relatively close to ideal levels. Consequently, (s)he will be less likely to perceive two products in the category as substitutes and will appreciate relatively deep assortments.

Proposition 4 *A high level of consumer expertise and/or a high level of enduring involvement with a product category will be positively correlated with consumer preference for deep retail assortments with respect to purchase from that product category.*

Finally, in chapter 2 it was argued that distribution services reduce consumers' distribution-related costs and/or provide other shopping-related benefits, in particular decision support and shopping pleasure. Distribution services offered by the retailer may assist the consumer in making an efficient and good choice. These services may for example influence consumers' perception of different alternatives' features and associated merchandise variety. Retailer provision of distribution service other than assortment, such as ambience and information provision, will consequently relate positively to consumer evaluations of the assortment.

Proposition 5 *Retailer provision of distribution service other than assortment will positively influence consumer evaluation of retail assortment.*

3.6 A model for consumer assortment choice

The present chapter identified three important types of determinants of consumer choice of and from retail assortments, i.e., the consumption goal, purchase situation, and decision context. The existence of situationally determined consumption goals, defined broadly so as to include usage goal, and several dimensions of purchase situation (see section 3.2), through which a consumer activates or constructs goal-derived categories provide the starting point for the proposed framework for consumer choice from assortments[9]. Contextual influences include a retailer's effect on both the desired household outputs and the household's consumption activities through distribution service provision. Advertisements address both consumption goals, situational, and contextual characteristics.

Consumer choice of retail assortment implies choice of specific distribution service and associated benefits that together comprise availability. Item choice

[9] The current investigation of the consumer decision making process does not explicitly consider post-purchase processes; these are discussed in chapter 5.

cannot be viewed independent from assortment choice. The two choices are interdependent to a certain extent, depending on among other things the connection between brand and store. As an extreme example, choice of a store's own brand implies purchase at the particular store chain that sells it. In general, assortment or store choice constitutes an important phase in the consumer's decision process. Models of store choice usually consider features of retail outlets that form retail image, often including assortment attractiveness and service. They do not in general consider the specific characteristics of retail assortments as a distribution service element, nor the psychological mechanisms underlying consumer assortment choice. Section 4 considered in this respect the influence of assortment composition on item choice. Figure 3.1 presents a model of consumer assortment and item choice that will be discussed in the following. The model considers several stages in the decision making process, including consideration and choice set formation, assortment choice, and item choice, in which it considers the influence of consumption goals, purchase situation, and specific context factors. Based on the model a number of propositions have been developed, several of which will be tested in the subsequent chapter.

Throughout this chapter the role of consumption goals has been emphasized. Figure 3.1 starts with the by now familiar relationship between salient consumption goals and goal-derived categories. The consumption goals a consumer pursues may range from abstract and general to concrete and detailed, or even product-specific (compare Betancourt and Gautschi's (1990) consumption goals). Consumption goals can be viewed similar to the hierarchy used in the means-end chain model (Gutman 1982) which assumes consumers search for product features for the purpose of achieving a desired end-state and those features are meaningful in the sense that they relate to attributes that differentiate specific products. Specific or detailed goals can be conceived of as the benefits for which a consumer searches (Park and Smith 1989), or more specifically, "abstract benefits sought by the consumer that are available through the features of a product class that offer fulfillment of those goals" (Huffman and Houston 1993).

Consumer decision making is generally modeled as a sequential process which is often characterized using conceptualizations of nested sets. In this simplified view of decision processes, starting from the *universal set* or "the totality of all alternatives that could be obtained or purchased by any consumer under any

circumstance" (Shocker et al. 1991), a decision maker arrives at his ultimate choice through a sequence of decisions in which he forms hierarchical or nested sets of alternatives[10]. Phased decision strategies have been found to simplify choice in complex situations (Bettman 1979; Wright 1975). In general two stages in decision making are considered. The first stage consists of general, non-compensatory screening, in the second stage the remaining alternatives are evaluated in detail using a compensatory decision model (Gensch 1987).

The items in the universal set the decision maker is aware of and that he believes to be suited for the goal that he pursues form the *awareness or knowledge set.* From the awareness set a decision maker constructs a *consideration set.* A consideration set is defined here as a purposefully constructed set "consisting of those goal-satisfying alternatives salient or accessible on a particular occasion" (Shocker et al. 1991). Since consideration sets are formed for a purpose they will be affected by situational factors such as intended usage (Ratneshwar and Shocker 1991), prompted by existing retrieval cues (Nedungadi 1990), and changed as a consequence of information from the environment (cf. Coupey 1994). Consideration sets may thus include alternatives with different physical characteristics (Srivastava, Leone and Shocker 1981; Ratneshwar and Shocker 1991) or even from different product categories (Ratneshwar, Pechmann and Shocker 1996), as long as they meet the particular usage requirements. Consideration sets in which all items come from one nominal product category typically range from 2-8 items (Hauser and Wernerfelt 1990).

Recent studies suggest goal-derived categories play an important role in explaining and predicting formation of consideration sets, judgment, and choice. Categorization research has focused not only on how consumers mentally represent products (e.g., Loken and Ward 1990; Ratneshwar and Shocker 1991), but also on how consumers retrieve alternatives from memory while forming consideration sets (e.g., Hutchinson, Raman and Mantrala 1994; Nedungadi 1990; Ratneshwar, Pechmann and Shocker 1996; Ratneshwar and Shocker 1991), and how consumers evaluate products and make choices (e.g., Bettman and Sujan 1987). For example, Barsalou's (1985) concept of goal-derived categories has been proposed as

[10] Many authors defined sets of alternatives with respect to decision making (e.g., Fotheringham 1988; Hauser and Wernerfelt 1990; Narayana and Markin 1975; Roberts and Lattin 1991; Silk and Urban 1978). This book adopts the conceptualization of decision hierarchy and its associated

mediating the effect of usage context on consideration set formation (Graonic and Shocker 1993; Park and Smith 1989; Warlop and Ratneshwar 1993). Since the physical environment implies a consumer may encounter new information and consequently restructure existing information patterns (Coupey 1994), goal-derived category structures may be influenced by the physical choice environment offered, eventually leading to context effects that have been discussed in section 4. This applies to the characteristics of the assortments offered as well as to extrinsic cues in the choice environment, such as store layout, ambience, other distribution services, and advertising. The relationships between consideration set formation, consumption goal, category construction and activation, and contextual influences described here are shown in Figure 3.1.

As argued before, salient specific consumption goals activate associated goal-derived categories in working memory. Salient specific goal-derived categories constrain the problem solving process and structure the consumer's problem (Barsalou 1991; Warlop and Ratneshwar 1993). Barsalou (1993) claims that context-specific relations between levels of goals and goal-derived categories are stored in associative networks in memory. Consumers are thus likely to form consideration sets "top-down" by comparing the activated goal-derived categories with alternatives they perceive in the stimulus environment (cf. Park and Smith 1989). Alternatives thus do not have to be screened individually using a noncompensatory model (cf. Huber and Klein 1991), which is a costly comparison procedure (Shugan 1980).

Sindra (1994) distinguishes between common, i.e., everyday familiar buying, situations and ad-hoc situations. In common situations situational factors may directly elicit the choice alternatives in the consideration set, without an apparent mediation of goals and goal-derived categories. Common situations have been frequently encountered earlier, so subjects may already be in possession of well-developed categorical structures associated with the specific situations, that are also well-established in memory. The specific situation may only serve to cue the retrieval of the stored goal-derived category and thus elicit the consideration set. In ad-hoc situations the individual must invest much more cognitive resources than required in common situations. These situations will lead to the creation of certain goals or ideals, and subjects will frame the choice problem in the context of meeting

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nested sets as defined by Shocker et al. (1991).

these preset goals. The resulting consideration set will indicate the mediation of the corresponding goal-derived categories. In contrast to common situations, goals will be highly salient in the choice process for ad-hoc situations.

Each consideration set is dynamic within and across usage situations. It changes as the consumer processes the alternatives and recalls or encounters additional elements during the decision process. It is affected by contextual factors - represented as "assortments" and "other distribution services" in figure 3.1 - and their interaction with individual goals and preferences. The "set of alternatives considered immediately prior to choice" (Shocker et al. 1991), is called the *choice set*. The choice set is a subset of the consideration set and consists of fewer, more highly differentiated alternatives selected from the consideration set. The choice set is final in the sense that it represents the result of, instead of being affected by, situational and contextual factors with respect to decision making.

Determination of consideration sets improves the accuracy of predictions of choice models (Silk and Urban 1978; Gensch 1987; Fotheringham 1988), and can aid in defining a market and investigating its structure (Ratneshwar and Shocker 1991; Urban, Johnson, and Hauser 1984). Recognition of the dynamic and individual nature of consideration sets and resulting choice sets still represents a challenge for choice modeling. Many studies consider only choices based upon information in memory. Many real-world decisions combine memory factors with information acquired externally. In mixed choice tasks (Lynch, Marmorstein and Weingold 1989) a choice task consists of both. Based on external information consumers restructure information using operations such as editing information, transforming it, or inferring attributes and/or attribute values (cf. Coupey 1994).

Ratneshwar, Pechmann, and Shocker (1996) found that both goal ambiguity and goal conflict make so-called across category consideration sets consisting of alternatives from multiple product categories more likely. When a consumer perceives a generic need or consumption purpose, but has fuzzy or ambiguous goals instead of well-defined, salient goals, (s)he experiences difficulty in evoking goal-derived categories in working memory and thus the external choice environment will play important role in determining the composition of consideration sets, and across category consideration becomes more likely. Goal conflict occurs when, as a consequence of a negatively correlated environment, a

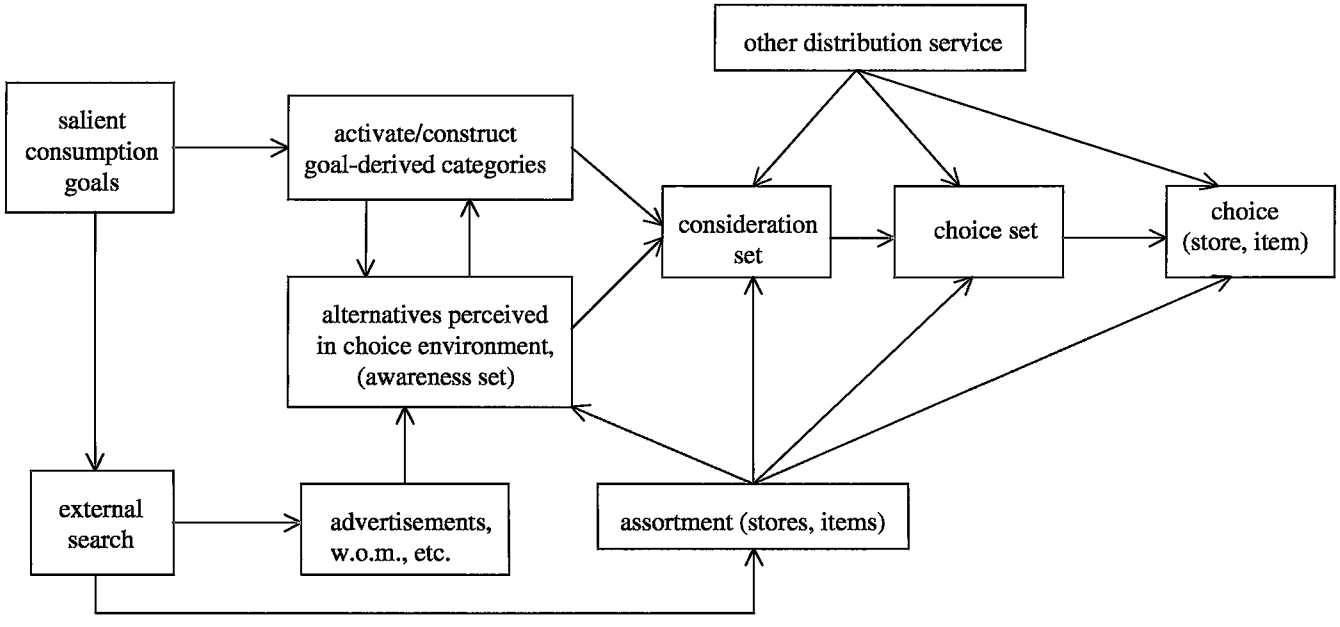

Figure 3.1 Procedural framework of consumer assortment choice

consumer's multiple salient goals cannot be realized by choosing a product in any given category. This will also make across category consideration more likely.

Performance ambiguity refers to an ambiguous relationship between salient consumption goal(s) and alternatives in the goal-derived category since the consumer is uncertain with respect to evaluation of the product's performance. The external choice environment will thus play a greater role in consideration set formation. A higher level of performance ambiguity implies more uncertainty with respect to the degree to which a product can fulfill category wants and needs and thus more uncertainty about the closeness of a product to the category ideal. A similar reasoning as followed in the previous section with respect to assortment evaluation applies to assortment choice. The previous section proposed a positive relationship between consumer expertise or involvement and evaluation of deep assortments (proposition 4). Here, this proposition is extended to a positive correlation between consumer expertise or involvement and consumer choice from deep assortments. Consumers with a high level of expertise and/or a high level of enduring involvement with a product category will show a relatively high choice incidence from relatively deep retail assortments.

The effect of consumption goal thus extends to actual choice, through formation of goal-derived categories and consideration set formation. Other determinants of choice from assortments include variables that have been mentioned in previous sections of this chapter, such as preference for (characteristics of) items, utilities associated with nonoptimal alternatives, perceived cost of choosing an alternative, situational and contextual factors. Choice set formation and actual choice will be influenced by contextual factors, such as distribution service provision and assortment presentation. The following propositions are therefore obvious extensions of the previous.

Proposition 6 *Choice incidence from a retail assortment is dependent on the consumption goal.*

Proposition 7 *The effects of product features on choice incidence depends on the consumption goal.*

Proposition 8 *Choice incidence from an assortment is positively related to provision of other distribution service elements.*

Finally, a consumer searches for the ideal alternative in the salient goal-derived category. Alternatives that are more similar to this alternative will be relatively close to the ideal alternative in the consumer's mind. They will be more likely substitutes for this ideal alternative than alternatives that differ in many respects. Attribute values convey information on the benefits associated with consumption of an alternative. Alternatives that are similar in many respects will therefore be closer in the consumer's mind than alternatives that are less similar.

Proposition 9 *When the salient alternatives in an assortment differ only in one feature they are more likely to be substitutes than when they differ on more attributes.*

Retail assortments assist consumers in efficiently and effectively fulfilling their needs for acquisition of products that complement their own assortment. Consumption goals are a central concept with respect to consumer choice of and from assortments. This chapter emphasized the significance of consumption goals, that determine substitutability and complementarity between items in an assortment for consumers. It was argued that substitution and complementarity are subjective concepts that are conditional on consumers' salient consumption goals, contextual influences, including assortment composition and provision of other distribution service, and situational variables. The next chapter empirically investigates the role of consumption goals, assortment composition and other distribution service, in particular ambience, on consumer choice among and within assortments and tests several hypotheses that are based on the theory discussed in the present chapter.

Chapter 4

Assessing the Effects of Assortment Composition and Store Ambience on Consumer Purchase*

4.1 Introduction

Assortment composition is a key issue faced by retail store and category managers. Given limited shelf space, which items should be added to or deleted from the assortment? How will these and competitors' assortment decisions affect total and individual item sales? Management of assortment requires knowledge of substitution and complementarity patterns among items in the assortment, as well as the effects of offerings from competing stores. It also requires knowledge of the impacts of other distribution services, such as store ambience and accessibility, on these inter-item relationships.

Though a large literature exists on shopping models and consumer choice processes, only a few articles apply to the issue of assortment composition and its effects on consumer choice of assortment. Merchandise assortment has been consistently present as one of the dimensions that constitute store image (see Mazurski and Jacoby, 1986). Also, models of consumer choice of shopping destination always seem to include a predictor like choice range, selection, quality of the assortment and the like (see Oppewal, Louviere and Timmermans, 1997), and typically find that larger assortments are preferred over smaller assortments.

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* This chapter has been published as Koelemeijer, Kitty and Harmen Oppewal (1999), Assessing the Effects of Assortment and Ambience: A Choice Experimental Approach," Journal of Retailing, 75 (Fall), 319-346.

Finally, Kahn and Lehmann (1991) found preference for an assortment to be positively related to individual item preference, an additional item's uniqueness relative to the existing assortment, and the total number of items in the assortment. No further empirical work seems to have been done in describing the characteristics that make an assortment more or less attractive.

In contrast, there is an overwhelming amount of literature on how consumers choose items from assortments, as essentially the whole literature on choice processes and choice models focuses on this issue. Particularly relevant in the present context however are studies that have focused on the items in the offered set as a source of violation of rationality principles in choice (e.g., Simonson and Tversky 1992; Tversky and Simonson 1993; see also chapter 3). From studies in this area it has been found that if items are added to or deleted from an assortment, or if item characteristics change, choice probabilities of other items change in ways that are inconsistent with existing preference structures. One particular so-called context effect is asymmetric dominance (Huber, Payne and Puto, 1982). This effect involves that the addition of an alternative to the choice set leads to an increase in the choice probability of at least one other alternative. This effect is inconsistent with the assumptions underlying most choice models but was found to occur in a variety of types of consumer behavior. The same phenomenon was observed at the aggregate (or sales) level and was used by Bultez et al. (1989) to model optimal retail space allocation for products in an assortment (cf. Carpenter et al., 1988). However, apart from the latter studies little additional work seems to have been done in terms of assessing and predicting the inconsistencies that may appear when people choose from assortments.

This chapter aims to contribute to a better understanding of the issue of retail assortment composition and its effects on consumer choice from and among assortments, that is, what is the impact of distribution services and inter-item relationships on purchase decisions. The theoretical framework underlying the research has been presented in chapters 2 and 3. From the propositions in chapter 3 testable hypotheses are developed that next are tested using the method of choice experiments and the extended logit model. Betancourt and Gautschi's (1990, 1992) framework restates and formulates what is known as the key problem in retail management: how to consistently position a store on all elements of the retail mix. Betancourt and Gautschi present a comprehensive formalization of the relationship

between heterogeneous consumer needs and inter-item relationships. To our knowledge, the framework has never been operationalized with respect to consumer choice in the literature. The research reported in this chapter relates the effects of assortment composition and other distribution services on purchase decisions. As we will demonstrate, this can be efficiently accomplished by using choice experiments and extended logit models.

In choice experiments (Carson et al. 1994; Louviere and Woodworth 1983) subjects are presented experimentally designed choice sets of hypothetical alternatives. Typically subjects receive multiple choice sets and are requested to choose their most preferred alternative from each set. Choice experiments have advantages that are particularly relevant to the study of retail assortments, even though these advantages have not always been exploited in choice experiment applications. They allow the researcher (and hence the manager) to control and assess various aspects that remained elusive in much of the earlier work on assortments. As we will demonstrate, they allow experimental manipulation of the composition of assortments. They also allow control over variations in other distribution services by defining a master design and nesting the choice experiment under this 'context design' (Oppewal and Timmermans 1991). In the present application, we will treat store ambience as a context factor. The extended logit model also has particular advantages, mostly because it avoids the proportionality assumption that underlies the MNL model and can give mode insight in inter-item relationships. The extended logit model is a type of cross effects model (Anderson and Wiley 1992; Louviere and Woodworth 1983; McFadden, Train and Tyre 1977). There have been applications of cross-effects models based on choice experiments in several areas that are relevant to retailing, including new product development, financial services, transportation, and urban planning, but they have to our knowledge not been directly applied to study retail assortments. Lazari and Anderson (1994) illustrate their design approach for cross effects with an example concerning frozen entrees but their study is not directly focused on managing assortments. The model nevertheless seems a natural for studying retail assortments, as we intend to demonstrate.

Using a choice experimental approach, this chapter thus will address issues that are pertinent to managing assortments and will (partly) operationalize Betancourt and Gautschi's theoretical framework. Focal questions are: what makes

an assortment attractive, what are the relations between items in an assortment, what are the relations between assortment composition and other distribution services in determining consumer purchase behavior. By presenting a case in which we model assortment effects, the chapter will also outline and demonstrate the use of choice experiments and extended logit models to build models that support the quantification and optimization of assortments.

The structure of this chapter is as follows. In 4.2. we will first briefly investigate choice experiments and logit models. Next, we will continue our discussion of assortment issues in 4.3, following the theory of consumer evaluation and choice of assortment outlined in chapter 3. The formulation of the hypotheses that we aim to test in our empirical application is described in section 4.4. Then follows in 4.5 a description of the application concerning florists' assortments of cut flowers. We discuss experimental design in 4.6 and estimation of different models in 4.7. We then demonstrate in section 4.8 how the model can be applied for evaluating different merchandise assortment strategies. The chapter concludes with a discussion of results and implications, including issues for further research.

4.2 Modeling assortment competition

Marketing decision making requires analysis of competition between relevant products at the level of a market as a whole as the result of individual consumer decision making, i.e., assessment of the market structure. A market structure consists of the classification of brands into submarkets that have a higher degree of competition than the market as a whole (Day, Shocker, and Srivastava 1979). Product-market structures can be analyzed using perceptual versus behavioral approaches (Day, Shocker, and Srivastava 1979; Fraser and Bradford 1984). Perceptual approaches[1] are aimed at assessing potential substitutability and ask

[1] For example the substitution in use (SIU) approach (Day, Shocker, and Srivastava 1979; atneshwar and Shocker 1991; Stefflre 1971). SIU assumes usage situations act as environmental constraints that help define consumers' ends or goals and thus limit the nature of the means (products) that can achieve those ends. Products are assumed to act as surrogates for "bundles" of benefits and are presumed to deliver similar benefit combinations when grouped on the basis of appropriateness for similar usages. The method measures consumers' perceptions of usage appropriateness of the benefits offered by individual products. Simultaneous clustering of usages and products reveals product-market structures.

consumers to judge the perceived substitutability of alternatives in terms of, e.g., similarity ratings or rankings. Behavioral approaches[2] use recorded data of consumers' actual behaviors, such as diary or scanner data, to identify revealed substitution between alternatives by a household. In the present study we are interested in the effects of particular variables on consumers' actual, or revealed behavior, i.e., choice. Prediction of choice behavior requires prediction of consumer preferences that are heterogeneous across individuals and choice situations. Chapter 3 gives an overview of the consumer choice process with respect to assortments. In this section we discuss the adopted approach to modeling the consumer choice process that results in estimation of parameters and subsequent prediction of choice from the perspective of consumer's consumption goals, retail assortment composition, and other context variables.

4.2.1 Conjoint choice experiments

Choice experiments are becoming increasingly popular in marketing as a way of measuring consumer preferences and building predictive models of consumer choice. In conjoint choice experiments (Carson et al., 1994; Louviere and Woodworth, 1983) respondents typically choose their preferred alternatives from designed sets in which both hypothetical alternatives and currently existing multi-attribute alternatives may be present. The alternatives are defined by attributes, one of which can be brand name. From each choice set respondents choose their most preferred alternative, or allocate a fixed budget among the alternatives. Based on the observed frequencies or proportions the parameters of discrete choice models can be estimated. Observed choices are mostly analyzed assuming the multinomial logit (MNL) model to underlie the choice responses. The conjoint choice approach, also known as decompositional choice experiments, stated choice experiments, experimental choice analysis, multiple choice experiments, or discrete choice experiments (e.g., Louviere and Gaeth 1988;

[2] An example of a behavioral approach to analyzing product-market structure is Frazier and Bradford's (1983, 1984) Competitive Market Structure Analysis (CMSA).

Oppewal 1995; Oppewal and Timmermans 1991), has resulted from an integration of conjoint analysis and discrete choice theory.

Conjoint analysis or "any decompositional method that estimates the structure of a consumer's preferences, given his or her overall evaluations of a set of alternatives that are prespecified in terms of levels of different attributes" (Green and Srinivasan 1990, p. 4), allows us to combine a decompositional approach with experimental manipulation of product characteristics. The experimental procedure is generally aimed at estimating part-worth utilities, or utility associated with specific attribute levels, through analysis of overall preference for experimentally designed, hypothetical alternatives or profiles. The use of fractional factorial design techniques permits strong reduction in the number of profiles together with optimally efficient estimation of main effects only (e.g., Louviere 1988; Montgomery 1984). Furthermore, respondents often participate in a complete replication of the experimental design which allows for estimation of the parameters of individual preference functions. Note that fractional factorial designs assume additive utility and negligible interactions. It is beyond the purpose of this chapter to give a detailed description of the method. For a more complete overview of conjoint analysis the reader is referred to Green and Srinivasan (1978 and 1990) and Louviere (1988).

Conjoint analysis is used to predict choice based on the estimated preference functions for a group of respondents that are of interest to the particular market under focus. After respondents' utilities are calculated for "new" alternatives, a choice rule is applied to determine which alternative is chosen by each individual. Examples of choice rules are highest utility equals choice, and choice probabilities are equal to the proportion of utility in the total utility across alternatives. Aggregation of predicted choices is used to estimate market shares for the new market conditions. Despite its obvious appeal, conjoint analysis has several drawbacks that are relevant to our study (see also Oppewal 1995), the most important of which concern the use of ad hoc decision rules to predict choice, and limited reliability of parameters estimated due to limited residual degrees of freedom.

The conjoint choice approach combines the advantages of conjoint analysis - natural and relatively easy tasks, multiple observations per respondent, controlled composition of choice sets, and experimental control, - with the advantages of

discrete choice analysis - tests of model structure, specification and studying of context effects, direct estimation of probabilistic discrete choice models, and accommodation of currently available alternatives into the hypothetical framework -.

Experimental design plans are used to generate efficient choice sets such that the statistical model of interest can be estimated. The selection of proper experimental designs for choice experiments requires advanced knowledge and skills, and this is even more so if one wants to estimate so-called cross-effects models. The study needs to be carefully designed to ensure that all effects of interest can be estimated. No general procedures or guidelines exist so far to generate optimal designs for choice experiments, though catalogs of efficient designs have been developed for special cases (Anderson and Wiley 1992; Lazari and Anderson 1994). Nowadays there is also commercial software that can generate choice sets that allow estimation of MNL models, this software however does not produce the most efficient designs and, more importantly, its designs typically do not allow estimation of cross effects.

Choice experiments have advantages that are particularly relevant to the study of retail assortments, even though these advantages have not always been exploited in choice experiment applications. They allow the researcher (and hence the manager) to control and assess various aspects that remained elusive in much of the earlier work on assortments. As we will demonstrate, they allow experimental manipulation of the composition of assortments. They also allow control over variations in other distribution services by defining a master design and nesting the choice experiment under this "context design" (Oppewal and Timmermans, 1991). Choice experiments can be used to get efficient, independent and easy to interpret estimates of inter-item effects of price on item choice. Cross-price effects were estimated using the extended logit framework from real market data that was collected in uncontrolled circumstances by Krishnamurthi, Raj, and Sivakumar (1995), resulting in parameters that were difficult to interpret. Finally, choice experiments combine control with the possibility of using real-world alternatives, so the choice sets contain no hypothetical alternatives, from which validity will benefit.

4.2.2 The Extended Multinomial Logit model

Virtually all approaches to consumer decision making assume a consumer perceives alternatives as bundles of attributes that together provide utility. Discrete choice theory and conjoint analysis are the two predominant so-called decompositional approaches in analyzing consumer preference and choice. Decompositional methods decompose responses to total choice alternatives into utility associated with each attribute level, according to an assumed underlying preference function. Discrete choice theory assumes a consumer chooses the alternative from which bundle of features he or she derives highest utility (Lancaster 1966, 1971). Random utility theory acknowledges inherent randomness in perceptions and preferences, randomness due to the choice situation, as well as measurement error, and is therefore suited for modeling and analysis of consumer choice experiments. Random utility theory assumes utility decomposition into a systematic or deterministic component (V_i) and a random component (ε_i):

$$U_i = V_i + \varepsilon_i$$

From a choice set A the alternative, i $(\forall i, i' \in A)$, with highest utility, U_i, is chosen. Therefore,

$$\begin{aligned} p(i|A) &= p(U_i > U_{i'}) \\ &= p(V_i + \varepsilon_i > V_{i'} + \varepsilon_{i'}) \\ &= p(V_i - V_{i'} > \varepsilon_{i'} - \varepsilon_i). \end{aligned}$$

When the error terms are assumed to be normally distributed the Luce (1959) strict utility choice model emerges. The Multinomial Logit (MNL) Model assumes the error terms are independently and identically double exponential (Gumbel or 'type I Extreme Value') distributed. This assumption leads to a conveniently closed, tractable, model form since it allows integration of a Thurstone type of random utility model with independently and identically distributed error terms (Case V, in Torgerson 1958) with Luce's (1959) choice axiom (Henscher and Johnson 1981; Ben-Akiva and Lerman 1985). Most applications have assumed the MNL model to

underlie the choice responses. The MNL model assumes that the probability p that alternative i is chosen from set C is:

$$p(i|C) = \frac{\exp(\mu V_i)}{\sum_k \exp(\mu V_k)}, \forall i,k \in C \qquad (1)$$

The MNL model can be applied to alternatives for which systematic utility V_i depends on multiple characteristics X_{ij} (j=1,..,N) of an alternative i. In that case V_i is a function of attributes that is intrinsically linear in the parameters of the attribute value of alternative i: $V_i = \beta X_i$, with β the parameter vector to be estimated and X_i a vector of known attribute levels of alternative i. In this formula μ is the scaling factor, that is arbitrarily set to unity in single applications.

An implication of the MNL is the so-called Independence of Irrelevant Alternatives characteristic (IIA, see chapter 3, section 4). When using the MNL model one assumes that the utility of an alternative, V_i, depends only on the characteristics of this alternative, i, and not on the characteristics and availability of the remaining alternatives in a set. This assumption can be expressed as that the odds ratio of any two alternatives (but not necessarily their choice probabilities) remain constant if other alternatives are added to or deleted from the set, or if their attributes are changed.

Consumers almost by definition will violate the IIA characteristic when choosing from or among assortments. They tend to combine purchases of complements and focus their trade-offs on the subset of most substitutable items. Vice versa, one of the major problems in managing assortments is to foresee which items will be good complements and which ones will be substitutes. With respect to substitutes the problem is twofold. The first question is whether and when the addition of (more) substitutes leads to increased cannibalization and diminishing returns. The second is whether and when an increase in choice range within the category will increase the attractiveness of the category, or assortment as a whole, thus leading to increased purchases from the category as a whole. The assessment of these effects, the trade-off between increasing and decreasing assortment size and the optimization of assortment composition, can be supported by models based on choice experiments as illustrated in our florist store case below.

One way to overcome the IIA limitation is the extended logit model, also called the universal or mother logit model. In this model, firstly proposed by McFadden, Train, and Tye (1977; see also Krishnamurthi et al. 1995) the utility specification of an alternative is extended with terms that represent the characteristics of other alternatives in the choice set as follows:

$$V_i = \beta X_i + \sum_k \gamma_{i,k} X_k, \qquad i,k \in C, \quad i \neq k, \tag{2}$$

where γ_{ik} is the parameter vector representing the effects of availability and attributes of alternative k on i, and X_k is the vector of attribute indicator variables for k, indicating whether k is available or not and, if so, what its attributes are. The probability of item i being chosen from choice set C is modeled to be dependent on the levels of the attributes of the item itself and the levels of the attributes of the other items in the choice set, including the levels of context variables. The model includes possible IIA violations by explicitly modeling the effects of other items' characteristics on choice of a particular item. The effects of a product's own attribute-levels on its choice probability are so-called main effects. The terms that represent the availability of other alternatives in the set are called "availability cross effects", whereas the terms that represent the attributes of other alternatives are called "attribute cross effects" (Anderson and Wiley 1992; Lazari and Anderson 1994; Louviere and Woodworth 1983; Oppewal and Timmermans 1991). Cross effects are effects on utilities and should not be confused with cross elasticities. The availability cross effect of, say, alternative A on alternative B captures the extent to which the addition of alternative A to a choice set that already contains B leads to a larger or smaller decrease in the utility, and hence, choice probability (or share), of B than would be predicted from the MNL model. Availability cross effects typically are negative, indicating they pick up substitution between alternatives. In some cases however a positive cross effect will be found, indicating that two alternatives are more complementary than other pairs of alternatives. Attribute cross effects are also mostly negative, but in case of a disutility, such as price, the "own" attribute parameter will be negative and the attribute (price) cross effect will be positive if substitution occurs. For example, a negative "own" price parameter for product A will lead to an increase in the share of A that is equal to the proportional decreases in the shares of all competitors. However, if the model in addition contains a

positive price cross effect of A on B, this effect predicts an additional decrease in the share of B if A decreases its price. This thus indicates that A and B are more close substitutes than other pairs of alternatives. Our application will demonstrate the use and interpretation of availability and attribute-based cross effects. There have been applications of cross-effects models based on choice experiments in several areas that are relevant to retailing, including new product development, financial services, transportation, and urban planning, but they have to our knowledge not been directly applied to study retail assortments. Lazari and Anderson (1994) illustrate their design approach for cross effects with an example concerning frozen entrees but their study is not directly focused on managing assortments. The model nevertheless seems a natural for studying retail assortments, as we intend to demonstrate.

In principle, the extended MNL model can be designed such as to yield quantified insights into substitution effects of changes in the marketing mix positions of products and the availability of products. Extensions of MNL models have been developed that account for asymmetric competitive effects that are associated with substitution and complementarity (Batsell and Polking 1985; Carpenter et al. 1988; Bultez et al. 1989). Since substitution need not be symmetric cross-effects are interpreted as asymmetric substitution effects and, hence, allow us not only to test for the occurrence of asymmetric competition, but also to model this competition.

Cross effects models are only one of the possible ways to overcome the IIA property. Other options discussed in the literature include Probit, Nested Logit, and Heteroscedastic Extreme Value models[3]. Cross effects models however have the advantage that they are flexible and relatively easy to interpret and estimate, even though they have been criticized as being not completely consistent with random utility theory (cf. Carson et al. 1994; Krishnamurthi et al. 1995). An important additional advantage is that cross effects models can pick up asymmetric dominance whereas the other models mentioned cannot.

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[3] Problems may arise with the practical estimation of this type of models because of the number of cross-effects parameters to be estimated proliferates with the inclusion of more attributes, attribute-levels, or alternatives. The estimation of these cross-effects models requires large numbers of observations, that are preferably obtained in controlled conditions. Conjoint choice experiments are increasingly used for this purpose (cf. Batsell and Louviere 1991).

4.3 Assortment issues in the study

In the present study we will focus on a subset of four of the assortment issues that were brought up in chapter 3 and demonstrate for each how choice experiments allow one to investigate and test ideas about these issues: consumption goal, purchase context, price effects, and item availability.

4.3.1 Consumption goal

An assortment allows consumers to fulfill shopping needs at a lower cost if it includes many substitutes and complements. Chapter 3 already mentioned that two products that can satisfy the same need are generally considered substitutes and two products that satisfy a particular need if consumed jointly are considered complements (Henderson and Quandt 1958). Also, the chapter referred to Lattin and McAlister's (1985) argument that substitute products fulfill the same component of a consumer's composite need because they share so-called want-satisfying features and that complementary products thus meet different components of the composite need.

Betancourt and Gautschi (1990, 1992) show that these inter-item relationships depend on the requirements underlying the activities a consumer or household undertakes in order to generate desired outputs. For example, for an everyday television evening several types of potato chips may be substitutes, but when preparing a party they may be complements. Also the extent to which items are substitutes may differ. For example, for an everyday meal veal and pork may be almost perfect substitutes, whereas for a special occasion only one particular type of meat may suffice. Betancourt and Gautschi argue that retail outlets carry different assortments because they cater to customers that have different needs due to differing activities and associated 'end-product' requirements.

The elusiveness of what defines substitutes and complements has made results from previous investigations difficult to interpret. Following Betancourt and Gautschi, we therefore argue that substitutability and complementarity are concepts that depend on the consumption goal pursued by a consumer and that, hence, the consumption goal should be taken into account when investigating substitution and

complementarity (cf. Srivastava, Leone and Shocker, 1981; Srivastava, Alpert and Shocker, 1984).

Scanner and survey data that are typically used to study substitution effects however not easily allow taking consumers' consumption goals into account, and are therefore often difficult to interpret. For example, a purchase of a particular brand of soup in a particular store may be explained by an intrinsic need for variety (cf. McAlister 1979, 1982), preference heterogeneity due to different consumption goals (e.g., Barsalou 1983, 1985), a want for processing new information, social interaction processes, learning about new trends (cf. Bellenger and Korgaongar 1990), or time pressure. Scanner data also typically cover limited price ranges and show relatively little variation in item availability. Moreover, observed variations in these variables are often collinear, which may cause estimation problems. To take multiple users and multiple usage occasions within the household into account, Bucklin and Srinivasan (1991) developed a survey-based approach to determine cross-price elasticities and the extent of brand switching. However, as they note, there is likely to be substantial error in their choice data, which are based on reported recent usage. In addition, they estimate choice model parameters for individual households, which due to the small sample sizes will make the choice model parameters quite unreliable. Clearly, such approach requires large, high-quality datasets in order to obtain reliable estimates at the household level and consequently imposes high demands on datacollection. As we will demonstrate, choice experiments offer an alternative and efficient way of taking the consumption goal into account because they allow the researcher to fix or manipulate the goal in the choice task instructions (cf. Carson et al., 1994). This essentially results in a separate utility function being specified for each goal. Standard tests can then be performed to see whether (parts of) the utility functions should be constrained across different goals.

4.3.2 Decision context

A second aspect that can be controlled for by designing an assortment choice task is the essentially hierarchical and interactive nature of the consumer decision process. When planning a shopping trip, a consumer may choose a retail outlet before

selecting a specific product, or vice versa, he or she may first select a particular item and then select a store for purchasing this item (cf. Ahn and Ghosh, 1989). Also, once in the store a consumer can decide at any time to walk out and visit another store before making a final purchase decision. By exactly specifying and by manipulating the task context of the decision-maker, choice experiments allow the researcher to focus at a particular stage in the assumed decision process. That is, one can specify features of the purchase environment (e.g., store ambience) and the nature of the task (e.g., how much time is available to make the purchase). In contrast, scanner and other real market data only allow after the fact inferences on the different stages of the consumer decision process and need to be supplemented by difficult to collect observations, think-aloud-protocols or intercept surveys about in-store behavior (cf. Dickson and Sawyer, 1990). The focus in our application is on *in-store* decision making. Similar to the consumption goal effects, the effects of the different decision contexts are analyzed by specifying a separate utility function for each decision context condition and then testing whether the parameters can be constrained across context conditions.

4.3.3 Price effects

A third relevant characteristic of assortments is that individual items are priced but that it is the composite of the individual item prices that conveys the price image of the assortment as a whole, regardless of whether the assortment concerns a category or a store. Store price image cannot easily be explained from the constituent item prices, which in fact is a major reason why retail pricing is one of the most difficult aspects of retail management. A retailer will be interested to know the customer's price sensitivities for the individual items in the assortment, but at least as important to know are the price cross-effects of the items within the assortment, and between the own category or store and the competing categories or stores. Price cross effects were studied by Krishnamurthi, Raj and Sivakumar (1995), who used the extended logit framework advocated in this chapter. They studied inter-brand effects of price on brand choice on a panel data set on household coffee purchases. Their model thus was estimated from real market data that was collected in uncontrolled circumstances, which makes the parameters difficult to interpret. As we will

demonstrate in our application, the attribute cross effects as specified in equation (3) allow one to get efficient, independent and interpretable estimates of effects such as investigated by Krishnamurthi c.s. Note that this approach is not restricted to price effects per se. It could in principle also be applied to assess cross effects of the qualities of the individual items in the assortment. Since the present experiment was not designed to vary the quality of the individual items, we cannot further demonstrate or test this in the present study.

4.3.4 Item availability

The composition of the assortment in terms of the available items and their inter-relations is the fourth relevant issue. Particularly relevant is to look at differences in substitution between products. Our experiment will allow inspection of the effects of brand or item availability and how these effects are affected by other own or competing distribution services. This is accomplished by including availability cross effects as specified in equation (2) in the utility function of the choice model to estimate.

4.4 Hypotheses

The hypotheses below are based on the propositions that are presented in chapter 3, but have been reformulated for the situation where a consumer needs to make an in-store purchase decision from a generic category of unbranded products of different types or subtypes, such as a florist store. We assume the consumer has arrived at a store and hence can observe the available assortment and experience the store ambience. The consumer now needs to decide whether and what to buy from this store. For details on the propositions underlying the hypotheses presented here, the reader is referred to chapter 3.

Chapter 3 proposed that distribution service provision will positively affect consumer choice. With a shorter distance to the store and a larger choice range, the respondent will perceive a higher chance of succeeding in finding an acceptable product at that store. We also expect that the alternative store is more attractive and

hence will draw more customers when it has a good ambience than if it has a poor ambience.

Hypothesis 1a *A competing store will draw more customers away from the present store when this store is nearby than when it is further away.*

Hypothesis 1b *A competing store will draw more customers when its choice range is large instead of small.*

Store ambience has been shown to influence customer shopping behavior through its effect on mood (cf. Donovan and Rossiter 1982). In addition, all else equal, customers will infer the products to be of better quality if the store ambience is better.

Hypothesis 2 *Customers are more inclined to purchase at the present store if this store has a good ambience than if the ambience is poor.*

Hypothesis 3 *The current and the competing store's ambience will interact, such that the overall probability of purchase (at the present or in the competing store) is largest if the competing store is more unique, that is, if its ambience is different from the ambience of the present store.*

Hypothesis 4 *Creating variety in the assortment by adding products that differ in only one feature will lead to increased substitution relative to adding products that differ in more respects.*

These effects will be evidenced by negative availability cross-effects of products that are only different on the selected feature. In our application on cut flowers this feature is the color of the flowers and we expect that different colors of the same flower type act as substitutes.

Consumers value large assortments, but continued addition of items to an assortment will lead to increased substitution. We therefore hypothesize:

Hypothesis 5 *If the assortment in the present store increases purchase likelihood at the present store will increase, but at a decreasing rate.*

Hypothesis 6 *Price cross effects between products of the same type will be positive, that is, if the price of one product goes up, the purchase probabilities of other products of the same type increase more than proportional.*

Hypothesis 7 *The store and inter-item relations hypothesized above (H1 to H5) will differ depending on the consumption goal.*

4.5 The application

The application concerns consumer choice of fresh cut flowers. This product category possesses a number of characteristics, both with respect to the physical product and its distribution, that makes it particularly well suited for studying distributive services and assortment composition.

Domestic and foreign producers of cut flowers sell their products, predominantly through the Dutch auction system, to a large variety of traders, including approximately 250 domestic wholesalers and many more exporters, and retailers. The first to develop the cooperative auction system in order to secure a fair price were growers of vegetables who used to sell their products to a powerful, at that time limited, number of traders. Today there are seven flower auctions, where the bulk of all Dutch flower growers' products are daily presented before the clock. The greater part of Dutch flower production, as well as a large share of internationally traded foreign produce is sold through Dutch auctions. Due to the independent auctioning of large numbers of product lots from many independent growers and the presence of many competing buyers, both producers and traders are unable to exert any individual influence on price formation. Nowadays the three large auctions have mediation agencies that sell growers' products directly to large wholesalers and retailers.[4]

[4] Recently, the auctions face a number of important developments, that are beyond the scope of the research presented here, but will have significant implications for the system and thus deserve mentioning. An example is purchase of large quantities by e.g., supermarket chains that aim at selling homogeneous products and therefore prefer individual contracts with producers in order to

In the Netherlands there are over 4,000 registered florists. Many of these florists sell through outlets other than specialized flower stores or combine multiple outlet types, such as a specialized store and open air market sales. The consumer market for flowers is thus rather fragmented and decentralized, with approximately 40% of flower sales through specialized independent outlets. Until today only a small percentage of sales goes through retail chains and supermarkets. Specialized retailers add value to the product by providing general and product-specific distribution services, and many of them offer creative services, including combining flowers into bouquets, often for special occasions, and selling ornamentals such as vases. In addition to retailer service provision, retail prices are affected mainly by auction prices, which in turn are affected by many factors, such as season of the year, product quality, and the presence or absence of specific growers. Product advertising is done collectively by all associated Dutch retailers in cooperation with the Flower Council of Holland.

The availability of different flower types varies with the seasons and the presence or absence of specific growers' offerings. Prices also vary considerable over time and over retail outlets. Cut flowers are typically distributes as unbranded products, with standardized protective packaging, and are presented in the stores using their generic names. Sales through supermarkets and non-store outlets are still small, but growing. Local advertising is exceptional. Because of their perishableness, consumers cannot stockpile cut flowers.

At all levels of the distribution channel some uncertainty remains with respect to quality maintenance since neither channel member knows how much time elapsed since harvest, nor what treatment the product has received, e.g., cooled storage, hygiene measures, antibacterial fluid used. Quality guarantees, e.g. concerning vaselife, are generally not given, despite several attempts to institutionalized quality[5]. The only product labels available to the final consumer are the name of the flower variety, the retailer's name, and possibly the auction name on the flower container. For wholesalers and retailers who purchase at the

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secure a lower price than would be the realized if they purchase large quantities through the auction.

[5] Several individual retailers and large supermarket chains are offering a vaselife guarantee (usually seven days) for the product sold to their customers.

auction, quality information supplied by the auction and the producer's name are the only available labels.

Cut flowers thus are a heterogeneous, perishable, unbranded, and unpackaged product with daily varying prices and little advertising. In addition, most consumers and retailers are not familiar with specific flower varieties, thousands of which exist in the market. Therefore, consumers will need to use other available extrinsic quality cues to form quality judgments, such as store prestige and reputation. Store prestige refers to distribution services, such as ambience, including presentation, and packaging. Retailer reputation depends largely on store type. A specialized store is generally considered a quality provider relative to a supermarket or gas station.

This heterogeneity with respect to product, price, and the assortment offered in the real-world flower market, and the relative independence of the cut flower channel structure from distributive structures for other goods make it possible to present consumers with experimental tasks that are very much representative of the choice conditions that they encounter in the real market. The cut flower sector thus allows unique opportunities to test hypotheses about effects of distribution services, including assortment composition, on consumer purchase behavior in experimental settings with real consumers.

Based on consumer behavior theory we may conclude that to consumers only a few cues are available from which inferences can be made with respect to product and retailer quality (e.g., Broniarczyk and Alba 1994; Ross and Creyer 1992; Sujan and Dekleva 1987). Therefore, quality inferences will be made by consumers using external cues, such as store reputation, information provided by and behaviors of store personnel, and store tangibles, such as decoration, and internal cues, such as visible physical product characteristics. Most of these cues used in making quality inferences can be simulated in an experimental study. Many relevant cues, with the exception of e.g., personnel, are controlled for in the experiment. This reduces the probability of consumer inferential belief formation on the basis of missing information. Also, brand equity does not exist, and will therefore not influence the effects of product availability.

Complementary products are of limited significance in specialist flower stores. With the exception of purchases such as vases, most consumer purchases at specialist florists' are limited to cut flowers. Complementarity exists mainly

between flower varieties that may be combined into one bouquet when the consumer is already in the store. In our analysis these flower compositions will not be considered. The heterogeneity with respect to product, price, and the assortment offered in the real-world cut flower market, and the relative independence of the cut flower channel structure from distributive structures for other goods make it possible to present consumers with experimental tasks that are very much representative of the choice conditions that they encounter in the real market. The cut flower sector thus allows unique opportunities to test hypotheses about the effects of distribution services, including assortment composition, on consumer purchase behavioral in experimental settings with real consumers.

4.6 Design of the study

A consumer experiment was designed using fresh cut flowers as the product category under investigation that are purchased at specialized florists' outlets. Because analysis of item interrelationships within and among multiproduct assortments is the main research purpose, the experiment was designed for analysis of consumer in-store choice of cut flowers[6]. The experimental design explicitly incorporates competition within and among assortments. In the experiment consumer demand is represented by choices made by consumers from a variety of assortments. This section discusses the design of the study.

[6] Research (Koelemeijer 1994) indicates that most consumers do not substitute between buying cutflowers at a specialized florist's and other product categories during their shopping trip. The majority (80%) of a sample of 1400 consumers indicated choice among product categories and choice of florist's to patronize had already been done at home. This will probably not be the case for flower purchases at different types of outlets, such as markets and supermarkets, where flower purchases may be impulse purchases.

4.6.1 Subjects

The experiment was conducted among members of a large existing consumer panel in The Netherlands[7]. From this panel, 896 members were selected who had bought cut flowers at least once a month during the last two years. A total of 448 members had mostly bought flowers for use in their own home, the other members usually bought flowers as a gift. Individuals who bought flowers equally often for both occasions were randomly assigned to one of the two groups. The questionnaires and high-quality photographic material were distributed among the 896 panel members. Of the "own use" group, 358 members returned and completely filled out their questionnaire, comprising a response rate of 79.9 percent; from the "gift" group we obtained 383 completed questionnaires (85.5 percent response rate). Thus, the total size of our final sample was 741.

The consumers participating in the study had ample previous experience with choice of florists and flower purchase. We may therefore assume their goal or decision criteria are well-developed. Making a goal or decision criteria salient will in that case have a limited influence in determining what attributes are considered important, and on the degree of usage of concrete attributes (Bettman and Sujan 1987; Barsalou 1983). Because in our experiment the flower purchase goal was already salient the participating consumers are in addition likely to have used concrete attributes for product evaluation and choice in past purchase decisions.

4.6.2 The experimental choice scenarios

Each assortment was a designed choice set consisting of photographs of bunches of cut flowers, each bunch carrying a price label. All flowers were equally fresh and were photographed in standardized auction barrels, all at the same distance, from an angle similar to the way consumers view flowers in stores. The use of pictorial stimuli allows a higher degree of realism (Smead, Wilcox and Wilkes 1981) in the experiment, which aimed to mimic the real-world in-store purchase environment.

[7] Datacollection was done among members of the GFK Household panel who have been accustomed to reporting monthly purchase data on a variety of consumer durables and nondurables, among which cutflowers.

Loosschilder et al. (1995) show that consumers are able to evaluate pictorial stimuli without use of verbal key words in a conjoint analysis task.

Participants received a mail-back questionnaire accompanied by photographs displaying a store's interior and exterior and several choice sets representing possible cut flower assortments. The experiment contained two different stores that represented a high and a low ambience store, which was confirmed by pretesting. The two stores were randomly allocated to participants in the study and differed on, e.g., layout and flower presentation. After asking questions about their last purchase of cut flowers, the questionnaire explained respondents that they had to assume they were in the store as displayed on the photographs, wanting to buy flowers today for the same occasion as when they last bought cut flowers. This meant that panel members who mostly buy for their own use had to assume they would buy flowers for use in their own home under similar conditions as when they last time bought flowers. Members who typically buy flowers as a gift had to assume they would buy flowers for a similar occasion as the last time they bought flowers as a gift. Because we aimed to make the task as realistic as possible we refrained from randomly allocating respondents to different "goal" conditions. Note however that this is a trade-off. Random allocation would have been possible, but at the cost of having people encountering goal conditions that they were unfamiliar with. Participants were then asked to select their preferred bunch of flowers from each of the presented assortments of cut flowers, or choose to buy no flowers. In some conditions, respondents could also choose to visit a competing store. If this competing store option was available, the questionnaire mentioned the travel time to this store (one, five, or ten minutes), whether the store ambience had much or little appeal, and whether they could expect a large or small choice range. In contrast to the present store interior, these competing characteristics were verbally described because this would better approximate the real in-store purchase situation than if we had used pictures to manipulate the features of the competing store.

4.6.3 Experimental design

The multiple choice experiment involved fifteen different frequently sold flower bunches, which were displayed on colored photographs. The flower bunches

included eight different flower types, with seven of them in two different colors. Preliminary investigations indicated that the distinction between variety and color was detailed enough for consumers to choose flowers. Consumers do not, and mostly are not able to, distinguish more detailed differences among flowers, for example between subvarieties. In order to assure representativeness of the product sample and to assure respondent familiarity with the products involved in the experiment cut flowers were selected that occurred in the top 10 of quantities sold, which has remained rather stable throughout several years. In addition, there was an option of visiting a competing store to buy flowers. Figure 4.1 presents the options, i.e., flower varieties and competing store, used in the experiment. The presence or absence of each of the fifteen flower bunches and of the competing store in the choice sets was systematically varied through a 4^{16} design in 64 treatments (cf. Lazari and Anderson 1994). We used four levels for each option to obtain balance between the availability of the different options and the distribution of sizes of choice sets. Of these four levels, the first two received the value "not available", whereas the other two levels indicated that the particular flower bunch was available in a set, either at low price (level three) or at a high price (level four).

Figure 4.1 *The sixteen alternatives (competing store and fifteen flower bunches) for which presence/absence was manipulated.*

1:Competing store	6:Tulips, red	12:Dianthums, red
	7:Tulips, yellow	13:Dianthums, white
2:Roses, large, red	8:Chrysanthemums, pink	14:Lillies, red
3:Roses, large, white	9:Chrysanthemums, yellow	15:Lillies, yellow
4:Roses, small, red	10:Irisses, blue	16:Fresia, white
5:Roses, small, white	11:Irisses, white	

Each flower bunch's price was displayed and was the real market price plus (high price) or minus (low price) 150 cents. Level one of the competing store indicated "not available", levels two to four were used to systematically vary the travel distance to the competing store (one, five, or ten minutes travel distance). This design thus generated 64 different assortments, containing five to twelve

flower bunches of different color and/or variety. In 48 cases, the option of visiting a competing store was present. Due to a field error, however, the competing store option was not administered to the sample of respondents who mostly buy flowers as a gift. Each respondent received a block of eight assortments only; these blocks were created by using an independent blocking factor.

This "availability by price or travel time" design was nested under a 2^3 full factorial between subjects master design to vary the following factors: (1) Ambience at the current store, that is, the store where the consumer is supposed to see the assortment displayed ("Good ambience" versus "Poor ambience", manipulated through the pictures of the present store's interior); (2) Ambience at the competing store ("Much appeal" versus "Little appeal", manipulated through presenting these verbal labels in the questionnaire); and (3) Choice range at the competing store ("Large selection" versus "Small selection", manipulated through presenting these labels in the questionnaire). The total number of different scenario's in the experiment was therefore 512 (i.e., eight times 64). In Table 4.1 an overview is given of the attributes and attribute-levels used in the experimental design.

Table 4.1 *Attributes and attribute levels used in the experiment.*

Attributes	No. levels	Description of levels
Flower types	2	Each of the 15 color-variety combinations present or absent
Price	2	Flower-type specific high, low
Alternative store	2	Present, absent
If present:		
distance	3	1, 5, 10 minutes to store
assortment	2	many, few choice possibilities
ambience	2	good, poor

4.6.4 Dependent variables

Responses collected in the questionnaire concerned the respondent's previous flower purchases, impressions of the described hypothetical current store and competing store, and the choice responses for each of the eight choice sets, i.e., choose flowers, visit competing store or no purchase. Participants in addition rated each of the assortments (choice sets) on various characteristics and responded to statements intended to measure their task involvement, however these latter measures will not be analyzed in the present study.

Several manipulation checks have been used in the study. Store manipulations were checked using a 5-item, 5-point scale described hereafter. Perceptions of current store ambience was checked using two items with poles ranging from respectively "Not agreeable at all" (1) to "Very agreeable" (5), and "Very bad atmosphere" (1) to "Very good atmosphere" (5). Manipulation of the competing store was tested using a 3-point scale ranging from "Very unattractive" (1) to "Very attractive" (5).

Validity checks were used to assess whether the choice task and the photographic materials used matched real-life in-store decision making context. The most important reason for using pictorial stimuli instead of product descriptions was the higher degree of selection and choice realism (Smead, Wilcox and Wilkes 1981) that would be achieved in the experiment. The degree of realism refers to the amount of information in each stimulus, and the manner in which the stimuli are presented (De Bont 1992). With respect to the latter realism will be enhanced because design-related attributes can be included, more attributes can be included and each attribute can be manipulated to greater detail by using printed pictorial stimuli. With flowers visualization of the product is probably essential for preference formation, since in our study consumers have only a limited number of other cues to infer quality from, such as price and store reputation. Use of pictorial stimuli allows more realistic and detailed manipulation of product attributes that concern physical characteristics, such as form, length and color, because reading and visualization of the information, which may be difficult, does not have to be done by the respondent (Green and Srinivasan 1978). With pictorial stimuli the probability of holistic information processing will be enlarged (Paivo 1971). Vriens et al. (1994) show that consumers are able to evaluate pictorial stimuli without use

of verbal key words in a conjoint analysis task. In our study additional information was provided, e.g. price, using short, written attribute descriptions below each photograph.

Respondents were asked to indicate for one particular, randomly assigned, choice set they received the degree to which each of the pictures matched real-life presentation on a 5-point Likert-type scale ranging from "The flowers on picture *i* are not at all like you see them in the store" (1) to "The flowers on picture *i* are very much like you see them in the store" (5). The overall degree of realism captured by the choice sets was indicated by having the respondents rate a statement concerning the choice set as a whole. Finally, the choice task was evaluated by rating the degree to which the choice task and context described matched reality.

4.7 Analysis and results

4.7.1 Manipulation checks

Of the 741 participants, 375 had been assigned to the high ambience store and 366 had been assigned to the low ambience store. A t-test on the mean score of a 3-item 5-point rating scale (α=.84) indicated the photographs we used to frame ambience had successfully manipulated respondent perceptions of the current store's ambience (t_{337}=12.86, p≤.000).

Manipulation of travel distance, ambience, and choice range resulted in 12 different competing store profiles. Consumers' perceptions of the competing store profiles differed significantly and in the expected direction with respect to the factors ambience ($F_{1,534}$=22,06, p≤.000) and choice range ($F_{1,534}$=7,53, p≤.002), but did not differ with respect to travel distance ($F_{2,534}$=0.09, p≤.892). Manipulation checks generated similar results for each of the two purchase goals.

4.7.2 Base model

Models were estimated with a maximum likelihood approach from a data matrix that contained the choices aggregated into a matrix of 992 different choice sets. We

Table 4.2 *Base model estimation results.*

Log likelihood with no coefficients	-14769.5
Log likelihood at convergence	-10638.5
Rho-square	0.280
Rho-square (AIC)	0.278
Rho-square (BIC)	0.275
Number of parameters	21

Variable			Coefficient	Stand.Err.	Asymp.t	p-value
Flower Bunch Constants[a]:						
V2	Roses, large	Red	1.452	0.086	16.794	0.000
V3		White	1.104	0.091	12.085	0.000
V4	Roses, small	Red	1.627	0.085	19.223	0.000
V5		White	1.535	0.086	17.948	0.000
V6	Tulips	Red	1.281	0.089	14.399	0.000
V7		Yellow	1.099	0.091	12.022	0.000
V8	Chrysanthemums	Pink	1.108	0.092	12.094	0.000
V9		Yellow	1.148	0.091	12.674	0.000
V10	Irises	Blue	0.518	0.103	5.029	0.000
V11		White	0.248	0.111	2.230	0.026
V12	Dianthums	Red	1.580	0.085	18.564	0.000
V13		White	0.689	0.099	6.947	0.000
V14	Lilies	Red	0.927	0.094	9.835	0.000
V15		Yellow	0.203	0.112	1.816	0.069
V16	Fresias	White	1.500	0.086	17.410	0.000
Flower bunch generic parameters:						
	Price		-0.272	0.016	-17.481	0.000
	Ambience of current store		-0.070	0.064	-1.082	0.279
Competing Store parameters (effects on utility of competing store):						
	V1 (Constant)		-0.353	0.158	-2.230	0.026
	Distance		0.110	0.174	0.631	0.528
	Choice range		-0.104	0.141	-0.735	0.462
	Ambience of competing store		0.185	0.141	1.313	0.189

[a]) Numbers correspond to flower types and colors in Figure 4.1.

first estimated a main effects MNL model that included a constant for each of the 15 color-by-type alternatives separately, one price parameter one parameter for current store ambience, and in addition parameters for the distance, choice range and ambience as described for the other store, if available. The parameter estimates for this model are displayed in Table 4.2. Regarding our first hypothesis (H1), the observed t-statistics lead us to retain the null hypothesis that the characteristics of the competing store have no effect on the choice probability of this alternative.

The model further shows that the price parameter has the sign as expected, higher prices leading to lower purchase likelihood. The constants for each of the fifteen color-by-type alternatives reflect the preferences for each and indicate that, for example, across all sets 4:Small Red Roses were most preferred and 15:Yellow Lilies were least preferred. These constants in fact are a direct transformation of the marginal frequencies of the different color-by-type varieties because in our case a completely balanced design was used, this is however not generally true.

We respecified the model to include a dummy ('main effect') for each flower type and separate dummies ('main effects') for red and pink or blue flowers. This led to a significant decrease in fit, indicating that preferences are very much color-by-variety specific (Likelihood Ratio Chi-2 value is 107.1 at 5 degrees of freedom, $p \leq .001$). To further test the hypothesized effects we next estimated several other models and compared these to this base model. We will now discuss the results of these model comparisons for each of the hypothesized types of effects separately.

4.7.3 Store ambience

We hypothesized that the ambience at the current store would positively influence purchase probabilities (H2). Because current store ambience was a characteristic of the choice context and not of a particular alternative, we tested for the effect of current store ambience by including a parameter for current store ambience in the fifteen utility functions. As shown in Table 4.2, this generic parameter was not significant (t=1.08,n.s.). Estimation of a separate current ambience parameter for each flower bunch did also not lead to a significant improvement of the model. (LR Chi-2 =14.5, d.f.=14, n.s.).

We also hypothesized that the ambience effects for the current and competing stores would interact, such that if the ambiences are different the probability of purchase increases (H3). We thus added the interaction of the current and competing stores' ambience to the utility function for the competing store (see Table 4.3). We furthermore hypothesized that price sensitivities might be different depending on the current store ambience. We therefore also added the interaction of price and current store ambience to each of the fifteen utility functions. The model including all these additional parameters did not significantly improve the fit of the base model however. (LR Chi-2 =23.0, d.f.=18, n.s.). We thus retain our null hypothesis that current store ambience does not affect the in-store purchase likelihood and choice probabilities, even though the manipulation checks confirmed the manipulation of the current store ambience. Worth mentioning is also that we found a significant ($t=3.03$, $p \leq .01$) negative interaction of current store ambience and distance to the other store, suggesting that in particular if the current store ambience is poor and the distance to the competing store is small, there is an increased chance that the consumer leaves to visit this other store.

Table 4.3 *Estimation results for base model extended with cross effects and store ambience by competing store interactions.*

Log likelihood with no coefficients	-14769.5
Log likelihood at convergence	-10577.8
Rho-square	0.284
Rho-square (AIC)	0.280
Rho-square (BIC)	0.271
Number of parameters	54

Variable		Coefficient	Stand.Err.	Asymp.t	p-value
Flower Bunch Constants[a]:					
V2 Roses, large	Red	1.747	0.121	14.449	0.000
V3	White	1.400	0.128	10.941	0.000
V4 Roses, small	Red	1.793	0.118	15.155	0.000
V5	White	1.690	0.120	14.089	0.000
V6 Tulips	Red	1.551	0.126	12.339	0.000
V7	Yellow	1.409	0.129	10.958	0.000
V8 Chrysanthemums	Pink	1.113	0.133	8.353	0.000
V9	Yellow	1.241	0.130	9.539	0.000
V10 Irises	Blue	0.465	0.157	2.956	0.003
V11	White	0.596	0.157	3.802	0.000
V12 Dianthums	Red	1.719	0.121	14.253	0.000
V13	White	0.936	0.140	6.694	0.000
V14 Lilies	Red	1.076	0.135	7.941	0.000
V15	Yellow	0.376	0.162	2.320	0.020
V16 Fresias	White	1.508	0.113	13.374	0.000
Flower bunch generic parameters:					
Price		-0.271	0.016	-17.427	0.000
Ambience of current store (CSA)		-0.085	0.066	-1.287	0.198
Competing Store parameters (effects on utility of competing store):					
V1 (Constant)		-1.083	0.869	-1.246	0.213
Distance		0.119	0.175	0.683	0.495
Choice Range		-0.119	0.144	-0.829	0.407
Ambience of Competing Store		0.196	0.141	1.384	0.166
Interaction effects of Current Store Ambience (CSA) and competing store attributes on Competing Store:					
CSA * Distance		-0.566	0.188	-3.013	0.003
CSA * Choice range		0.235	0.146	1.601	0.109
CSA * Ambience of Competing Store		0.027	0.141	0.190	0.849
Cross effect of Number of Items in Current Store Assortment on utility of Competing Store:					
Items		0.058	0.115	0.510	0.610

Table 4.3 *Continued*

Variable	Coefficient	Stand.Err.	Asymp.t	p-value
V3_2C	-0.126	0.108	-1.167	0.243
V2_3C	-0.229	0.123	-1.865	0.062
V5_4C	-0.044	0.102	-0.435	0.664
V4_5C	-0.060	0.104	-0.579	0.563
V7_6C	-0.298	0.115	-2.584	0.010
V6_7C	-0.452	0.124	-3.641	0.000
V9_8C	-0.218	0.123	-1.772	0.076
V8_9C	-0.160	0.121	-1.320	0.187
V11_10C	0.145	0.154	0.941	0.347
V10_11C	-0.355	0.179	-1.987	0.047
V13_12C	-0.162	0.102	-1.579	0.114
V12_13C	-0.442	0.150	-2.954	0.003
V15_14C	0.011	0.130	0.083	0.933
V14_15C	-0.197	0.179	-1.102	0.270
Availability Cross Effects of Competing Store on Flower Bunches[c]:				
V1_2C	-0.724	0.182	-3.969	0.000
V1_3C	-0.549	0.191	-2.874	0.004
V1_4C	-0.417	0.174	-2.399	0.016
V1_5C	-0.254	0.175	-1.451	0.147
V1_6C	-0.386	0.184	-2.101	0.036
V1_7C	-0.272	0.188	-1.448	0.148
V1_8C	0.239	0.185	1.294	0.196
V1_9C	-0.072	0.184	-0.390	0.697
V1_10C	-0.049	0.209	-0.233	0.816
V1_11C	-0.495	0.238	-2.083	0.037
V1_12C	-0.182	0.174	-1.048	0.295
V1_13C	-0.194	0.203	-0.954	0.340
V1_14C	-0.419	0.196	-2.137	0.033
V1_15C	-0.211	0.230	-0.916	0.360
V1_16C	-0.016	0.175	-0.089	0.929

[a]) Numbers correspond to flower types and colors in Figure 4.1.
[b]) V3_2 means: cross effect of flower 3 on flower 2.
[c]) V1_2 means: cross effect of competing store(=1) on flower 2.

4.7.4 Substitution (cross) effects

To investigate the substitution patterns among the items in the assortment we next added terms to the utility function that pick up the substitution effects between pairs of alternatives. We hypothesized that if for some flower type two different colors are available, these two products compete more among each other than that they compete with other flower types of any color (H4). For each alternative we therefore included a term in the utility function that represented the availability of this competing alternative in the set. We thus estimated 14 flower-on-flower cross effects (the eighth flower type was available in only one color, so we did not include a cross effect for this flower).

The logit model extended with these terms improved the model fit significantly relative to the base model (LR Chi-2 =47.4, d.f.=14, $p \leq .001$). The Adjusted Rho-square value based on the Akaike Information Criterion however shows only a very small increase when the cross effects are included. This confirms that the model performs better if we include cross effects but that if we take model parsimony into account the improvement is only marginal. Indeed, if we use the more strict Bayesian (or Schwartz) Information Criterion (see Rust et al. 1995), the fit even decreases (see table 4.2 versus 4.3). To make the extended model more parsimonious the insignificant parameters could be dropped and the model could be re-estimated. We refrain from reporting this model (note however that Table 4.4 reports more restricted models).

Inspection of the within flower type cross effect estimates, displayed in Table 4.3, reveals that the flower types for which we find the strongest and significant substitution effects are 6:Red Tulips on 7:Yellow Tulips (cross effect is -0.452), 12:Red Dianthums on 13:White Dianthums (-0.442), 10:Blue Irises on 11:White Irises (-0.355), and 7:Yellow Tulips on 6:Red Tulips (-0.300), in decreasing order of effect size. Note that the substitutions are not symmetric, we interpret them as asymmetric dominance effects (Huber, Payne and Puto, 1982): the availability of 12:Red Dianthums suppresses the choices for 13:White Dianthums more than proportional, likewise, 10:Blue Irises dominate 11:White Irises, and 6:Red Tulips dominate 7:Yellow Tulips. The interesting observation from this is that there is a tendency for red and blue to dominate over yellow and white, but not for all flower types.

4.7.5 Competing store (cross) effects

We next tested our ideas about assortment size and the drawing power of a competing store (H5). We included a parameter in each alternative's utility function to represent the effect of the availability of the other store in the choice set on this alternative; hence, there were 15 of these cross effects. All these availability indicator variables were dummy coded (1=present, 0=absent), their effects are therefore interpretable in terms of their magnitudes. We also included a cross effect for the number of items in the assortment in the utility specification of the competing store option to pick up effects of the assortment size at the present store on the likelihood of purchasing at the competing store. The logit model extended with these terms improved the model fit significantly relative to the previous model (LR Chi-2 =62.10, d.f.=16, $p \leq .001$). The Adjusted Rho-square increases to .279, confirming that the model performs better if we include these cross effects, even if we take model parsimony into account.

If we look at the effects of the availability of the competing store as displayed in Table 4.3, we find that these are significant for six flowers: 2:Large Red Roses (-.724), 3:Large White Roses (-0.549), 11:White Irises (-0.494), 14:Red Lilies (-0.419), 4:Small Red Roses (-0.417), and 6:Red Tulips (-0.386). The negative signs of these estimates indicate that if the competing store is available, these flowers are bought relatively less often, indicating that for these flower types customers are more willing to go to the competing store. Note that 6:Red Tulips and 11:White Irises are affected by both types of cross effects, which we interpret as indicating that people have only weakly developed preferences for these flower types and are easily distracted from buying them.

Increasing the assortment size by adding items increased the likelihood of purchasing at the current store proportional to the attractiveness of the items added, as assumed in the MNL model. A cross effect captures the extent to which addition of an item to an assortment increases purchase likelihood to a larger or smaller extent than would be predicted from the MNL model. We consequently find no cross effect of assortment size at the current store on the probability of visiting the competing store. This suggests that, even though we found substitution effects within flower types, there was no significant overall substitution between flower types.

4.7.6 Price effects

Allowing a different price parameter for each separate flower type or color-by-type did not significantly increase the explanatory power of the base model (LR Chi-2 =15.4 at 14 d.f., n.s.), so we conclude that price sensitivities are not different for the different flower alternatives. To test our hypothesis about price cross effects (H6), we included in each alternative's utility function parameters to represent the prices of the remaining available alternatives in the set. None of these effects were significant however, so we retain our null hypothesis that price cross effects are zero. We thus conclude that the price substitution that occurs between different flowers is independent of the type of flower bunches involved.

4.7.7 Purchase goal

The previous models were all estimated across our two samples, that is, across the "own use" and "gift" purchase goals. To test whether the parameters are different for these two purchase goals (H6), we applied the test as proposed by Swait and Louviere (1993). Using a FIML estimation routine, we first tested whether the scale parameter, which is embedded in all MNL parameters, was different between the two samples. The estimated ratio of the scales in the own use and gift conditions was 1.195 and significantly different from one. This indicates that the error variance was largest in the gift condition (the scale value is inversely related to the error variance, see Swait and Louviere, 1993). We next tested whether the parameters are different after rescaling. We estimated our model for each separate sample. Thus allowing separate parameter estimates for each sample improved the total model fit significantly relative to the above pooled, but rescaled, model (LR Chi-2 =83.8, d.f.=31, $p \leq .001$).

Table 4.4 displays the model parameters for the two purchase goal conditions side by side. The most right-hand column displays the differences between the parameters after rescaling the own use model parameters and their significances. It appears that, overall, people are more inclined to make a purchase in the gift than in the own use condition. The respondents in the gift sample buy red and large roses in particular more often. 11:White Irises and 14:Red Lilies are also bought more often

Table 4.4 *Separate estimation results for "Own Use" and "Use as a Gift" samples.*

Goal = 1: Own Use							**Goal = 2: Use as a Gift**					
Log likelihood with no coefficients				-6859.21			Log likelihood with no coefficients			-7910.33		
Log likelihood at convergence				-5033.41			Log likelihood at convergence			-5536.99		
Rho-square				0.266			Rho-square			0.300		
Rho-square (AIC)				0.262			Rho-square (AIC)			0.296		
Rho-square (BIC)				0.252			Rho-square (BIC)			0.288		
Number of parameters				31			Number of parameters			30		
Variable			Coefficient	Stand.Err.	Asymp.t	p-value	Variable	Coefficient	Stand.Err.	Asymp.t	p-value	Parameter-differences[c]
	Price		-0.273	0.023	-11.826	0.000	Price	-0.270	0.021	-12.777	0.000	0.042
Flower Bunch Constants[a]:												
V2	Roses, large	Red	0.939	0.152	6.160	0.000	V2	1.994	0.142	14.072	0.000	-1.211
V3		White	0.725	0.160	4.529	0.000	V3	1.641	0.150	10.962	0.000	-1.037
V4	Roses, small	Red	1.284	0.136	9.454	0.000	V4	1.991	0.139	14.305	0.000	-0.921
V5		White	1.320	0.135	9.753	0.000	V5	1.857	0.143	13.000	0.000	-0.757
V6	Tulips	Red	1.134	0.146	7.776	0.000	V6	1.712	0.150	11.384	0.000	-0.766
V7		Yellow	1.053	0.148	7.132	0.000	V7	1.561	0.154	10.147	0.000	-0.683
V8	Chrysanthemums	Pink	1.180	0.141	8.346	0.000	V8	1.247	0.162	7.683	0.000	-0.264
V9		Yellow	1.020	0.145	7.021	0.000	V9	1.448	0.153	9.456	0.000	-0.597
V10	Irises	Blue	0.415	0.173	2.400	0.016	V10	0.482	0.201	2.403	0.016	-0.136
V11		White	0.059	0.203	0.290	0.772	V11	0.781	0.184	4.255	0.000	-0.732
V12	Dianthums	Red	1.427	0.134	10.681	0.000	V12	1.889	0.143	13.166	0.000	-0.700
V13		White	0.742	0.155	4.773	0.000	V13	1.017	0.167	6.085	0.000	-0.399
V14	Lilies	Red	0.638	0.164	3.888	0.000	V14	1.215	0.163	7.451	0.000	-0.683
V15		Yellow	0.266	0.182	1.458	0.145	V15	0.342	0.206	1.656	0.098	-0.120
V16	Fresias	White	1.422	0.115	12.398	0.000	V16	1.601	0.131	12.219	0.000	-0.416

Table 4.4 *Continued*

Goal = 1: Own Use					**Goal = 2: Use as a Gift**					
Variable	Coefficient	Stand.Err.	Asympt.t	p-value	Variable	Coefficient	Stand.Err.	Asympt.t	p-value	Parameter differences[c]
V3_2C	-0.119	0.178	-0.667	0.504	V3_2C	-0.139	0.136	-1.022	0.307	0.040
V2_3C	-0.106	0.191	-0.553	0.580	V2_3C	-0.313	0.160	-1.947	0.051	0.224
V5_4C	-0.049	0.156	-0.318	0.751	V5_4C	-0.018	0.136	-0.133	0.894	-0.023
V4_5C	-0.198	0.158	-1.255	0.210	V4_5C	0.084	0.138	0.605	0.545	-0.249
V7_6C	-0.194	0.169	-1.150	0.250	V7_6C	-0.401	0.158	-2.543	0.011	0.239
V6_7C	-0.331	0.179	-1.849	0.064	V6_7C	-0.546	0.173	-3.166	0.002	0.270
V9_8C	-0.346	0.170	-2.038	0.042	V9_8C	-0.065	0.178	-0.363	0.717	-0.224
V8_9C	-0.214	0.176	-1.210	0.226	V8_9C	-0.134	0.166	-0.809	0.419	-0.044
V11_10C	-0.067	0.215	-0.311	0.756	V11_10C	0.350	0.225	1.559	0.119	-0.406
V10_11C	-0.436	0.285	-1.533	0.125	V10_11C	-0.324	0.230	-1.409	0.159	-0.040
V13_12C	-0.193	0.149	-1.292	0.196	V13_12C	-0.135	0.140	-0.961	0.336	-0.026
V12_13C	-0.603	0.219	-2.757	0.006	V12_13C	-0.307	0.206	-1.492	0.136	-0.196
V15_14C	-0.058	0.197	-0.296	0.767	V15_14C	0.064	0.173	0.372	0.710	-0.113
V14_15C	-0.509	0.260	-1.960	0.050	V14_15C	0.100	0.250	0.402	0.688	-0.524
Competing Store Effects:										
Constant	-0.573	0.165	-3.464	0.001		n.a.				

[a]) Numbers correspond to flower types and colors in Figure 4.1.

[b]) V3_2 means: cross effect of flower 3 on flower 2.

[c]) Difference between own use and gift parameter, after rescaling own use parameter (by multiplying with 1/1.20)

as a gift than for use in the home. Also note that 12:Red Dianthums are the favorite flower for use in the own home. None of the cross effects are significantly different between the two purchase conditions and neither is the price parameter.

4.8 Evaluating different merchandise strategies

The model that was developed in our application can be used in various ways to optimize assortments and to evaluate different possible merchandise strategies. In order to demonstrate this, we use the following simplified case. Suppose that for reasons such as inventory costs, supply problems, and/or space limitations, a retailer has been able to carry only four flower items (SKU's) at a time. The retailer has recorded the sales levels of each week and hence can infer what the most popular flowers are. She cannot infer from this historical data however what the effect will be of increasing the number of SKU's. Also, not all combinations of flower bunches will have been observed, for example because the retailer is reluctant to jeopardize the store image and therefore always makes sure to have roses in stock. The effect of substituting roses with another flower is therefore unknown.

A choice experiment as reported in this chapter would complement the retailer's insights by allowing the retailer to know the effects of different assortment compositions and sizes on category purchases and total purchase volumes. This is illustrated in Table 4.5. In this table we first use the MNL model that we estimated from our experiment (Table 4.2) to predict the shares and total likelihood of purchase at this store for different assortments. For the sake of simplicity, we focus on the case where the retailer historically observed sales for only two assortments: I: {2:Red Roses, 6:Red Tulips, 7:Yellow Tulips and 12:Red Dianthums} and II: {2:Red Roses, 6:Red Tulips, 10:Blue Irises and 11:White Irises}. Because these two assortments both carry 2:Red Roses and 6:Red Tulips, it is impossible to disentangle the effect of the availability of these flowers on purchase likelihoods of other flowers in the assortment or on the total likelihood of purchasing at this store. Neither is it possible to know the separate effect of carrying 12:Red Dianthum versus carrying the two Irises. In contrast, the choice experimental results disentangle the contribution of each separate item to the total sales. It furthermore allows the prediction of item shares and purchase likelihood from any assortment,

as demonstrated for assortments Ia and Ib. If the extended logit model is used instead of the regular MNL, different predictions result for item shares and total sales volume. For example, in assortment Ia the predicted total sales is half a percent less than if the extended logit model is used. Moreover, the share for dianthums is predicted to be higher. The effects observed for assortment Ib indicate that, though in this case the extended model predicts the same sales volume, the retailer should stock less roses and more tulips.

As another example of an assortment problem we take the case of assortment IIa, which is one of the possible assortments that our retailer ponders. Assortment IIa carries six items: 2:Red Roses, 3:White Roses, 6:Red Tulips, 10:Blue Irises, 12:Red Dianthums and 13:White Dianthums. Our retailer• s major worry for this assortment is that 3: White Roses substitute with 2:Red Roses and similarly, that 12:Red and 13:White Dianthums are such close substitutes that the sales effect of the assortment size extension is minimal whereas the handling and inventory costs may have increased. Furthermore there may be a fear that having only one type of Iris will make the Iris flower category go unnoticed. As demonstrated in our example, the extended logit model estimated for this application indicates that substitution among these flowers does occur, however not to a large extent. As can be seen in Table 4.5, the MNL and the extended logit predictions of shares of flower items and of total purchase likelihood differ a few percentage points. The difference between both models' results may seem small, but it can still have a large impact on profits. It should also be noted that in other applications larger deviations easily may occur.

Finally, the model results can be used to select an optimal assortment. As an example we again focus on assortments consisting of six items. If we assume all SKU's to have identical margins and cost structures, and hence, (relative) prices, the parameters in the simple MNL can be used directly to compose the optimal assortment. This assortment (IIb) would consist of the six items with the largest constants in the model (2:Red Large Roses, 4:Red Small Roses, 5:White Small Roses, 6:Red Tulips, 12:Red Dianthums, 14:Red Lilies, 16:White Freesias). It would increase the predicted purchase likelihood from 90 to 94 percent. Though the procedure is a little more complex, the extended logit model can be used in a similar fashion to derive the optimal assortment. It involves that for each alternative two utilities are calculated, one for the case where the alternative is the sole

Table 4.5 *Simulation results for various assortment compositions (Probabilities predicted using the MNL and extended logit models).*

Category		Item	Assortments with four items				Assortments with six items			
			IA		IB		IIA		IIB	
			MNL	Extended	MNL	Extended	MNL	Extended	MNL	Extended
Roses, large	Red	V2	.242	.209	.336	.278	.199	.154	.135	.106
	White	V3					.141	.117		
Roses, small	Red	V4							.161	.144
	White	V5							.147	.150
Tulips	Red	V6	.204	.179	.283	.320	.168	.202	.114	.122
	Yellow	V7	.170	.149						
Chrysanthemums	Pink	V8								
	Yellow	V9								
Irises	Blue	V10			.132	.175	.078	.095		
	White	V11			.101	.078				
Dianthums	Red	V12	.276	.350			.227	.249	.154	.177
	White	V13					.093	.085		
Lilies	Red	V14							.080	.073
	Yellow	V15								
Fresias	White	V16							.142	.169
None		V0	.057	.075	.079	.100	.047	.063	.032	.038
Alternative store		V1	.051	.037	.070	.049	.047	.035	.034	.022
Probability of purchase in this store			**.893**	**.888**	**.851**	**.851**	**.906**	**.902**	**.934**	**.940**

representative of the category and one for the case where both alternatives are present in the assortment. In our present application this procedure leads to a similar advice regarding the optimal assortment derived from the MNL. This will not be true in general however. Note furthermore that our models imply different numbers of items to stock for the different items. Finally, if different cost structures and margins were allowed, then other optimization techniques, such as linear programming, need to be used to derive the optimal design size and composition. In general, this will lead to different assortment solutions.

4.9 Conclusions and discussion

The assortment forms an important component of the retail mix together with other distributive services, such as store ambience. In addition to mere product preference, consumer choice of store and item is influenced by distribution services that jointly constitute the retail context. This chapter adopted a comprehensive formalization of the relationship between consumer need for distribution services and retail demand and operationalized distribution services with respect to consumer choice using insights from cognitive psychology. It specifically investigated the relationships between three retail context variables with respect to store and item choice: assortment composition, i.e., the availability of specific items and their prices, store ambience, and consumers' consumption goals.

This chapter argued the usefulness of choice experiments and extended logit models for modeling consumer decisions regarding the selection of items and assortments. Choice experiments allow the researcher to control the composition of the assortments for which responses are collected. In addition, they allow control over the decision context in terms of for example purchase goal, store ambience, and the availability of competing stores and their characteristics. The extended logit model allows the researcher to model and gain insight into the substitution patterns within and among the assortments that are studied, which can be either categories or total stores. The combined use of choice experiments and the extended logit model methods thus allows a full-fledged operationalization of the conceptual framework regarding assortments and distributive services that was developed by Betancourt and Gautschi (1990, 1992).

The approach was demonstrated in an application to modeling consumer choices from and among cut flower assortments in florist stores. For this product category various hypotheses regarding substitution patterns and effects of distributive service characteristics were empirically tested. With respect to store characteristics it was found that in-store decisions of customers about whether to purchase at the present store, at a competing store, or to not purchase at all, are not much affected by the ambience or choice range expected for the competing store, nor by the travel distance to that store (H1). We also found no evidence that these decisions are affected by the ambience of the store in which the decision is made (H2), and no interaction between the current and the competing store's ambience (H3), even though our manipulation checks the manipulations to be successful. We did find however an effect of the size of the assortment in the present store on the likelihood of walking out to the other store (H5). That is, the constants for the various items were significant whereas the parameter that we included in the model to capture overall substitution within the current assortment was not significant. Within the model that was used this indicates that an increase in assortment size attracts additional purchases proportional to the attractiveness of the items added. Once a consumer has entered the store the present assortment, if large enough, thus constitutes a powerful force that induces consumers to purchase. A store's drawing power is in particular at jeopardy if a competing store is located nearby and the store's own ambience is poor. We furthermore found that the availability of a competing store differentially affected the purchase likelihood of the items in the current store. With respect to the model presented in chapter 3 (figure 3.1), which extends beyond the scope of the study reported in this chapter, we conclude that the presented retail assortment influences consumers' purchase decisions for cutflowers to a large extent. Store ambience as well as store accessibility have only limited influence on purchase decisions.

With respect to assortment composition we found evidence that different color flowers of the same variety act like substitutes (H4), but not for all varieties. We found for example that different color tulips act very much like substitutes, whereas white and red roses are not substitutes at all. We were also able to test for differential price cross effects within flower types (H6), but found that none of the price cross effects was significant; hence, we conclude that there was no differential price substitution within flower types. We finally were able to demonstrate

asymmetric dominance effects. In most cases we found that red flowers dominated yellow or white flowers, meaning that if a red flower is added to an assortment that contains a white flower of the same type, the sales for the white flower go down, but that the reverse is not true. Comparison of results for the two consumption goals revealed substantial differences in purchase likelihood and cross effects between choices as a gift and for own use (H7, see also figure 3.1). We for example found that the own use sample is most likely to buy red dianthums, whereas the gift sample most often buys red roses. We readily admit that the test of this last hypothesis was only quasi-experimental, we leave it for follow-up research to further test for differences in preference arising from differences in purchase goal. This chapter at least shows how one in principle can manipulate purchase goal through choice experiments.

There are several possible explanations for not finding an ambience or travel time effect. One concerns the nature of our application and consumption goal; we analyzed the effects of store characteristics on decisions regarding the intended purchase of cut flowers for own use only. Store characteristics may be more relevant for impulse purchases and for more deliberate purchases, and also for purchase goals that evoke higher levels of involvement, such as gifts.

Another possible explanation for finding insignificant effects for most store characteristics is sample heterogeneity. Capturing heterogeneity is one issue to explore in further analyses of this data, for example by including socio-demographic or purchase history variables in the model or by estimating heteroscedastic extreme value models. Pursuing such types of analysis however was not the focus of the present chapter. A final explanation could be that our manipulations of ambience and competing store choice range and distance diluted over de course of the choice tasks. Note that our manipulation checks confirmed that the stores' ambience and the competing store's choice range were perceived as assumed. The checks however were not repeated after the choice task had been completed, so we cannot be sure that the manipulation was equally effective for all the choice sets. In next applications attempts should be made to control for this.

It needs little explanation that models as developed here are of much interest to retail managers. Models like this provide a powerful tool to support the optimization of retail assortments. The models allow simulations of assortment compositions and store repositionings in varying competitive scenarios. The models

can help to predict the effects of changes in retail mix elements on customers' purchase behavior. The model parameters give insight into the patterns of substitution and asymmetric dominance. Model simulations of different retail merchandise strategies can help to investigate the effects of assortment composition on category shares and purchase likelihood. If the costs of carrying the different product items are known, optimization models could complement the use of the proposed approach to determine optimal assortment size and composition, and consequently maximize total return and minimize duplication.

The approach obviously also has its limitations however. Many of these are issues to focus on in future research. One is to further conceptualize and operationalize the possible purchase conditions, and to develop a refined sampling frame of purchase conditions. As demonstrated, an important aspect of the approach is that it allows one to specifically define the choice task in terms of the assumed purchase conditions. In the end however one will wish to generalize the results and use the models to predict for example total sales across all purchase conditions. Another issue is preference heterogeneity, which may be accommodated by proper segmentation as noted. Third, the external validity might be enhanced, though there is accumulating evidence already that experimental choice methods allow very precise real market predictions (after rescaling the parameters to be in accordance with the error level of the model when used to make predictions for the target market of interest). Finally, the approach we presented was limited in the respect that we analyzed single choices of single components. Designing experiments and developing models to study quantities purchased, multiple purchases, or bundles of items seems to be a logical next step in this area.

Part III:
Retailer Distribution Service Provision and Consumer Satisfaction/Dissatisfaction Formation

Chapter 5

Supplier Determinants of Consumer Distribution Service Evaluation

5.1 Introduction

Every firm wants to satisfy and retain its customers. Satisfied customers are likely to continue their relationship with the firm, and they require less marketing effort than new customers. They are inclined to purchase more and acquire new customers through positive word-of-mouth (Reichheld and Sasser 1990). Customer satisfaction has a significant impact on profitability; it is central to assessing the past performance of firms, and to predicting their future financial success (Anderson and Fornell 1994). The present part of this book investigates the role of retailer distribution service provision in consumer postpurchase evaluation and satisfaction formation. More specifically, it relates determinants of supplier distribution service provision and actual distribution service performance indicators to consumer evaluations of the shopping experience and of the products purchased.

Retailers influence their customers' perceptions of product and service quality through the physical products they sell, the service they deliver, the prices they charge, their promotions, as well as the whole range of physical evidence they show in their stores. Retailer distribution service provision often is related to the sale of a physical product and consequently influences a consumer's evaluation of an exchange episode through experience with both the physical product and the associated service, as has already been argued in chapter 2. A retailer should therefore ask herself how she influences consumer perceptions of product and service quality and what impact her logistics operations have on consumer service

perceptions and ultimately on satisfaction/dissatisfaction. Related questions include "to what extent are consumers' perceptions of distribution costs affected by retailer behavior," and "are retailers able to make up for low service levels provided by their supplier?"

Most studies on consumer satisfaction/dissatisfaction use measures of consumer perceptions of, often experimentally manipulated, product performance attributes. Research on retailer performance on the other hand concerns mostly real-life behavior and is usually assessed through SERVQUAL-related measures (Parasuraman, Zeithaml, and Berry 1988), that predominantly consider consumer perceptions of contact personnel service performance. During a service encounter customers only experience performance of the service provider's front-office, whereas a service provider would be interested in the effects of front *and* back-office service performance on customer evaluation. Insight into the causes of consumer satisfaction/dissatisfaction with their retailer's offerings and subsequent improvement of retailer distribution service provision cannot be obtained from consideration of consumer perceptions of specific aspects of retailer service encounter performance only. The antecedents of consumer satisfaction/dissatisfaction should therefore include other measures of the process and outcomes of retailer service provision, such as variables relating to retailer decisions, and objective assessments of service performance.

This chapter adopts a broad perspective on consumer satisfaction/ dissatisfaction with retail performance and focuses on supplier, in particular retailer, distribution service-related determinants of consumer perceptions of service and product performance, and resulting consumer satisfaction/ dissatisfaction. A study has been done among retailers and their customers in which the three conceptual approaches to distribution service that were discussed in chapter 2, i.e., distribution service as logistics system performance, the economic approach, and distribution service as a behavioral concept, were brought together as antecedents of consumer satisfaction/dissatisfaction. Data collection has been done among retailers and their customers in a real-world market. Through decomposition of the data into consumer and retailer effects using multilevel regression analysis the research model has been estimated and the impact of retailer and consumer variables in consecutive stages of consumers' evaluation processes could be assessed.

The chapter proceeds as follows. First, in 5.2 the theory on consumer satisfaction/dissatisfaction formation as a result of distribution service evaluation, including perceived product and service performance as its antecedents, is reviewed briefly and the consumer model is developed. The concepts discussed in this section represent mainly the behavioral approach to distribution service, as described in chapter 2[1]. Section 5.3 discusses the retailer model, i.e., determinants of supplier distribution service performance and their potential impact on consumer perceptions of product and service performance. Next, 5.4 presents the design of the study, datacollection, and measurement. Data analysis is done in 5.5. Finally, section 5.6 discusses and concludes the results of the study.

5.2 Consumer distribution service evaluation and satisfaction formation

Studies on consumer satisfaction/dissatisfaction generally adopt the disconfirmation of expectations paradigm which describes the psychological process underlying consumer satisfaction formation. This section discusses the disconfirmation of expectations paradigm and adapts it to fit analysis of the role of distribution service provision in consumer satisfaction formation.

5.2.1 Consumer satisfaction/dissatisfaction

Satisfaction has been stated to result from "processing the affect in a consumption experience" (Hunt 1977; Mano and Oliver 1993; Yi 1990). Spreng, MacKenzie, and Olshavsky (1996) argue that overall satisfaction is "an affective state that is the emotional reaction to a product or service experience". Accordingly, feeling-related items have been included in scales measuring CS/D. Mano and Oliver (1993) mention that "...the adjective 'satisfied' has been found in studies that assess pleasantness or other positive emotions...". Several empirical studies found significant correlations between measures of feelings and satisfaction (e.g., Westbrook 1987; Westbrook and Oliver 1991).

[1] For more details the reader is referred to chapter 4, section 2.3 and chapter 2, figure 2.1.

Cognitive judgments on product attributes (e.g., Oliver 1980) or product relevance (e.g., Mano and Oliver 1983) precurse consumer satisfaction/ dissatisfaction. The dominant paradigm of satisfaction/dissatisfaction (hereafter referred to as CS/D) formation - the disconfirmation of expectations model - specifies that CS/D results from a comparison of expectations concerning the quality of consumption, with the actual consumption experiences (Oliver 1980). The model assumes expectations are used as a standard against which experiences are compared, with satisfaction or dissatisfaction as an outcome. In course of time substraction of expectations and experiences as a measure of disconfirmation has been replaced by direct measurement of perceived disconfirmation of expectations as a separate construct that mediates the effects of expectations and perceptions of performance on consumer satisfaction/dissatisfaction. The model has been used widely for analysis of CS/D with goods as well as services after a single purchase and/or usage experience (cf. Churchill and Surprenant 1982; Oliver 1980), as well as for the analysis of CS/D processes over multiple service encounters or transactions, for example in a retailing context (Oliver 1981).

5.2.2 Consumer perceptions of retail performance

According to the disconfirmation of expectations model of CS/D formation perceived product performance is an antecedent of CS/D. With respect to distribution service provision and associated retail performance chapter 2 already argued that distribution service provision may affect both product and service quality. Whether or not a firm considers production and sale of physical products as its core business, the service encounter may have a significant impact on total customer experience. Since publication of Parasuraman, Zeithaml and Berry's (1985) conceptual model of perceived service quality the concept is generally considered a customer's attitude or global judgment on service superiority or excellence. Perceived quality has been treated in the literature as a cognitive-based evaluation of service excellence, resulting from evaluation of the so-called get-components or the benefits a consumer receives from consumption of a good or a service. The literature on perceived product quality focuses predominantly on consumers' prepurchase quality judgments. Due to the characteristics of services,

such as intangibility and simultaneity of production and consumption, services possess relatively many experience and credence attributes and relatively few search attributes and prepurchase evaluation is relatively difficult (cf. Zeithaml 1981). Accordingly, the literature on perceived service quality has focused almost exclusively on postpurchase and postconsumption evaluation. From an operational point of view perceived service quality has been defined as the difference between a consumer's expectations and perceptions of service performance (e.g., Parasuraman, Zeithaml, and Berry 1988), where expectations serve as a benchmark against which service performance is evaluated. Note the similarity to the perceived disconfirmation of expectations concept.

The causal relationship between perceived service quality and consumer satisfaction/dissatisfaction (CS/D) has caused some confusion among researchers and has received considerable attention in literature. Fisk, Brown, and Bitner (1995) indicated the ambiguity between CS/D with services and perceived service quality by stating that "...researchers do not share common definitions of the terms, nor is there clear understanding of how the two relate." However, perceived product quality and perceived service quality are equivalent to the product or service evaluations used in disconfirmation of expectation models (e.g., Mano and Oliver 1993; Oliver 1980) as an antecedent of CS/D. Several studies (Woodside, Frey and Daly 1989; Iacobucci, et al. 1996; Reidenbach and Sandifer-Smallwood 1990) already indicated that perceived quality is an antecedent of CS/D. Consumer perceptions of distribution service performance that express itself through perceptions of product and service quality will therefore be considered as an antecedent of CS/D in the present study.

5.2.3 The role of consumer expectations in CS/D formation

The role of expectations in both quality formation and measurement and consumer satisfaction/dissatisfaction is still somewhat ambiguous. Both the dominant framework for perceived service quality and the expectation- disconfirmation framework assume that a customer is both motivated and able to form prior expectations, and is motivated and able to compare these with subsequent experiences. Several studies did not find a significant effect of expectations on

CS/D. Oliver and DeSarbo (1988) found that the most dominant process in CS/D formation was based on experiences and disconfirmation of expectations, see also, e.g., Churchill and Surprenant 1982, and Oliver and Bearden 1983. Measurement of perceived service quality using SERVQUAL has lead to similar results, which motivated development of a new instrument, SERVPERF (Cronin and Taylor 1992, 1994), based solely on measurement of performance perceptions. The disconfirmation of expectations model does not take into account the fact that a specific firm is competing for the consumer's attention with other firms that exist in a market. Rigid application and interpretation of the 1-period, static expectation-disconfirmation model would encourage managers to lower customer expectations as much as possible, just above the level where customers will decide not to enter the service encounter. The implausible result of such actions would be, according to the model, maximization of positive expectation-disconfirmation as well as satisfaction. Spreng, MacKenzie, and Olshavsky (1996) solve for the inconsistencies of the expectation-disconfirmation model by adding desires congruency in addition to expectations congruency as a separate intermediate concept preceding satisfaction. After all, low expectations together with low perceived performance do not lead to satisfied customers when the product does not perform as desired.

One explanation for the changing role of expectations in both quality and CS/D measurement is given by the occurrence and nature of assimilation processes (e.g., Pieters, Koelemeijer, and Roest 1995). The standard disconfirmation of expectations model assumes that expectations and experiences are independent constructs that do not mutually influence each other. Expectations thus are not assumed to have a direct impact on experiences and vice versa. Expectations act as a comparison standard in the formation of CS/D in a direct and negative way, since for a certain level of experiences, customers with high expectations will be less satisfied than customers with low expectations (Oliver 1980). Assimilation theory (Hovland et al. 1957) specifies that people dislike to experience discrepancies from their previously held positions or opinions, and therefore assimilate their interpretations of events and their experiences in the direction of their previous positions.

Forward assimilation occurs when expectations influence CS/D by affecting the level of experiences of customers. The impact of expectations in case of forward

assimilation is indirect and positive, since the higher the expectations are, the higher the experiences will be. Through forward assimilation, increased expectations will lead to increased experiences with the service and consequently putting effort into increasing customer expectations would pay off to the point where they become credible. Consumers tend to rely on the consumption experience itself when the experience is unambiguous, and tend to rely on prior hypotheses when the experience is ambiguous (Hoch and Ha 1986). It is therefore likely that forward assimilation is stronger for services with many credence attributes, or where the experiences are rather ambiguous, than for services with many search attributes and where experiences are rather unambiguous.

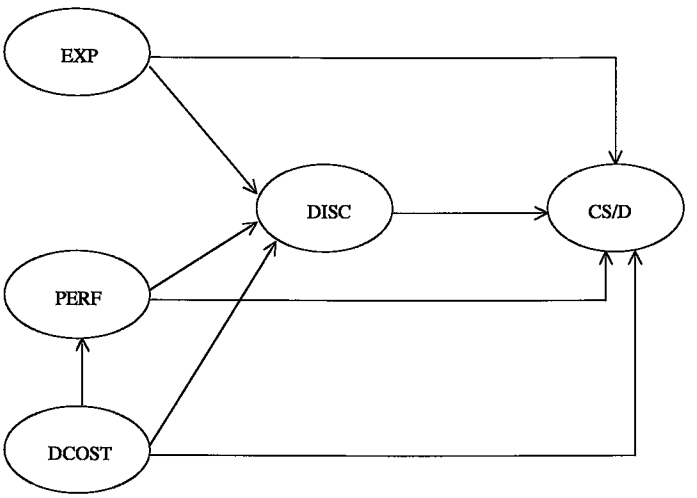
The disconfirmation of expectations model implies that people are able to recall their prior expectations correctly once the outcomes of an event, for example a service encounter, become known. However, people are often unable to remember their expectations of the outcomes of an event correctly once the outcomes of the event become known (Christensen-Szalanski and Willham 1991). A consumer may have no correct recall of his or her prior expectations, for example when he or she finds it difficult to form prior expectations, or when the experience deviates largely from prior expectations. In those cases recalled expectations may be used as the comparison standard instead of, or in addition to, prior expectations, or influence CS/D directly. This backward assimilation effect on CS/D is similar to what is known as hindsight bias (Fishhoff 1975).

Several causes can be pointed out for finding an insignificant effect of prior quality expectations on CS/D in empirical studies. Consumers may use recalled expectations as a basis of comparison instead of prior expectations. In addition, when expectations are measured in hindsight, as is done in most SERVQUAL applications, a significant effect of expectations may be found although prior expectations do not relate to the outcome. Expectations may drive experiences, resulting in almost equal measurement scores for expectations and perceived performance. Finally, continuous adaptation of expectations over time, for example as a result of frequent consumption of goods and frequently encountered services (Oliver 1981) will lead to strongly reduced disconfirmation of expectations and consequently CS/D will be most likely driven dominantly by experiences (Cronin and Taylor 1992), with more positive experiences leading to more satisfaction and more negative experiences leading to more dissatisfaction. In that case, CS/D is

likely to become less extreme with low expectation-disconfirmation, leading to less extreme satisfaction in the case of positive disconfirmation, and less extreme dissatisfaction in the case of negative disconfirmation.

5.2.4 The consumer model

The consumer model of CS/D formation that will be used in the present study is presented in figure 5.1. Expectations and perceptions of retailer performance, together with perceived disconfirmation of expectations have been modeled as antecedents of CS/D. Given the effect of distribution service on reducing consumers' cost of product acquisition as mentioned in chapter 2, consumers' perceptions of distribution-related cost have been included in the model as an antecedent of perceived service performance and perceived disconfirmation of expectations. By definition retailer distribution service provision is related non-positively to consumers' distribution-related cost. In particular logistical service provision by a retailer lowers consumer distribution-related cost. Cost reduction, although preceded by actual service provision, is a benefit of service provision that is experienced by consumers. Consequently, distribution cost perception is an antecedent of consumer perception of distribution service performance. In addition, perceived distribution-related cost represents the sacrifices consumers make in obtaining the product and are therefore proposed to directly affect both disconfirmation of expectations and CS/D.



EXP	Expected retailer performance
PERF	Perceived retailer performance
DCOST	Perceived distribution-related cost
DISC	Perceived disconfirmation of expectations
CS/D	Consumer satisfaction/dissatisfaction

Figure 5.1. Consumer-level model of CS/D with retail performance

5.3 Determinants of retailer distribution service performance

The introduction to this chapter as well as chapter 2 argued that a retailer's and her supplier's distribution service provision affect the quality of the goods and pure services delivered by the retailer. This section discusses three major sources of a retailer's distribution service performance. Following Betancourt and Gautschi (1990) each retailer faces a strategic choice with respect to the consumption goals and consumer tastes to be catered. Decisions on distribution service provision thus result from a retailer's strategic orientation. In addition to the retailer's strategic choice two other determinants of distribution service provision deserve attention that relate to the retailer's actual provision of adequate distribution service. The quality of the relationship between channel members, e.g., a retailer and her

supplier, is an important determinant of commitment and cooperation. Consequently, it might affect the retailer's service delivery process and ultimately the quality of distribution services a retailer provides to her customers. Finally, distribution service performance is influenced by the provider's physical distribution system according to the logistics system view on distribution service that was discussed in chapter 2. Supplier distribution service provision indirectly affects retailer distribution service provision through its influence on physical product quality and retailer distribution cost, and exerts a direct influence on retailer distribution provision through the interrelatedness of supplier and retailer physical distribution systems. As a well-known example of the latter, if a supplier does not deliver reliably, his customer may in turn not be able to provide reliable delivery or only at a high cost. This section discusses the three determinants of retailer distribution service performance mentioned above and develops hypotheses concerning their effects on consumer satisfaction formation.

5.3.1 Retailer strategic orientation

A retailer has to make a strategic choice concerning distribution service she plans to provide. Given the consumption activities the retailer caters her decisions on the appropriate service package are influenced by factors such as the characteristics of the consumption goals aimed at by consumers, consumers' heterogeneous tastes, competing retailers' service provision, characteristics of the goods carried, and the costs involved in service provision. Distribution service forms an important aspect of retailer positioning. For example, a retailer who aims at providing excellent service will focus on expertise and communicative skills in personnel selection, while a cost-oriented retailer will put a stronger emphasis on efficiency. In the research reported in this chapter the retailer's actual strategic choice is considered exogenous, as opposed to the research presented in chapters 6 and 7.

While most strategy typologies have been developed for manufacturing firms (e.g., Porter 1980), Wortzel (1987) distinguished three generic retailer competitive strategies that seem very useful for the research under focus in this chapter. The three strategic dimensions are price leadership, defined as "consistently offering lower prices than competitors," merchandise differentiation or "offering an

assortment of unique products," and service and personality augmentation or "providing convenience, product advice, or an especially attractive setting". Note that the two latter strategies match elements of distribution service as defined in chapter 2. Smith, Venkatraman, and Wortzel (1995) adopt Wortzel's (1987) classification of retailer strategies, with the exception of "service and personality augmentation", and argue that retailer competitive strategy drives retailer actions, as well as retailer perceptions of manufacturers' supporting activities. They found that retailer and manufacturer activities together influence retailer performance relative to competition in terms of profitability and sales.

In the study conducted for this chapter all three strategic dimensions as suggested by Wortzel (1987) have been considered. As will be shown in the methodology section the specific application under focus - specialized retailing of cut flowers - favored joining the merchandise differentiation and service and personality augmentation strategies into one distribution service strategy dimension. This dimension represents distribution service provision, i.e., assortment vs. information provision, location, delivery, and ambience. Retailers following a service strategy will be oriented towards consumer service needs and consequently perform better on distribution service provision than retailers following a low-price strategy. The associated hypothesis is therefore:

Hypothesis 1a *Retailer strategic service-orientation is related positively to consumer perceptions of distribution service performance.*

A consumer's distribution cost is by definition influenced by retailer distribution service provision. Retailer strategy will therefore lead to differential cost perceptions by consumers:

Hypothesis 1b *Retailer strategic service-orientation is related negatively to consumers' perceptions of distribution-related cost.*

5.3.2 Retailer-supplier relationship

Trust is an important concept pertaining to a firm's attitude towards a specific supplier. A channel member trusts another channel member if he firmly beliefs that "the trustworthy party is reliable and has high integrity" (Morgan and Hunt 1994). When a relationship between two channel members is characterized by high levels of trust both parties can allow themselves to focus on the long-term aspects of their relationship instead of worrying about the other party's opportunistic behavior (Doney and Cannon 1997; Ganesan 1994; Noordewier, John, and Nevin 1990). This will lead to lower transaction costs and increased competitiveness. Credibility and benevolence are the two determinants of trust (Ganesan 1994), where credibility refers to the belief that the trading partner is a reliable expert in conducting transactions with, and benevolence reflects the partner's genuine interest and motivation in joint business. According to Morgan and Hunt (1994) behavioral intentions or the willingness to act are considered an outcome or a potential indicator of trust that would be appropriately included in a measure of trust.

Trust in a supplier influences buyer cooperation (Morhan and Hunt 1994, Schurr and Ozanne 1985) and effort (Anderson, Lodish, and Weitz 1987), while it reduces conflict and increases channel member satisfaction (Anderson and Narus 1990). Overall, trust affects a buyer's commitment to a relationship (Anderson and Weitz 1992; Geyskens et al. 1996; Moorman, Zaltman, and Despande 1992; Morgan and Hunt 1994). For an overview of trust in a distribution channel context see for example Doney and Cannon (1997).

Reve and Stern (1986) developed a broad behavioral concept related to trust, i.e., transaction climate, which is defined as "a set of sentiments and behaviors that characterize the exchange". Underlying transaction climate are goal compatibility, domain consensus, evaluation of accomplishment, and norms of exchange. Reve and Stern argue that the less conflictive the climate is, the higher performance is likely to be, despite discussion in the literature about the functionality of conflict. Based on Williamson's (1975, 1979) transaction cost theory argument that transactions are less costly to complete when exchanges take place in an atmosphere of trust and commonality of purpose, they hypothesized that a more favorable transaction climate would lead to higher economic performance of the members of

retailer-wholesaler interfirm dyads. Their study did however not generate convincing empirical evidence in support of this hypothesis.

In a close buyer-seller relationship transaction cost benefits can be realized not only because less effort is required in order to complete an exchange, but also because a supplier will provide distribution service that better fits the retailer's needs. A closer relationship implies better communication and cooperation and consequently supplier service provision will be better adapted to the retailer's needs and likely even the retailer's customers' needs. In addition, a retailer can translate her (transaction) cost benefits into improved service provision to her customers. This will affect consumers' satisfaction formation through perception of distribution service performance and distribution-related cost and can even extend beyond service provision and influence disconfirmation of expectations. The associated hypotheses are therefore:

Hypothesis 2a *A retailer's trust in her main supplier is related positively to her customers' perceptions of distribution service performance.*

Hypothesis 2b *A retailer's trust in her main supplier is related negatively to customers' perceptions of distribution-related cost.*

Hypothesis 2c *The level of retailer trust in her main supplier is related negatively to positive disconfirmation of consumer expectations.*

5.3.3 Retailer distribution system performance

A retailer's logistics operations play a crucial role in distribution service provision, since logistics operations affect almost every distribution service element, including the assortment, through lead times and inventory level, information provision, delivery at the right time, and quality maintenance. Chapter 2 argued that logistics performance indicators may be important for system control, but give insufficient information to gain insight into customer evaluation of distribution service. The limited relationship between logistics performance indicators and customer perceptions was confirmed by Koelemeijer, Lemmink and Wetzels (1994). They

investigated the causal relationship between two objectively measured logistics performance indicators, i.e., fill rate and lead time deviation, and subjective measures of service performance, for contact persons of 117 international customers of a large, multinational, Dutch-based brewery. The logistics performance indicators showed only significant relationships with nonpersonal, "technical" dimensions of perceived service performance. The same article mentions that in another similar study among customers of a Dutch manufacturer of food products a significant relationship was found between fill rate and customer evaluation of transportation only, while the percentage of backorders did not have a relationship to customer evaluation at all. These studies however were focused on manufacturer-distributor relationships and used common logistics performance indicators that were related to delivery time and inventory positions. The study that was done for this chapter analyzes retailer-consumer relationships, using logistics performance indicators that have been designed for the particular study. Given the definition of distribution service in chapter 2 and the resulting link with logistics operations the hypotheses are:

Hypothesis 3a *Retailer logistics performance relates positively to perceived distribution service performance.*

Hypothesis 3b *Retailer logistics performance relates negatively to consumer perceptions of distribution-related cost.*

5.4 Methodology

The research application focuses on fresh cut flowers sold through specialized florists' outlets in. Both the physical product and distribution channels for fresh cut flowers possess a number of characteristics that suit analysis of distribution services particularly well. Since chapter 4, section 5 already mentioned the characteristics of fresh flower distribution additional relevant characteristics will be discussed very briefly here. Flowers are distributed as heterogeneous, perishable, unbranded and unpackaged products, whose prices vary daily. The only product labels available to the final consumer are the name of the flower variety, the retailer's name, and

possibly the auction name on the flower container. For wholesalers and retailers who purchase at the auction, quality information supplied by the auction and the producer's name are the only available labels. Product and retailer performance will therefore be interwoven in the consumer's mind and the retailer plays an active role with respect to both product and service performance. This translates into high customer loyalty; over 70% of the consumers that were interviewed for purpose of the current study had bought for more than three years in succession at that particular florist's.

5.4.1 Datacollection

The research approach followed used a nested design with multiple customer interviews per retailer. Retailer interviews were conducted first. A proportionally stratified sample was drawn from a database, consisting of over 8,000 outlets in The Netherlands that sell fresh cut flowers, which had been made available by the Flower Council of Holland. The retailers in the database differed greatly with respect to the outlet through which they operate - e.g., either through a store, on open air markets, or even selling from their own home - and the nature of their business, e.g., both specialized florists, supermarkets, gasoline stations, and gift shops were included in the database. Since the research focuses on specialized florist stores and the database did not provide any information on retailer type telephone interviews were held with the retailers in the sample. A retailer was considered qualified for the research if she operated a store specialized in selling flowers and pot plants with regular and fixed opening hours. From a final sample of 300 florist owners or managers selling through specialized stores 205 (68.3%) were interviewed personally.

When all interviews with retailers had been completed, their customers were interviewed. Interviewers were randomly allocated to four-hour time blocks during a three-week period in which no holidays occurred and that were scheduled proportionally to nation-wide flower sales throughout an average week, e.g., far more interviews were held on Friday and Saturday than on Monday and Tuesday. Central for the study were postpurchase interviews that were conducted with 1197 consumers who bought cut flowers after leaving a florist's that participated in the

study. In addition, 251 consumers were interviewed before entering a store. Ninety-five percent of them made a purchase in the store: 207 (82.5%) consumers bought fresh cut flowers, 29 (11,6%) bought a houseplant, and 3 (1.2%) bought another product. The 207 consumers who bought cut flowers were interviewed once again immediately after leaving the store. Accordingly, a total of 1404 postpurchase interviews were completed. Since analysis of the data elaborates on the nested research design only retailers with three or more interviewed customers were retained. In addition, the multilevel regression analysis software package used to analyze the data (ML3) does not allow missing values at the retail level. Therefore, retailers with one or more missing values with respect to the constructs used in the analysis were removed. This lead to a final sample consisting of 154 completed retailer interviews and 1210 matching, completed consumer postpurchase interviews that were input for statistical analysis.

5.4.2 Consumer construct measurement

The consumer constructs that have been measured for the study include consumer satisfaction/dissatisfaction, perceived disconfirmation of expectations, perceived distribution service performance, and perceptions of distribution-related cost. Table 5.1 presents an overview of the characteristics of the consumer constructs measured in the postpurchase interviews.

Perceived distribution service performance. Perceptions of distribution service performance were measured on a 16-item 7-point Likert-type scale, ranging from "Totally disagree" (1) to "Totally agree" (7), similar to SERVQUAL (Parasuraman, Zeithaml, and Berry 1988). The items referred to the distribution service dimensions mentioned in the previous chapter, i.e., assortment, availability of information, accessibility of location, delivery at the right time and in the right form, and ambience, and the personal interaction dimensions represented in the SERVQUAL scale. The latter have been modified to suit the particular retail service encounter under focus. The final 16 scale items were retained from a pool of 102 items generated through literature search and consumer interviews. First, 225 consumers who were frequent buyers of fresh cut flowers rated item importance on a three-point scale and rated item determinance as the extent to which their regular

florist's performance on each service item matched their expectations. The scale was purified through elimination of the items that were unequivocally considered to be least important. Factoranalysis revealed five factors, i.e., personal interaction and ambience, product quality maintenance, information and expertise, presentation and layout, and assortment. Next, a new group of 150 consumers rated their regular florist's service performance on the important and determinant items that resulted from the previous stage. The results of this datacollection procedure yielded the three-factor 16-item scale that was used in the study. The dimensions were labeled personal interaction and ambience, product quality and presentation, and information. The seven items for the personal interaction and ambience dimension include items from the SERVQUAL responsiveness, assurance, and empathy dimensions, such as "The salesperson gave personal attention" and "The store had a pleasant ambience". The product quality and presentation dimension consisted of six items, including for example "I think these flowers are fresh," and "These flowers have been wrapped nicely". The information dimension consisted of three items, including "The salesperson was knowledgeable," and "I was given much information on treatment of cut flowers". A subsample of consumers was interviewed immediately before entering the florist's store and answered questions on prepurchase expectations using the same 16 items that were rephrased to allow expectations ratings.

Perceived distribution-related cost. Consumers' perceptions of distribution-related cost were measured on a 4-item, 7-point Likert-type scale. The items covered the distribution-related cost categories presented in chapter 2; the effort made to reach the store, search effort made in order to find flowers suited for the purchase goal, adjustment costs due to the store's present assortment, and psychic costs due to irritation while in the store.

Perceived disconfirmation of expectations. Expectations disconfirmation was measured on a two-item, 7-point Likert-type scale ranging from "Much worse than expected" (1) to "Much better than expected" (7). The items concerned the store's service and the store's cut flower offerings. Only 51 respondents (4.2%) experienced negative disconfirmation of expectations, i.e., had scale values below 4, and 595 (49.2%) consumers did not experience any disconfirmation, i.e., their scale value was exactly 4.

Consumer satisfaction/dissatisfaction. Overall satisfaction/dissatisfaction was measured as the overall evaluation of the entire in-store purchase experience for this single transaction. One item reflected overall satisfaction on a 5-point scale ranging from "Very dissatisfied" (1) to "Very satisfied" (7). The remaining two items emphasized affect by asking the consumer for his or her postpurchase feelings on 5-point scales ranging from "Very Unpleasant" (1) to "Very pleasant" (5) and "Very disappointed" (1) to "Very pleased" (5).

Table 5.1 *Overview of postpurchase consumer constructs.*

Consumer construct:	Items	Mean	St. Dev.	Cronbach's α
Consumer satisfaction/dissatisfaction	3	4.50	.63	.886
Perceived disconfirmation	2	4.86	1.18	.869
Perceived distribution service performance	16			.874
Personal interaction and ambience	7	6.46	.67	.892
Product quality and presentation	6	6.45	.59	.724
Information	3	5.49	1.20	.712
Perceived distribution-related cost	4	1.45	.76	.516

5.4.3 Retailer construct measurement

Retailer constructs that have been measured in the study are strategic orientation, trust in retailer's main supplier, and several indicators of the retailer's distribution system and activities. Table 5.2 presents an overview of the characteristics of retailer constructs that will be discussed consecutively in this section.

Retailer strategic orientation. Retailer's strategic orientations were measured using a slightly modified version of Wortzel and Venkatraman's (1991) scale for retailer competitive strategies. The modifications concern mainly product differences, i.e., cut flowers are an unbranded product, and addition of items concerning retailer service provision. The final scale consisted of 18 items that were rated on a 7-point Likert-type scale, ranging from "Totally disagree" (1) to "Totally agree" (7). Thirteen items related to distribution service, and five related to price

leadership. Sample items from the original scale are "We emphasize well-known cut flowers and pot plants," "Our salespeople have extensive experience and product knowledge and can advise and educate our customers," and "We depend on everyday low prices to draw in customers." Modified items include "We are generally among the first store to carry new varieties." Factoranalysis yielded two factors, one relating to distribution service, including product quality and merchandise novelty (α =.828), and the other relating to price orientation (α =0.754, total scale α =.840). Only the first factor is hypothesized to affect consumer distribution service evaluation and consequently the price leadership dimension of retailer strategic orientation is left unconsidered in the remaining of the analysis.

Retailer trust in supplier. Trust was measured on a 5-item 7-point Likert scale, and included items such as "I can rely on this supplier to be honest," and "This supplier and I mutually trust each other." Morgan and Hunt (1994) argue that behavioral intentions would be appropriately included in a measure of trust. Trust and deliberation have therefore been included in the study as two separate constructs. Deliberation represents the extent to which the retailer shares important decisions with her main supplier. The construct was measured on two items, for example, "I try to consult with this supplier as much as possible."

Distribution system performance indicators. Three distribution system indicators have been included in the study. During the retailer interview the presence of a cold storage room was investigated. Furthermore, the retailer responded to a question on the percentage of flowers that is generally lost due to quality problems. Finally, the ratio of the number of weekly hours of salespersonnel labour employed, including the retailer's own labour, to the number of square meters selling area was calculated as a measure of distribution service intensity. A similar measure has been used by Betancourt and Gautschi (1992b, 1993b).

Table 5.2 *Overview of retailer constructs.*

Retailer construct:	Items	Mean	St. Dev.	Cronbach's α
Retailer strategic orientation:				
Merchandise and service	13	5.74	.76	.828
Retailer-supplier relationship:				
Trust in supplier	5	5.13	1.52	.870
Deliberation with supplier	2	1.44	1.44	.662
Distribution system indicators:				
Labour (hours per m^2)	1	.91	.85	n.a.
Percentage quality loss	1	5.21	5.44	n.a.
Cooled storage (dummy)	1	.542	n.a.	n.a.

5.5 Analysis and results

The data have been analyzed in three stages. First, the consumer model of satisfaction formation was investigated using the consumer-level data, including both prepurchase expectations, and postpurchase perceptions of distribution service performance. Based on the results of this analysis the consumer-level model has been adapted and the consumer-level and retailer-level models and the associated hypotheses are tested jointly using multilevel regression analysis. Finally, a separate analysis was done for the retailers who purchase exclusively at a specific supplier type, i.e., the flower auction.

5.5.1 The consumer-level CS/D model

The 207 consumers who were interviewed just before entering the store and immediately after leaving the store answered questions on prior service expectations and postpurchase service experiences, in the respective interviews. Regression analysis of CS/D was done on expected and perceived distribution service performance, and perceived disconfirmation of expectations, using averaged total scale measures. Results of the analysis showed that perceived distribution service performance and perceived disconfirmation have highly significant positive effects

($p<.005$) on CS/D, while prior expectations of distribution service performance do not have a significant effect on CS/D ($p>.10, R^2=.237$). Since the data indicate that consumer prior expectations do not play a significant role in the particular application under focus they will not be considered in the remaining analysis. Below the relevance of the three alternative explanations for the insignificance of prior expectations that were mentioned in section 3.2.3 for this result will be discussed briefly.

First, frequent past adjustments of consumers' service expectations based on experiences with florists' offerings may have led to prior expectations that are about equal to perceptions of service performance across purchases. This would coincide with reduced disconfirmation of expectations. This is confirmed by an average rating of 4.93 (st.dev. 1.20) on the 7-point perceived disconfirmation scale. The consumers in the study are regular purchasers of fresh cut flowers and show considerable store loyalty. About 50% of the interviewed consumers buy fresh cut flowers at only one specialized outlet, over 77% buys cut flowers at one or two outlets. Another explanation could be that consumers did not form prior expectations due to low involvement with flower purchase. The average involvement score of the 175 consumers that completed a mailed questionnaire two weeks after their purchase was 4.97 (st.dev. 1.65) on a 6-item 7-point scale ($\alpha=.820$), indicating at least a moderate level of involvement with flower purchase, which makes this explanation less obvious. Finally, the possibility that recalled expectations drive CS/D seems unlikely, since the conditions that favor hindsight bias and backward assimilation are not met. It has already been shown that disconfirmation of expectations is not large. Furthermore, there is no reason to argue that consumers have difficulty in forming expectations. The consumers in the study are generally experienced buyers of cut flowers and performance ambiguity is not high: the 175 cut flower consumers rated performance ambiguity on average 3.90 (st.dev. 1.91) on a 4-item 7-point scale ($\alpha =.545$).

5.5.2 Analysis across multiple supplier-retailer-consumer channels

The methodology section already indicated that multiple consumer interviews were held for each retailer who participated in the study, i.e., the data have a nested

structure. Consumer distribution service evaluation, perceived disconfirmation, and CS/D undergo influences from both the consumer-level and the retailer-level. Each consumer enters a service encounter in a particular state of mind, e.g., mood, and forms satisfaction or dissatisfaction using idiosyncratic weighing of attributes. The retailer on the other hand influences consumer evaluations through her performance with respect to service delivery, etc. Consequently, variance in consumer evaluations consists of a separate consumer component and a separate retailer component. Data analysis using ordinary regression models implies pooling data across retailers, while treating consumers as independent observations. Ignoring the relationship between consumers and retailers introduces inefficiency because it involves estimating more coefficients, provides no information on the variation in retailers, and could generate estimated standard errors that are too small (Woodhouse 1993). The hierarchical structure of the data is explicitly considered by multilevel regression models (Bryk and Raudenbusch 1992; Goldstein 1995). In this section, variance in consumer-level constructs is decomposed into variance within retailers and variance within consumers first. Next, consumer distribution service evaluation and CS/D formation is explained from both consumer-level and retailer-level variables.

5.5.2.1 Variance decomposition

Variance in measures of consumer distribution service evaluation is decomposed into variance within retailers and variance within consumers, using a multilevel random ANOVA model without explanatory variables. This model is denoted as (Prosser, Rasbash, and Goldstein 1991):

$$Y_{ij} = \beta_{0j} X_0 + e_{ij}$$
$$\beta_{0j} = \gamma_{00} + u_{0j}$$

with:

Y_{ij} : the value of the dependent variable, e.g., CS/D, for consumer *i* who buys at retailer *j*;

X_0: the intercept variable (=1);

β_{oj}: the within-retailer intercept, representing the score on the dependent variable for an average consumer who buys at retailer *j*;

γ_{00}: mean value of Y_{ij} for an average consumer who buys at an average retailer;

u_{0j}: level-2 residual, i.e., retailer-level random variable;

e_{ij} : level-1 residual, i.e., consumer-level random variable;

$e_{ij}, u_{0j} \sim N(0,\sigma^2)$ and $\text{cov}(e_{ij}, u_{0j}) = 0$.

The model can be rewritten as: $Y_{ij} = \gamma_{00}X_0 + (u_{0j}X_0 + e_{ij}X_0)$, consisting of a fixed part and a random part, the latter shown between brackets. The variance of the random part of the model can be written as: $Var(\tilde{Y}_{ij}) = \sigma^2{}_{u_0} + \sigma^2{}_e$. Here, $\sigma^2{}_{u_0}$ is the variance of β_{0j}, i.e., the variance between retailers, and $\sigma^2{}_e$ is the variance of Y_{ij}.

The systematic consumer and retailer variance components in consumer perceptions of distribution service performance, distribution cost, disconfirmation of expectations, and CS/D were estimated using a Full Information Maximum Likelihood routine. The results of this analysis are presented in table 5.3. The proportions of variance accounted for by the consumer-level and the retailer-level have been obtained by dividing each variance component by the sum of both variance components. The table shows that the proportion of variance due to differences between retailers is highly significant for all constructs ($p<.001$) and varies from about 11% for perceived distribution-related cost to almost 60% for perceived disconfirmation of expectations.

A consumer's experience with service provision resulting from retailer-customer interaction is influenced largely by the state in which the consumer enters the service encounter (mood), and also the employee-customer fit and service quality for the specific encounter. The other distribution service dimensions, in particular physical product quality and presentation are obviously more unilaterally influenced by the retailer. Consumer perceptions of distribution-related cost show a significant unique retailer variance, indicating that there is systematic retailer influence. In other words, retailers affect consumer perceptions of distribution-related cost. On the other hand, consumer perceptions of distribution-related cost are to a large extent consumer specific, since cost of transportation depends on for example location of consumer's home and means of

transportation used, and search and adjustment cost depend on, for example, purchase goal. Perception of disconfirmation of expectations involves a consumer's subjective comparison of perceived service performance with prior expectations. The large systematic retailer influence on perceived disconfirmation indicates that florists are far more influential in consumer expectations disconfirmation than in consumers' performance perceptions. Finally, a consumer's feelings of satisfaction/dissatisfaction are highly idiosyncratic although a systematic retailer influence has been assessed. In sum, although the affective state in which the consumer enters the transaction has shown to exert an important influence on service perception, retailer performance significantly influences consumer evaluations. Since all systematic retailer variance components are highly significant this section continues with an analysis of the effects of retailer variables on consumer satisfaction formation.

5.5.2.2 Model estimation results

A two-level random-intercept model was specified to explain variance in consumer evaluation from variables at the consumer level and at the retailer level:

$$Y_{ij} = \beta_{0j} + \sum_{k=1}^{K} \beta_{kj} X_{kij} + e_{ij}$$
$$\beta_{oj} = \gamma_{00} + \sum_{n=1}^{N} \gamma_{0n} Z_{nj} + u_{0j}$$
$$\beta_{kj} = \gamma_{k0}, \qquad k = 1,\ldots,K$$

Since consumer satisfaction formation is a process that involves multiple constructs separate regression analyses were done, one for each construct, in order to assess the influence of retailer-level variables. The most elaborate analysis concerns the following variables. The Y_{ij} represent consumers' ratings on the satisfaction/dissatisfaction scale. The five explanatory consumer-level variables involved, or the X_{kij}, are:

- perceived disconfirmation
- retailer performance on personal interaction and ambience
- retailer performance on product quality and presentation
- retailer performance on information, and
- perceived distribution-related cost.

The eight explanatory retailer-level variables, the Z_{nj}, are

- retailer distribution service strategy,
- retailer-supplier trust,
- retailer-supplier deliberation,
- presence or absence of cooled storage,
- percentage quality loss,
- labor intensity,
- age, and
- gender.

The results of the analyses are shown in table 5.4.[2]

The discussion of the multilevel regression analysis results starts with the effects of consumer- and retailer-level variables on consumer perceptions of distribution service performance. The last three columns of table 5.4 show that consumer perceptions of distribution-related cost have a highly significant negative effect on consumer perceptions of distribution service performance. When a retailer succeeds in lowering distribution-related cost, his customers will evaluate her service more positively. This is consistent with the definition of distribution service in chapter 2 and the consumer-level model presented in section 5.2.4. Retailer strategic distribution service orientation has a significantly positive effect on consumer evaluation of all three distribution service dimensions, personal interaction and ambience, product quality and presentation, and information. This finding supports hypothesis H1a. Retailer trust in her main supplier relates positively to consumer perceptions of product quality and presentation. This provides partial support for H2a. The extent to which a retailer deliberates with her main supplier has no effect on consumer perceptions of distribution service performance. No effects of distribution system operations on service performance were found, except for a weakly significant positive effect of labor intensity on personal interaction and ambience evaluations. H3a is therefore not supported. Only weak evidence was found that older retailers perform less well than younger

[2] All analyses reported in sections 5.5.2 and 5.5.3 have been repeated using mean-centered values for the independent variables in order to improve numerical estimation of the estimation algorithm (Prosser, Rasbash, and Goldstein 1991). An additional benefit of mean-centering is reduction of multicollinearity (Aiken and West 1991). Both analyses yielded parameter estimates that were practically identical.

retailers. Finally, female retailers perform better on the information dimension than male retailers.

In each equation two random variables have been estimated, representing residual systematic influence on the consumer and retailer levels. Table 5.4. at the bottom shows the percentage of variance accounted for in each level by the explanatory variables. This measure equals the ratio of the difference in the variance component in the random ANOVA model without explanatory variables and the two-level random intercept model to the variance component in the random ANOVA model. The results for perceived distribution service performance show that 1.10% to 4.74% of the consumer-level variance and 14.39% up to 28.57% of the retailer-level variance was explained by the independent variables, where product quality and presentation have been explained best by the variables in the model.

The second column of table 5.4 shows the results for perceived disconfirmation of expectations. The product quality and presentation performance dimension of distribution service performance is related positively to perceived disconfirmation. In addition, a weakly significant positive effect of information performance on perceived disconfirmation of expectations has been found. A decrease in distribution-related cost not only increases distribution service performance perceptions, but also raises positive perceived disconfirmation of expectations. With respect to the retailer-level variables, retailer trust in her main supplier is related negatively to perceived disconfirmation. Given the virtual non-existence of negative disconfirmation of expectations in this study one may argue that apparently, a trustful relationship coincides with greater consistency in retailer distribution service provision.

Table 5.3 *Estimated variance components for consumer and retailer level.*

Construct:	Consumer variance (s.e.)	% of total variance	p-value	Retailer variance (s.e.)	% of total variance	p-value
Consumer satisfaction/dissatisfaction	.325 (.014)	82.75	<.001	.068 (.013)	17.25	<.001
Perceived disconfirmation	.566 (.025)	40.97	<.001	.816 (.103)	59.03	<.001
Perceived distribution service performance:	.227 (.010)	65.50	<.001	.119 (.017)	34.50	<.001
Personal interaction and ambience	.333 (.014)	76.01	<.001	.105 (.017)	23.99	<.001
Product quality and presentation	.211 (.009)	60.15	<.001	.140 (.019)	39.85	<.001
Information	.998 (.043)	70.87	<.001	.410 (.063)	29.13	<.001
Perceived distribution-related cost	.516 (.022)	88.57	<.001	.067 (.016)	11.43	<.001

Table 5.4 *Multilevel regression analysis of CS/D on its antecedents.*

	CS/D		Perceived disconfirmation		Distribution cost	
	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value
Fixed variables:						
Constant	1.399 (.305)	.000	3.738 (.761)	.000	2.039 (.295)	.000
Perceived disconfirmation	.090 (.017)	.000	-	-	-	-
Personal interaction	.152 (.031)	.000	.046 (.046)	.317	-	-
Product quality	.178 (.036)	.000	.218 (.054)	.000	-	-
Information	.063 (.017)	.000	.048 (.025)	.054	-	-
Distribution cost	.002 (.022)	.917	-.071 (.032)	.028	-	-
Retailer strategy:						
Distribution service	.058 (.031)	.065	-.112 (.097)	.248	-.071 (.041)	.082
Relationship:						
Trust	-.015 (.021)	.473	-.126 (.064)	.049	-.036 (.027)	.187
Deliberation	-.013 (.017)	.424	.116 (.052)	.024	.023 (.022)	.286
Distribution operations:						
Cooled storage	.026 (.024)	.287	.041 (.077)	.598	-.045 (.032)	.163
% Quality loss	.001 (.004)	.792	.008 (.014)	.576	-.002 (.006)	.753
Labour/selling space	.029 (.028)	.300	-.040 (.089)	.650	-.039 (.038)	.296
Retailer characteristics:						
Age	-.018 (.022)	.417	.069 (.072)	.339	.007 (.030)	.803
Gender	.012 (.024)	.617	-.192 (.077)	.013	-.001 (.032)	.974
Random variables:						
Consumer level (σ_e^2) / %v.e.	.281 (.012) / 13.54		.545 (.024) / 3.71		.515 (.022) / .19	
Retailer level (σ_u^2) / % v.e.	.036 (.008) / 47.06		.674 (.086) / 17.40		.061 (.015) / 8.96	
-2 Log Likelihood	2000.689		3054.436		2729.463	
No. parameters	16		15		11	

Table 5.4 *Multilevel regression analysis of CS/D on its antecedents – continued.*

	Personal interaction		Product quality		Information	
	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value
Fixed variables:						
Constant	5.982 (.289)	.000	5.413 (.290)	.000	4.282 (.573)	.000
Perceived disconfirmation	-	-	-	-	-	-
Personal interaction	-	-	-	-	-	-
Product quality	-	-	-	-	-	-
Information	-	-	-	-	-	-
Distribution cost	-.157 (.023)	.000	-.155 (.019)	.000	-.151 (.041)	.000
Retailer strategy:						
Distribution service	.121 (.040)	.003	.153 (.040)	.000	.218 (.079)	.006
Relationship:						
Trust	.021 (.026)	.430	.062 (.027)	.020	.009 (.052)	.866
Deliberation	.010 (.021)	.642	.020 (.021)	.341	.047 (.042)	.261
Distribution operations:						
Cooled storage	.000 (.032)	.998	.047 (.032)	.138	.041 (.063)	.514
% Quality loss	.003 (.006)	.554	.007 (.006)	.238	.007 (.011)	.499
Labour/selling space	.068 (.036)	.062	.025 (.037)	.505	.015 (.072)	.839
Retailer characteristics:						
Age	-.053 (.029)	.069	-.030 (.030)	.317	.008 (.058)	.893
Gender	.039 (.031)	.216	-.028 (.032)	.374	.125 (.062)	.044
Random variables:						
Consumer level (σ_e^2) / %v.e.	.321 (.014) / 3.60		.201 (.009) / 4.74		.987 (.043) / 1.10	
Retailer level (σ_u^2) / % v.e.	.079 (.014) / 24.76		.100 (.015) / 28.57		.351 (.056) / 14.39	
-2 Log Likelihood	2220.268		1729.303		3616.771	
No. parameters	12		12		12	

Retailer deliberation with her main supplier is positively related to consumer perceived disconfirmation of expectations. This finding partially supports H2c.

Consumer perceptions of distribution-related cost (the third column of table 5.4) are not influenced significantly by the retailer variables in the study, except for a weakly significant negative relationship between retailer service orientation and perceived distribution-related cost. Therefore, no or weak support has been found for H1b, H2b, and H3b.

Perceived expectations disconfirmation as well as the all perceived distribution service performance dimensions have a positive and highly significant direct effect on CS/D. Consumer perceptions of distribution-related cost influence CS/D only indirectly. With respect to the retailer-level variables, only a weakly significant positive effect of retailer distribution service strategy on CS/D was found. No significant effect could be assessed for the other retailer-level variables.

5.5.3 The auction-retailer-consumer channel

The retailers in the study can choose to purchase cut flowers from three different supplier types, i.e., auctions, cash & carry wholesalers, and wholesalers that deliver at the retailer's point of sale. Each retailer answered questions for her major supplier, of any type, the analysis results of which have been reported in the previous section. The supplier types differ mainly with respect to distribution service provision. For example, a retailer who purchases at an auction has to travel back and forth with empty containers and fresh products, respectively, and often has to wait in the auction building for the products to be distributed. A retailer who purchases from a wholesaler who delivers can on the other hand choose only from the assortment that was brought to her outlet. Accordingly, retailer perceptions of distribution costs, measured on a 6-item, 7-point Likert-type scale which includes statements on each of the distribution cost categories mentioned in chapter 2 (α = .701), differ significantly between supplier types ($F_{2,151}$=31.208, p=.000). Mean perceived distribution cost for retailers who purchase predominantly through an auction is 3.26 (st.dev. 1.02), for retailers who have a cash & carry wholesaler as their main supplier mean perceived distribution cost equals 2.08 (.89), and for retailers who purchase at a delivering wholesaler perceptions of distribution costs

are on average 2.05 (.98). The significance of the difference between the auction on the one hand and both wholesalers types on the other hand was assessed using post hoc tests ($p<.005$).

A retailer-wholesaler relationship involves more personal interaction than a retailer-auction relationship. This is reflected in the values on the trust construct for each supplier type. Analysis of variance shows significant differences between supplier types with respect to trust ($F_{1,251}=3.311$, $p=.039$) and deliberation ($F_{2,151}=5,714$, $p=.004$). Post hoc tests show ($p<.005$) that mean ratings on deliberation are significantly higher for retailers who purchase mainly through delivering wholesalers (mean 3.01, st.dev. 1.61) or cash & carry wholesalers (mean 2.57, st.dev. 1.47) than for auction-buyers (mean 2.13, st.dev. 1.22). Ratings on the trust construct are for auction-buyers mean 5.65 (st.dev. .99), for retailers who purchase through a cash & carry wholesaler mean 6.11 (st.dev. 1.14), and for retailers who purchase mainly through a wholesaler who delivers 6.08 (st.dev. 1.29).

The retailer-level model presented in section 5.3 argued that service delivery by a retailer's supplier affects the cost incurred by a retailer in her own operations and can impact the retailer's service provision. The analysis reported in this section focuses on retailers that share the same purchase channel, the auction, and are consequently relatively homogeneous with respect to their distribution operations. The analysis therefore allows for incorporation of more distribution system indicators. The five additional distribution system variables that were included in the analysis are the average experienced waiting time at the auction (mean 79.21 minutes, st.dev. 46.98), the range in waiting time, i.e., the ratio between the difference between maximum and minimum waiting time and mean waiting time (mean .48, st.dev. 66), the time elapsed from product receipt at the auction until in-store presentation (mean 25.40 minutes, st.dev. 101.98), a dummy variable representing regular pre-purchase visual inspection of the product by the retailer in the auction's cooled storage, which is done by 63.49% of the retailers in the subsample, and the percentage of cut flowers purchased using the grower's name as the sole quality indicator (mean 32.06%, st.dev. 31.95). The subsample involved 63 retailers and 533 consumers.

5.5.3.1 Variance decomposition

Results for the random ANOVA model without explanatory variables are shown in table 5.5. All systematic retailer-level variance components are highly significant. Compared to the results for the sample as a whole, retailer-level variance is somewhat higher for consumer perceptions of distribution-related cost (16.75 compared to 11.43) and to a lesser extent for CS/D (20.24 vs. 17.25), and product quality and presentation (41.83 vs. 39.85). Retailer-level variance is somewhat lower for perceived disconfirmation (54.99 vs. 59.03) and personal interaction and ambience (20.99 vs. 23.99). These results are consistent with the fact that auction purchases involve less personal interactions between buyers and sellers.

5.5.3.2 Model estimation results

The results of the analysis on perceived distribution service performance for the retailers who purchase through an auction are presented in the last three columns of table 5.6. According to the proposed model consumer perceptions of distribution-related costs relate significantly and negatively to their perceptions of retailer distribution service performance. Retailers' strategic service orientation has a highly significant positive effect on performance with respect to product quality and presentation and information, partially supporting H1a. Retailer trust in the auction coincides with better performance on the product quality and presentation dimension of distribution service. This finding provides some support for H2a. Finally, retailer age relates negatively to consumer perception of product quality and presentation performance. No support was found for H3b, since distribution system indicators did not significantly affect consumer perceptions of service performance. The percentage of retailer-level variance explained by the retailer-level variables is relatively high, ranging from 33.64 to 44.91, compared with results in the previous section, due to the relatively homogeneous subsample used in the analysis. The percentages of consumer-level variance explained by the variables in the consumer-level model, ranging from 3.21 to 6.03, are somewhat higher than for the sample as a whole but remain low.

Retailer distribution service performance has no indirect effect on CS/D through perceived disconfirmation of expectations. The only variable that shows a significant, although small, positive effect on perceived disconfirmation is "product handling time," representing the elapsed time between product receipt at the auction

and in-store presentation. Apparently a longer leadtime coincides with a larger positive gap between expectations and perceptions of performance. A similar small, very weakly significant, effect has been found between leadtime and perceived product quality and presentation performance. One possible explanation could be that retailers who perform slightly better spend more time on product treatment.

The consumer-level variables effects on CS/D in the auction-channel are similar to the results for the entire sample. Distribution service performance perceptions and perceived disconfirmation exert a direct influence on CS/D. Perceived distribution cost does not relate directly to CS/D. Visual inspection by retailers of the products to be sold at an auction before purchase coincides with lower CS/D. The rationale behind this finding is highly ambiguous. Since not relationship of this variable with consumers' product quality evaluations has been found a daring suggestion might be that retailers who visually inspect the product at the auction may be relatively focused on the product they sell and less on their customers.

Contrary to the results for the sample as a whole distribution cost perceptions of consumers who buy at retailers with an auction as their main supplier are affected by retailer strategic service orientation and retailer trust in the auction. Retailers who have a service orientation and have a high level of trust in the auction provide better distribution service and reduce consumers' cost perceptions.

Table 5.5 *Estimated variance components for consumer and retailer level, auction as main purchase channel.*

Construct:	Consumer variance (s.e.)	% of total variance	p-value	Retailer variance (s.e.)	% of total variance	p-value
Consumer satisfaction/dissatisfaction	.335 (.022)	79.76	<.001	.085 (.023)	20.24	<.001
Perceived disconfirmation	.594 (.039)	45.01	<.001	.726 (.144)	54.99	<.001
Perceived distribution service performance:	.258 (.017)	66.43	<.001	.131 (.029)	33.57	<.001
Personal interaction and ambience	.405 (.026)	79.01	<.001	.108 (.029)	20.99	<.001
Product quality and presentation	.232 (.015)	58.17	<.001	.167 (.035)	41.83	<.001
Information	.953 (.062)	69.01	<.001	.428 (.099)	30.99	<.001
Perceived distribution-related cost	.458 (.030)	83.25	<.001	.092 (.027)	16.75	<.001

Table 5.6 *Multilevel regression analysis of CS/D on its antecedents, auction as main purchase channel.*

	CS/D		Perceived disconfirmation		Distribution cost	
	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value
Fixed variables:						
Constant	1.359 (.477)	.006	3.994 (1.189)	.002	2.972 (.461)	.000
Perceived disconfirmation	.125 (.025)	.000	-	-	-	-
Personal interaction	.197 (.043)	.000	.112 (.065)	.091	-	-
Product quality	.172 (.051)	.002	.105 (.081)	.199	-	-
Information	.065 (.026)	.017	.029 (.041)	.472	-	-
Distribution cost	.028 (.035)	.426	-.011 (.053)	.837	-	-
Retailer strategy:						
Distribution service	.006 (.061)	.928	-.218 (.180)	.232	-.255 (.075)	.005
Relationship:						
Trust	-.022 (.037)	.565	-.020 (.113)	.858	-.109 (.047)	.024
Deliberation	.012 (.034)	.729	-.001 (.101)	.993	.080 (.043)	.072
Distribution operations:						
Inspect product	-.088 (.041)	.037	.053 (.122)	.663	-.014 (.052)	.785
Purchase name	.000 (.001)	.857	-.001 (.004)	.868	.002 (.002)	.230
Waiting time, avg.	-.000 (.001)	.595	.002 (.003)	.424	.002 (.001)	.161
Waiting time, range	-.013 (.055)	.810	-.132 (.165)	.430	-.040 (.069)	.563
Cooled storage	.031 (.047)	.513	.000 (.139)	.998	-.069 (.059)	.248
% Quality loss	.005 (.007)	.502	-.001 (.021)	.960	-.021 (.009)	.023
Labour/selling space	.038 (.050)	.444	-.102 (.148)	.495	-.021 (.063)	.746
Product handling time	.000 (.000)	.985	.003 (.001)	.012	-.000 (.000)	.306
Retailer characteristics:						
Age	-.070 (.042)	.105	.045 (.126)	.721	.068 (.053)	.203
Gender	-.040 (.042)	.344	-.242 (.126)	.059	.039 (.053)	.470
Random variables:						
Consumer level (σ_e^2) / %v.e.	.277 (.018) / 17.31		.580 (.038) / 2.36		.456 (.030) / .44	
Retailer level (σ_u^2) / % v.e.	.033 (.012) / 61.18		.544 (.111) / 25.07		.053 (.020) / 42.39	
-2 Log Likelihood	871.566		1356.422		1136.328	
No. parameters	21		20		16	

Table 5.6 *Multilevel regression analysis of CS/D on its antecedents, auction as main purchase channel – continued.*

	Personal interaction		Product quality		Information	
	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value	Coefficient (s.e.)	p-value
Fixed variables:						
Constant	5.989 (.492)	.000	5.158 (.490)	.000	3.848 (.900)	.000
Perceived disconfirmation	-	-	-	-	-	-
Personal interaction	-	-	-	-	-	-
Product quality	-	-	-	-	-	-
Information	-	-	-	-	-	-
Distribution cost	-.194 (.041)	.000	-.185 (.031)	.000	-.239 (.063)	.000
Retailer strategy:						
Distribution service	.094 (.079)	.238	.172 (.079)	.034	.302 (.145)	.042
Relationship:						
Trust	.057 (.049)	.248	.112 (.050)	.029	.092 (.091)	.318
Deliberation	.046 (.045)	.308	.049 (.045)	.281	.077 (.082)	.356
Distribution operations:						
Inspect product	.016 (.054)	.766	-.030 (.054)	.597	.182 (.099)	.071
Purchase name	-.002 (.002)	.284	.000 (.002)	.949	.001 (.003)	.772
Waiting time, avg.	-.000 (.001)	.955	-.001 (.001)	.481	-.000 (.002)	.838
Waiting time, range	-.011 (.072)	.875	.069 (.073)	.348	.088 (.133)	.514
Cooled storage	-.016 (.061)	.790	.102 (.061)	.104	-.035 (.112)	.758
% Quality loss	.007 (.009)	.450	.015 (.009)	.106	.018 (.017)	.296
Labour/selling space	.046 (.065)	.484	-.036 (.065)	.589	-.108 (.120)	.371
Product handling time	.000 (.000)	.729	.001 (.000)	.059	-.000 (.001)	593
Retailer characteristics:						
Age	-.082 (.055)	.137	-.128 (.055)	.025	-.129 (.101)	.208
Gender	.038 (.055)	.493	-.056 (.055)	.318	.073 (.101)	.476
Random variables:						
Consumer level (σ_e^2) / %v.e.	.392 (.025) / 3.21		.218 (.014) / 6.03		.922 (.060) / 3.25	
Retailer level (σ_u^2) / % v.e.	.068 (.021) / 37.04		.092 (.022) / 44.91		.284 (.072) / 33.64	
-2 Log Likelihood	1068.243		794.878		1547.684	
No. parameters	17		17		17	

5.6 Conclusions and discussion

Retailers generally aim at improving or at least maintaining consumer satisfaction with the goods sold and services provided. Studies on CS/D formation generally yield insight on how product performance translates into consumer experiences. However, in practice goods and services are sold as an interrelated package. In this chapter the concept of distribution service performance has been used to investigate the role of both physical product and service provision on CS/D. The disconfirmation of expectations model of consumer satisfaction formation has been extended to include three dimensions of perceived distribution service performance as antecedents. They were labeled product quality and presentation, information provision, and personal interaction. In addition, perceived distribution cost has been included as an antecedent in the model. The results of the analysis show that consumer perceptions of retailer performance with respect to product quality and presentation, information, and personal interaction positively influence CS/D, both directly and through perceived disconfirmation of expectations. Consumer perceptions of distribution-related cost relate negatively to consumer perceptions of retailer distribution service performance. The role of prior expectations in CS/D formation is negligible in the application under focus.

A nested research design was used which allows the use of multilevel regression analysis for generating insight into the extent to which retailers affect consumer evaluations as well as the role of specific retailer variables as determinants of consumer satisfaction formation with florists fresh cut flowers offerings. The analysis has been done for the sample as a whole and for a subsample of florists who purchase cut flowers directly and exclusively at an auction. The latter group is relatively homogeneous and allows estimation of the effects of a variety of logistics performance indicators on consumer evaluation.

Variance in the variables in the consumer model has been decomposed into systematic consumer variance and systematic retailer variance. A considerable part of variance in consumer satisfaction formation constructs can be attributed to between-retailer variation. Retailers exert a systematic influence on all variables in the extended disconfirmation of expectations model. Despite this, it appears that CS/D is a highly idiosyncratic construct; about 80% of variance in CS/D is systematic consumer variance. Consumer perceptions of retailer distribution service

performance are only slightly less consumer-specific. Perceived disconfirmation of expectations, on the other hand, is more illustrative of systematic differences in retailer performance across different service encounters. When a firm aims to raise consumer satisfaction in time, it should realize that measurements reflect differences in consumer mood rather than in the firm's performance.

The influence of retailer-level variables on consumer satisfaction formation has been specifically addressed. Three retailer variables were hypothesized to affect consumer evaluations of retailer distribution service provision and perceptions of distribution-related cost, i.e., retailer strategic orientation, the quality of retailer-supplier relationship, and retailer distribution system performance. In addition to the analysis of the entire sample, analysis has been done for the auction-retailer-consumer channel. The inherent difference between distribution service provision by auctions and wholesalers is reflected through comparison of several of the results for the sample as a whole to the results of the subsample consisting of the auction-retailer-consumer channel.

The hypothesized positive relationship between retailer distribution service strategy and consumer experiences with distribution service provision (H1a) is generally supported. Retailers who are oriented towards service provision generally perform better on all three distribution service performance dimensions, i.e., personal interaction and ambience, product quality and presentation, and information. The relationship between retailer distribution service strategy and consumer perceptions of distribution-related cost (H1b) was supported for retailers who purchase mainly through an auction.

The retailer-supplier relationship was operationalized using the constructs retailer trust in her main supplier and retailer deliberation with her main supplier. Trust relates positively to one dimension of distribution service performance, namely consumer perceptions of product quality and presentation, both for the sample as a whole and for the auction sample. This finding partially supports H2a. For the auction-retailer channel a significant negative relationship was found between trust and distribution cost perceptions (H2b), but the relationship was insignificant for the sample as a whole. Both trust and deliberation were significantly and negatively related to perceived disconfirmation (H2c), but not for the auction-retailer channel. Finally, weak support was found for H3. No significant relationship exists between retailer distribution system characteristics and consumer

perceptions of distribution service performance (H3a). For the auction-retailer channel a significant negative relationship exists between the stated retailer percentage of quality loss and perceived consumer distribution cost (H3b). Retailer variables explained a sizeable 47% of total variance in CS/D at the retailer level.

Several methodological issues arise concerning the study. The study investigated evaluation processes of consumers who made real purchases and had not been instructed beforehand in a real context instead of a laboratory environment. Consequently the consumers interviewed in one store may have been served by different employees. Also, the consumers bought different cut flowers at different points in time. Despite this, sizeable retailer influence could be assessed. One may argue that in an experimental study retailer influence would even be larger. Also, the number of consumers interviewed per store differed which could cause misrepresentation of the findings. The research furthermore assumes that each employee acts according to the retailer's strategic orientation, since florists are generally small-scale retailers that work in their own store full-time. The same applies to the assumption that the retailer's relationship with her supplier is powerful enough to affect in-store operations.

The research reported in this chapter contributes to existing research in the field by assessing systematic retailer influence and systematic consumer influence on consumer satisfaction/ dissatisfaction and its antecedents. The results suggest how a retailer can actually improve the aspects of her offerings that matter most. Product quality and personal interaction are the most important variables in CS/D formation. By focusing on the retailer variables that affect these distribution service dimensions retailers can improve their product package and ultimately enhance CS/D.

Future research should aim at developing measures linking in-store, front as well as back-office, operations to consumer evaluations. In addition, the mechanism behind the influence of retailer-supplier relationship on service performance deserves attention. Other retailer-supplier relationship concepts could be included in analysis of retailer influences on CS/D formation. Also, the research could be extended to include more distribution channel levels so that insight can be obtained into the relationship between channel structure and channel performance. Finally, the research could be extended to include multiple product categories, whose characteristics may very well influence the relationships investigated.

Part IV
Strategic Channel Service Interactions and Retail Format Competition

Chapter 6

Distribution Service and Channel Structure

6.1 Introduction

The channel decision has been considered "among the most critical marketing decisions facing management" (Kotler 1986, Ch.17). This decision involves choice of channel structure, which comprises the number of channel levels (length) and type and number of middlemen in each level (breadth), and has both strong theoretical and practical relevance. One of the most commonly analyzed strategic decisions relating to the organization of marketing activities concerns the choice between a vertically integrated versus an independent distribution system.

Competition for customer demand between firms constitutes a major important determinant of channel structure. Competition among firms often involves price decisions, since price is often the only marketing instrument that can be adjusted easily by a firm in the short run (Tirole 1993). Product and store differentiation introduce other differences that attract consumers' attention and consequently reduce the severity of competition in the longer run. However, changing product characteristics, including quality, design, and distribution services, as well as changing cost structures or production and distribution capacity, generally require much more time and effort and is more difficult than lowering prices. Competition in the long run focuses on research and development, in particular process innovation and product innovation, which impose even more demands on an organization.

In today's modern marketplaces many consumers are deal-prone and many supermarkets offer "Every Day Low Prices" instead of occasional price deals. In addition, cheap imports create ample opportunity for price deals. This focus on

price competition is not only because most firms can react faster to a competitor's move by changing the price for one or more of its products than by changing product characteristics, but also because distribution channels tend to become shorter, and therefore more competitive, among other things as a consequence of technological developments that reduce the costs of coordinating vertical distribution systems (Shugan and Jeuland 1988), increase market transparency, and reduce costs of search.

Several developments, such as consumers' increased welfare and the saturation of several consumer goods markets, lead consumers to increasingly consider product quality and value. In addition to price and quality decisions, distribution services form an increasingly important category of decision variables for channel members. Changing demographics due to aging populations induce retailers to provide services that create convenience, while the increasing labor participation of women, among other things, offers possibilities for retailers to meet the needs of consumers with high opportunity costs of time through adding time-saving services to their offerings and improving the quality of these services[1].

The previous two parts of this book focused on consumer decision making - in particular consumer choice - and post-consumption evaluation processes, respectively. Chapters 6 and 7 adopt a strategic supply-side perspective; they consider channel members' decisions on price and distribution service provision resulting from competitive interactions and their consequences for channel structure. The present chapter shows how consumer demand, supplier performance, and channel structure form an interdependent set of variables. Different distribution channel structures and associated retail formats emerge as a consequence of competition for consumer demand, and at the same time influence consumer demand. Production and distribution cost constitute another influence on channel structure; supplier costs influence product prices charged by retailers, which in turn influence consumer demand. Distribution service provision impacts customers' and suppliers' distribution-related costs and adds value through improved customer decision making and enhanced shopping pleasure. Provision of distribution service forms a powerful instrument that can be used to reduce the severity of retail

[1] For a more detailed overview of these and associated developments see the introductory chapter of this book.

competition. Supplier decisions on distribution service provision play an important, often disregarded, role in the emergence and coordination of different channel structures. More specifically, distribution service provision constitutes an important element of retail format differentiation. Retail format differentiation is driven both by consumer demand for specific packages of goods and services and associated prices, and by supply-side cost considerations.

The present chapter continues in 6.2 with a discussion of the major determinants of distribution channel structure. Since competition has been found to be a major determinant of channel structure, the focus is on studies that consider price and non-price competition in horizontally and/or vertically competitive distribution channels. With respect to non-price decisions the role of distribution services in emergence and coordination of distribution channel structures deserves particular interest. Given the structure of a distribution channel, achievement of total distribution channel goals, such as profit maximization, cost minimization, or service maximization is conditional on coordination of channel members' efforts. Many authors have analyzed channel members' decisions relating to optimization and coordination of marketing efforts (e.g., Jeuland and Shugan 1983; McGuire and Staelin 1983; Coughlan 1985; Lal 1990; Choi 1991; Ingene and Parry 1995a,b). Section 6.3 summarizes and discusses recent research on channel coordination. It presents an overview of the field that has been based on a selection of the major contributions and identifies determinants of channel control problems and the role of several channel coordination mechanisms, including distribution service provision. The chapter concludes with a brief introduction to the next chapter, which presents a model of retail format competition with respect to price and service provision and identifies the conditions for coexistence of specific different retail formats.

6.2 Competition and distribution channel structure

Price and non-price competition for consumer demand and cost efficiency constitute among the most important influences on firms' channel decisions. This section briefly discusses the role of these and other factors in markets of different competitive structures and continues with an overview of recent research on the role

of firms' competitive strategies with respect to price and service in oligopolistic markets.

6.2.1 Basic rationales for channel structure

Many distribution channel structures exist in practice that differ with respect to the level of vertical integration of firms and centralization of marketing functions. As an extreme, the so-called conventional channel consists of independently owned and managed institutions that perform a traditionally defined set of marketing functions and pursue their own goals. Coordination in the conventional channel is achieved through market transactions that are possibly subject to bargaining and negotiation with other channel members. The completely vertically integrated channel constitutes another extreme, in which central ownership assures realization of one common set of goals. In practice, many so-called vertical marketing systems exist, which are voluntary or cooperative groups, such as franchise systems, that pursue joint goals with respect to selected marketing activities (Stern and El-Ansary 1992). The emergence of different channel systems resulted from each channel member's decision whether or not to (de)centralize marketing activities, and if so, what type of arrangement to use. The following outlines the major rationales for emergence of different channel structures. For a detailed overview of the role and evolution of marketing institutions in the agricultural marketing channel the reader is referred to Meulenberg (1997).

Many theories have been developed that focus on a limited number of basic factors that explain channel structure or, alternatively stated, the decision whether to vertically integrate or decentralize distribution channels. Traditionally, economists suggested that vertical integration is motivated by cost efficiency, a drive for market power, countervailing power, or structural and behavioral reasons, such as tax avoidance and managers' tendency to pursue expansionary and sales maximizing goals (e.g., Machlup and Taber 1960). Among other factors influencing channel structure are the geographical structure and size of the market, market segmentation, existing laws, and social and behavioral variables (see also Frazier, Sawnhey, and Shervani 1990). Finally, a variety of other personal and organizational motives may

underlie the decision to (de)centralize, including reseller solidarity, entrepreneurial values, and organizational rigidity (cf. Stern, El-Ansary, and Coughlan 1996).

Many contributions emphasized channel members' cost efficiency together with consumer demand heterogeneity as causes for the emergence of channel intermediaries. For example, cost-related rationales refer to channel members' relative efficiency of performing marketing functions, such as bridging the discrepancy between assortments in the channel through sorting, routinization, searching, and uncertainty reduction through information provision. This section briefly discusses important cost and demand-related rationales for channel structure, given market structure. Other rationales will come up occasionally in later parts of this chapter, in particular as instruments for channel coordination (see section 6.3).

Market structure, together with technological developments, constitutes an important but uncontrollable influence on firms' marketing decisions. Relevant competitive market structures that have been considered in the economic literature on distribution channels include among others pure competition, monopolistic competition, oligopolistic competition, and monopoly. Markets with pure and monopolistic competition and monopolist markets will be discussed first. Since the oligopolistic market structure is representative of many real-world markets it will be discussed separately.

In a *perfectly competitive market*, characterized by free entry, complete information, and where many suppliers selling identical products face many buyers, firms are so-called price takers. Market equilibrium is the result of the simultaneous independent decisions by many suppliers who do not know each other's identities and many buyers. Price is a decision variable but firms cannot but conform to the equilibrium price level in the market that equals both marginal cost and average cost, and consequently firms make no profits. Demand is perfectly price-elastic. When a firm decides to price her products slightly above marginal cost demand for this firm's products will drop to zero, whereas a slight price decrease below marginal cost necessitates all other firms to follow, eventually driving all firms out of business. Consequently, the only essential decision to be made by a supplier concerns quantity. In such a market an individual supplier cannot benefit from spinning off one or more marketing functions to an intermediary since differentiation, either vertically or horizontally, is not an option. Collectively contracting out specific marketing or production functions, such as is done through

for example dairy co-operatives, in order to increase suppliers' efficiency and/or effectiveness is a possibility on the other hand.

In practice perfectly competitive markets most likely do not exist and firms face price and quantity, as well as product decisions. Firms generally attempt to gain control over price levels by differentiating their offerings with respect to e.g., physical product characteristics and service. Markets with *monopolistic competition* (Chamberlin 1933) consist of many suppliers selling differentiated products to many buyers in a market with other characteristics equal to perfectly competitive markets. Suppliers face a downward-sloping demand curve in the absence of strategic interaction with other suppliers or buyers. Although some price control can be achieved by product differentiation, free entry prevents high long-run profits and assures a market in which many close substitute products compete for consumer demand. A supplier can only increase her price up to a certain point before consumers decide to purchase a close substitute. Increasing product differentiation remains the only feasible strategy for reducing price elasticity of demand and generating profits, but is limited by the costs involved and immediately attracts new entrants. Consequently, long-run equilibrium prices equal average cost.

At the level of the entire monopolistically competitive market a very simple, yet convincing cost-efficiency rationale for channel decentralization is that intermediaries reduce the number of contacts that are needed to establish a transaction. Mutual interaction between all m manufacturers and n households involves more costly contacts, and thus more search effort, than interaction through an intermediary (Alderson 1954). When only a few intermediaries emerge, market structure might even change into an oligopoly. The minimum transaction criterium has been extended by viewing channel intermediaries as active traders in information (Etgar and Zusman 1982) who add value to the channel by reducing uncertainty. Etgar (1978b) added the counterargument that forward vertical integration may be motivated by the desire to achieve product differentiation through provision of a high level of distribution services. Note in this respect the influence of product characteristics on channel structure as has been illustrated by Aspinwall's (1958) classification of red and yellow goods. In the longer run product differentiation through distribution service provision evokes imitation and entry of new firms. Therefore, the possibilities for profit generation through service

provision remain limited and service, just as price, is not a strategic decision variable.

Because each firm has negligible impact on other firms' decisions and actions, monopolistic competitive market structures are generally not used to study firms' decision making under strategic interaction with respect to variables such as price and product quality, but instead are used predominantly for analysis of more abstract issues on the level of the market economy (see also Tirole 1993). The competition between individual firms and its consequences for channel structure is generally modeled in an *oligopolistic market.* Oligopoly, or competition among a few firms is "the predominant structure in the real world..." (Moorthy 1985, p. 268). Many real-world markets, particularly those with many suppliers that cater to similar needs, such as grocery retailing, could be argued to represent monopolistic competition. The key distinction between markets with monopolistic competition and oligopolistic markets concerns strategic interaction, which is absent in markets with monopolistic competition and present in oligopolistic markets. Strategic interaction implies interdependency between firms' actions and the consequences thereof. In an oligopolistic market equilibrium prices, product qualities, service provision, etc. are the result of firms' strategic decisions based on their cost structures, customer demand, and their competitors' reactions to these decisions. Consequently, in oligopolistic markets profits dissipate mainly as a consequence of price and service competition, while in markets with monopolistic competition profits tend to vanish due to the entry of new firms.

Whether the nature of competition in a market can be considered oligopolistic depends on the scope that is adopted. For example, in the Dutch market three firms can be important competitors that interact strategically, while at least one of these firms is a negligible player from an international perspective. In addition, although competition in many consumer markets appears to be monopolistic in nature, oligopolistic competition may be better descriptive of such markets. For example, consider a market with hundreds or thousands of grocery stores, gasoline stations, or other fast-moving consumer goods retail stores that are differentiated from each other by brand name, location, and/or other services, such as the assortment of goods carried. With respect to price each store's manager probably anticipates and reacts to the prices set by other stores in the neighborhood. One reason for this is consumers' time, monetary, and information processing restrictions preventing them

to consider more than a few different outlets at a shopping trip. The assumption of oligopolistic competition is accordingly often more appropriate than monopolistic competition and the structure of these markets could be referred to as "local oligopoly".

In oligopolistic markets product differentiation and service provisions are used as instruments to "divide" the market. Firms in this market type have many decision variables, including price, quality, and distribution service provision. Due to the limited number of competing firms, in the long run an equilibrium results in which each firm has its own strategic positioning and maximizes its profits, given competitors' characteristics. Whenever a change occurs in cost structure, consumer preferences, or any other variable that relates to at least one firm's decision making, firms' optimal strategic decisions may be different and accordingly the market equilibrium may change. Analysis of oligopolistic markets offers insight into the dynamics of the effect of competition between individual firms on firms' behavior and associated channel structure.

Finally, in *monopolistic markets* where only one supplier exists, channel differentiation through spinning off marketing functions is an option if the benefits thereof exceed the associated costs, for example if an intermediary can more efficiently or effectively reach the firm's target customers. In a monopolistic market the lack of competition offers the opportunity to skim off the market at relatively little effort and consequently the price level is generally higher and the service level is generally lower than in a markets where two or more firms compete for consumer demand[2]. Monopolistic markets may exist in practice, but the issues that exist with respect to monopolies, such as entry of new suppliers, are less relevant for the distribution service issues that are central in this book and therefore will be left largely unconsidered in the remaining. The next section presents an overview of price and service competition in oligopolistic markets.

The discussion in this section continues with general rationales for channel structure that are more or less independent of the specific channel structure under

[2] Many results for monopolistic manufacturers are straightforward and consequently will not be discussed separately. The oligopolistic markets discussed in the next sections include distribution channels where either the manufacturer or the retailer is a monopolist. A uni- or bilateral monopoly often serves as a standard of comparison for analysis of channel coordination problems as discussed in 6.3.

focus, with the exception of perfect competition and monopoly. Many of the theories mentioned here imply that *cost efficiency* and product or service *quality* determine channel structure. A number of theories mention a direct relationship between channel structure and cost efficiency, which may concern any marketing function. For example, Stigler (1951) developed the concept of vertical specialization which suggests a firm may improve its competitive position by lowering average and marginal costs through delegating any marketing function to specialized, more efficient, intermediaries, a concept similar to Mallen's (1977) spin-off rationale. The sorting principle (Alderson and Martin 1965) argues that marketing intermediaries justify their existence by efficiently rearranging physical flows. In addition, specialization with respect to marketing functions allows efficiency through routinization. The minimum transaction criterium (Alderson 1954) is an example of cost efficiency with respect to service provision, to which Etgar and Zusman (1982) added the idea of uncertainty reduction through service provision.

Uncertainty is an important determinant of channel cost. Service provision influences channel cost efficiency and channel structure through its role in reducing uncertainty and the costs thereof, for example through information provision. A well-known example is the postponement principle which was introduced by Alderson (1950) and elaborated by Bucklin (1965) into his postponement-speculation framework. Postponement implies that costs associated with risk and uncertainty, particularly physical distribution costs, are reduced by postponing product differentiation with respect to form, identity, and inventory location to the latest point in time. On the opposite, a speculative channel carries large speculative inventories which involve lower costs due to economies of scale in production, less frequent ordering and transportation, and reduced stockouts. These speculative inventories are the driving force for the emergence of indirect channels. Recently, Bucklin, Ramaswamy, and Majumdar (1996) applied this principle to analyze the relationship between service provision and channel structure. They argue that a higher service level increases channel costs and reduces end-user costs. A direct channel incurs relatively low costs when a low level of logistical services such as market decentralization, lot size, waiting time, and product assortment are provided, while an indirect channel is relatively efficient in providing a high level of logistical service. The optimal channel structure is determined by the point where

average total costs are minimum, given the service level required by the end-user. With respect to so-called informational services that reduce uncertainty direct channels will be relatively more efficient in providing high service levels than indirect channels. Note that Bucklin abstracts from market structure and focuses entirely on costs associated with service provision in different channels.

Institutional economics provides comprehensive explanations of the conditions under which a strategy of vertical integration prevails and in which uncertainty plays an important role[3]. In marketing, "institutions" may be defined as "sets of conditions and rules for transactions and other interactions," (Arndt 1981), thus including market actors, such as manufacturers, and intermediaries. The institutional approach focuses on interactions between organizations and their environment and consequently integrates concepts from political and social science into economic theory. Obviously, this approach suits oligopolistic markets better than markets with monopolistic competition. The most important representatives of this school of thought are transaction cost theory, agency theory and the political economy framework. As an extensive discussion of institutional approaches is beyond the scope of this chapter, their relevance for distribution channel issues, in particular channel structure, will be mentioned briefly.

Transaction cost theory (Williamson 1975) argues that uncertainty is a major determinant of the costs associated with market transactions (costs of search, negotiation, and monitoring). The theory assumes that individuals may behave opportunistically - they seek self interest at the expense of (many) others - and have bounded rationality. Lack of mutual trust and/or environmental uncertainty may evoke excessive transaction costs, resulting in lengthy and detailed contracts. Under these conditions, vertical integration and the associated administrative costs will be preferred instead of market transactions. Stern and El-Ansary (1992) give an extensive overview of benefits and costs of vertical integration. Agency theory and the political economy framework add the issue of power to the cost arguments put forward by transaction cost theory with respect to the decentralization question. Consider for example a firm that has made high asset-specific investments that are tailored to a specific customer's quality demands and cannot be allocated elsewhere.

[3] Sheth, Gardner, and Garrett (1988) refer to this approach as the organizational dynamics school. Since the term institutional economics is common with respect to the distribution channel research discussed here, the terms will be used interchangeably.

Negotiation power allows a firm to set prices instead of accepting prices set by other firms and/or to influence other channel members' decisions for its own benefit. Although approaches based on institutional economics, functionalist school, or other theories may yield valuable insight into the forces influencing individual channel member behavior, for example through estimation of causal models, they do not capture the process of strategic interaction between competing firms in a distribution channel, their decision making and associated consequences, that are the topic of the next section.

6.2.2 Vertical differentiation in oligopolistic markets

The previous section already argued that the nature of competition between firms is an important force in shaping distribution channel structure. Research on channel structure traditionally addresses a manufacturer's problem of whether to vertically integrate or completely decentralize her distribution channel, which will be the starting point of this section as well. In oligopolistic markets, which are representative for many real-world markets, price and non-price competition are common, the latter referring to differentiation with respect to for example product quality, service, advertising, and location. Product and store differentiation interfere with price competition. Given a consumer's preferences for products and stores he or she may be induced to store and/or brand switching when perceiving the alternative total offerings, consisting of price, quality and other variables, as more attractive. But there is another, less well-known, argument for focusing on non-price competition.

Studies focusing exclusively on price competition generally assume that consumers behave perfectly rational and react to any small price difference. In reality it is unlikely that any small price change will induce consumers to shift to another product variant. This is easy to understand since actual store switching is costly, and store and product switching in addition imply a mental cost for the consumer. Assuming consumers are non-responsive to small price differences with respect to product choice, in equilibrium relative market shares are determined by non-price variables only (Fershtman 1982). Of course consumers may be insensitive with respect to small changes in non-price variables as well. Research on non-price

competition has been done with respect to a variety of variables inducing product and store differentiation, in particular store location, advertising, product quality, product information, warranty, but also on other service elements. Distribution service provision by a manufacturer or retailer concerns both horizontal and vertical differentiation since it affects characteristics of both the physical product involved and the store that presents and sells it. The current and next sections address the role of distribution service provision in vertical differentiation, and store differentiation, respectively, and its relationship with channel structure.

Due to the strategic interdependency of channel members' decisions the game-theoretic approach to analysis of distribution channels prevails throughout large part of this section. Game theory provides analytical tools that are particularly suited to analyze strategic interactions and decision making of competing or otherwise interdependent channel members with conflicting interests. The appendix to this chapter gives a concise and introductory overview of game theory. The models that have been used to analyze channel members' decisions and their consequences for channel structure in oligopolistic markets differ with respect to a number of structural characteristics of the channel under focus. Most models for analyzing channel structure consider channels with a limited number of levels, usually two, in which one or two manufacturers distribute their products to one or two retailers. Each manufacturer usually produces one product, that is substitutable to a certain extent with the other manufacturer's product. Channel members' often decide on price, and other decision variables may include service provision, product quality, advertising, location, etc. A channel's vertical power structure refers to leader-follower relationships. Finally, the nature of consumer demand, as reflected by its (non)linearity and variability influences channel members' decisions. Below each of the structural elements of distribution channels and their related influence on channel member decisions will be discussed further.

Typical *channel structures* that have been used in the literature to analyze the effects of manufacturer and retailer price and service competition on vertical differentiation are the exclusive dealer channel, also referred to as bilateral monopoly, and the multiple exclusive dealer channel. The simplest 2-level channel structure, the *exclusive dealer channel*, describes a mutual exclusiveness arrangement, in which one retailer sells only one manufacturer's product and in return is provided with an exclusive sales territory for the product. It represents the

real-life situation in which manufacturers and retailers sell totally differentiated products that serve two separate markets. In a channel where no competition exists, neither at the manufacturer level, nor at the retail level, retail prices are relatively high and quantity sold is relatively low from a consumer welfare perspective. The exclusive dealer channel has been studied with respect to the - usually manufacturer's - decision either to integrate, or to distribute through independent retailers. In addition, this channel type has been used extensively to analyze channel coordination problems between the manufacturer and his retailer. The manufacturer is generally modeled as the dominant decision maker in the channel who is aimed at maximizing his own profit or total channel profits through manipulating transfer price and providing incentives - such as side payments -, gaining cooperation or implicit understanding, and forming conjectures (e.g., Jeuland and Shugan 1983; Shugan 1985; Shugan and Jeuland 1988; Lal and Staelin 1983).

In the *multiple exclusive dealer channel*, also called the monopoly manufacturer channel, one monopoly manufacturer supplies multiple exclusive retailers. Examples of this channel type involve franchise outlets that exclusively sell the franchising manufacturer's products. This channel structure is typically used to analyze channel coordination with two or more heterogeneous competing retailers (cf. Ingene and Parry 1995a,b). The monopoly manufacturer needs to set a single wholesale pricing schedule than can be applied to all retailers. A more detailed discussion on the coordination problem can be found in section 6.3. In addition, this channel type has been used to analyze horizontal differentiation (see subsection 6.2.3). In this channel type retail competition will generally lead to relatively low retail prices. Retailer collusion, however is a severe threat to the manufacturer.

The *monopoly common retailer channel* consists of one retailer who sells two competing products from two manufacturers (e.g., Choi 1991). Because the two manufacturers rely on one retailer only for distribution of their products in this channel arrangement retailers can be powerful players that can assume leadership positions against the manufacturers, possibly resulting in low manufacturer profits. Channel conflict between retailers and manufacturer can easily develop and this channel structure may be less stable than the other types. The results for this channel type depend on the demand function that is used. For example, when a linear demand function is assumed, a manufacturer is better off with an exclusive

dealer whereas the retailer has an incentive to deal multiple products (Choi 1996). This channel structure is used particularly to study the effects of the retailer's ability to coordinate retail prices of multiple products for her profit maximization. Competition at the manufacturer level is expected to lower retail prices relative to the exclusive dealer channel. However, the relatively powerful retailer may benefit from product complementarity in her assortment and may therefore be able to charge relatively high prices.

More complex channel structures, such as the duopoly or tripoly common retailer channel, where two retailers carry two or three manufacturers' products have been used only to analyze specific problems with respect to retailer competition, that will be discussed in section 6.2.3.

Several alternatives exist with respect to *power structure*, or leader- follower, relationships in distribution channels. Choi (1991) refers to power structure as power balance scenarios. Lee and Staelin (1997) conceptualize vertical price leadership as "using the foresight of the channel partner's reaction in pricing decisions." The most common approach in the literature to model channel relationships is to view the problem from a manufacturer's perspective. The manufacturer faces problems such as whether to integrate the distribution function and how to coordinate channel strategies using price or other marketing variables, such as promotion. When the manufacturer is the channel's price leader and the retailer follows, the power structure is modeled by the *manufacturer Stackelberg* game. In this game manufacturers and retailers choose their prices consecutively. Each manufacturer chooses his wholesale price using the retailers' reaction functions, conditional on the observed wholesale price of the competitor's product. Given these wholesale prices, each retailer determines her margin as in the Nash game.

A channel where the retailer is the leader and the manufacturer follows is modeled by the Retailer Stackelberg game. In the Retailer Stackelberg game each retailer chooses her margin using the manufacturers' reaction functions, conditional on the other retailer's margin or retail prices. Each manufacturer sets his wholesale price, conditional on these retailer margins and the competing product's retail price. This game is essentially different from the Manufacturer Stackelberg game since it assumes consumer demand is directly influenced by retailers' decisions instead of being conditional on manufacturer decisions. The Retailer Stackelberg game may

lack stability since a retailer may deviate from her announced retail price or margin once she owns the product, unless the retailers freedom is restricted by "some precommitment mechanism", such as a formal contract or government regulation (Lee and Staelin 1997). In the *vertical Nash* game both manufacturer and retailer are followers, and players decide simultaneously on prices: each manufacturer chooses his wholesale price conditional on the retailers' margin and the observed retail price of the competing brand. Given these wholesale prices, each retailer sets her margin so as to maximize combined profits from both products.

There are many reasons to believe that several distribution channels show a shift of power from the manufacturers to the retailers (e.g., Ailawadi, Borin and Farris 1995; Messinger and Narashimhan 1997), such as growing concentration among retailers, consolidation into fewer, bigger stores, improved scanner information systems, fragmentation of consumer markets, improved quality of retail management personnel, and a decline in advertising. Little (1973) was among the first to argue that retailers as multi-level merchandisers are entitled to channel leadership. In many product categories, in particular fast moving consumer goods, large retailers sell their own brands in addition to manufacturer brands. These recent developments diminish the possibilities for vertical price binding and the decision of setting final consumer price rests more and more on the retailers, several of whom even influence wholesale prices. In addition, retailers choose the level of distribution service they offer their customers through for example assortment composition, ambience, information provision, and other services a manufacturer cannot easily provide.

Studies that focus on the manufacturer's decision whether or not to vertically integrate in multiple exclusive dealer channels found *price competition* between multiple channels to be the major force in shaping distribution channel structure (e.g., Coughlan 1985; Coughlan and Wernerfelt 1989; McGuire and Staelin 1983, 1986; Moorthy 1988). Price is a major decision variable for most channel members in an oligopolistic market and generally takes the form of a one-part tariff, or a linear transfer price (e.g., McGuire and Staelin 1983; Coughlan 1985; Lal 1990a) or a two-part tariff, consisting of a linear transfer price plus a franchise fee. Unless stated otherwise it is assumed throughout the text that prices are one-part tariffs. Other pricing systems, such as quantity discount schemes and royalty payments will be discussed in the section on channel coordination, insofar relevant. This chapter

focuses on short-term and medium-term competition and therefore assumes that capacity constraints do not exist.

The intensity of price competition depends on the degree of *substitutability* between products. One key finding is that the decision whether or not to vertically integrate depends to a large degree on the substitutability of manufacturers' products. Highly substitutable products tend to be sold through a direct channel, i.e., independent retailers in a centralized system (e.g., McGuire and Staelin 1983), while products that are only weak substitutes tend to be sold through decentralized channels. Since highly substitutable products imply little differentiation this finding indicates that low-quality products, or products for which a low level of distribution service is provided will be sold through centralized channels. It is a standard and obvious result in competitive retail pricing models that retail prices decrease with an increase in product substitutability in the absence of intermediaries. Several studies (Coughlan 1985; Coughlan and Wernerfelt 1989; Shugan and Jeuland 1988) found that addition of a distributor (i.e., retailer) level to a competitive duopoly, i.e., introducing an exclusive retailer for each manufacturer, decreases the channel's reactivity to competition and thus shields the manufacturer from competition. This finding was extended and the underlying mechanism elaborated by Coughlan and Lal (1992) who analyzed the consequences of increasing channel length beyond 2 levels for manufacturer profitability in ever more competing markets. Apparently, for low-service or low-quality products providing service through the use of middlemen, which could be referred to as "channel differentiation," is profitable to a manufacturer.

A closer look at mechanism underlying the proposed relationship between price competition, product substitutability, and channel length shows that the decrease in channel reactivity is caused by a phenomenon called double (for a two-level channel), triple (in a three-level channel), and so on marginalization (see 6.3 for a detailed explanation of this so-called basic externality). In a market with duopolistic manufacturers who make substitutable products longer distribution channels coincide with a higher retail price. Each consecutive independent channel member purchases the product at a higher price and thus contributes to an increase in the final retail price because of maximization of his own profits. In a two-level channel double marginalization already causes an increase in retail price and a

decrease in quantity sold compared to a one-level channel with centralized distribution.

Increased product substitutability intensifies competition and thus has a direct negative impact on retail prices. The associated increase in the number of channel levels restrains this fall in retail prices, and indirectly exerts a positive impact on retail prices. When demand is inelastic total channel profits even increase. When the number of channel levels increases, the decrease in channel margin due to competition is relatively low for each channel level, including the manufacturer, because of the higher retail price. Therefore, although increased price competition lowers channel margins, increasing the number of channel intermediaries reduces price competition between manufacturers, particularly when the products show little differentiation. With increasing substitutability the indirect effect, i.e., a decrease in manufacturer competition through channel lengthening, is overshadowed by the direct effect, i.e., increasing product competition, leading overall to a decrease in retail prices. When channel intermediaries provide high quality distribution service marginalization increases even more with each channel level due to the cost associated with service provision, favoring centralized distribution. On the other hand, product differentiation increases, which leads to a decrease in substitutability, favoring decentralized distribution.

When transfer prices take the form of two-part tariffs, i.e., a fixed fee plus a per-unit price, channel structure does not depend on the degree of substitutability anymore (Coughlan and Wernerfelt 1989), and the equilibrium channel structure consists of an infinite number of middlemen. The rationale behind this is that in a one-level channel delegation to a retailer makes the manufacturer a Stackelberg leader. This is profitable for the manufacturer, because in doing so he is able to motivate the middleman to charge a price which maximizes the manufacturer's profits but is not equal to the Nash equilibrium price in a one-level channel. In this delegated channel the manufacturer therefore has a further, but smaller, incentive to become Stackelberg leader relative to additional channel levels and thus set up another intermediary level.

Theoretically, for infinitely substitutable products an infinite number of middleman layers is optimal. It may be clear that if the manufacturer aims to maximize his own profits only, he will tend to have no more middleman levels than if he seeks to maximize total channel profits. Coughlan and Lal (1992) found their

result that more channel levels are optimal the more competitive the products in the market, to be consistent with institutional knowledge concerning the length of Japanese distribution channels. In practice, however, very few middlemen layers can be observed. Several explanations have been found for this. The previously mentioned studies assume all that intra-channel agreements or contracts are observable to competitors. However, firms have an incentive to reduce the observability of their agreements. Coughlan and Wernerfelt (1989) show that, regardless of the number of levels that exists in the channel, when observability cannot be assured channel profits are equal to zero-middlemen channel profits (see also 6.3).

In addition, various institutional factors can be distinguished that impose boundaries on the number of middlemen. Several of these factors were mentioned by Coughlan and Lal (1992), in particular middleman's opportunity cost associated with providing distribution services, the industry power structure, and channel members' profit orientations. A middleman's opportunity cost of distributing a product comprises the attractiveness of alternative opportunities and the costs of carrying and marketing the product, e.g., for servicing it or educating customers in its use. The middleman's opportunity cost thus limits the manufacturer's earnings per unit in a certain channel and consequently diminishes the attractiveness of a many-middlemen channel system. On the other hand, if a manufacturer provides distribution services that effectively reduce the middleman's costs of distributing the product that manufacturer's earnings per unit may increase, and thus increases the benefits of using a many-middlemen channel system. Another factor concerns the power structure in the industry. When middlemen power over manufacturers increases, the middlemen tend to extract greater shares of total channel profits, and manufacturers will find a channel with fewer middlemen more attractive. Finally, channel members' profit orientation influences the use of middlemen by manufacturers. For example, Japanese industries have more joint profit goals than American or Western European firms, and they consequently may find it more profitable to increase the length of their distribution channels relative to their American or European counterparts (cf. Coughlan and Lal 1992).

Shugan and Jeuland (1988) analyze price decisions for two competing exclusive dealer channels, whose products are substitutable, for three different power structures: the conventional channel where retailer and manufacturer take

independent but interdependent price decisions, a channel where the manufacturer is the Stackelberg channel leader, and a vertically integrated channel. They used a linear demand function with associated downward sloping reaction function. They found that in the leader-follower channel retail price is higher than in the follower-follower channel because the manufacturer demands a larger margin while the retailer cannot completely compensate for the price increase. The integrated channel yields lower retail prices than the other two channels because it reacts directly to the environment and is thus more competitive. Because total channel profits are highest for the integrated channel Shugan and Jeuland conclude that this channel type may be more enduring than other channel types, provided cost structures of the channels do not differ too much, a finding consistent with the predominance of vertical systems in the U.S. When the two products are strongly differentiated two competing vertically integrated channels yield highest profits. When the two products are highly substitutable, leader-follower channels are so profitable that they are stable, despite each individual channel's incentive to reorganize into a vertical system. Once again research findings point at decentralized channels for highly substitutable, often low-quality or low-service, products. Compare the channel structures for fast-moving consumer goods, such as groceries that are sold through low-service discount supermarkets.

Results obtained from a model of channel pricing may differ with the form of the *demand function* used. In the simple exclusive dealer channel it pays to be the vertical price leader in the associated Stackelberg game if the demand function is downward sloping (Gal-Or 1985). This was confirmed for linear demand by Moorthy and Fader (1990), but not for multiplicative demand that causes an upward sloping reaction function. Moorthy (1988) considered the effect of channel intermediaries on direct competition between two manufacturers in a channel with one common retailer who sells both manufacturers' products. With a linear demand function retailers will prefer to distribute multiple manufacturers' products, while manufacturers prefer exclusive dealers. With a nonlinear demand function all actors prefer an exclusive dealer channel. Moorthy found also that when the demand function is nonlinear more differentiated products generate higher manufacturer profits in an exclusive dealer channel and lower manufacturer profits in a common retailer channel. This can only be partly explained by the common retailer's ability to manipulate the retail price. Lee and Staelin (1997) elaborated Moorthy and

Fader's (1990) findings and argue that the distinction between linearity and nonlinearity of the demand function is not very important. Instead, it is the relationship between demand function and type of vertical strategic interaction, i.e., a channel member's optimal response to the other channel member's move, that matters.

The emergence of middlemen in a distribution channel is also dependent on another characteristic of consumer demand, i.e., *uncertainty*. When demand is uncertain, risk-averse middlemen will demand a risk-premium for undertaking sales activities (Lal 1990a). Greater uncertainty in the selling environment has an effect similar to that of higher costs facing the middleman, causing him to demand a higher payoff for carrying the product, all other things equal. In very uncertain situations the risk premia required to make the intermediaries willing to carry the product would severely reduce any increased profitability associated with putting them into service.

Many models of strategic interaction in distribution channels assume full information, i.e., actors have perfect knowledge about each others' motives. However, in practice many actors possess only limited information about their rivals' motivations and behaviors. *Information incompleteness* is assumed in for example Shugan (1985) and Coughlan and Mantrala (1992, 1994). The latter authors developed a dynamic pricing model and concluded that in a duopoly manufacturers' prices converge over time, and found that the time required for convergence increased, the more interrelated in demand the products are.

The research mentioned here illustrates how the introduction of intermediaries whose existence is justified solely by the fact that manufacturers spin off service provision, reduces the intensity of price competition without any actual product differentiation or specific consideration of the service provided. Studies that specifically addresses the relationship between distribution service provision and distribution channel structure are scarce. Betancourt and Gautschi (1998) extended their theoretical framework (Betancourt and Gautschi 1990, 1992) into a game-theoretic model of channel relationships and analyzed distribution service as a mechanism for exercise of economic power in a channel. They found that with higher price elasticity of demand the level of distribution service provision is likely to be higher in a decentralized channel than in a vertically integrated channel. Similarly to the phenomenon of double marginalization each subsequent channel

member will try to add value by providing distribution service, leading to both a higher retail price and a higher service level. Furthermore, whoever controls distribution service provision, the manufacturer or the retailer, enjoys a higher share of profit margin in a decentralized channel. This result is consistent with the previous in that a high level of distribution service provision favors a decentralized distribution channel.

It is apparent that most models of distribution channel dynamics refer to symmetric channels with one or two actors at each channel level. In practice channels with few manufacturers and many retailers are common for many consumer goods and may be sustainable because of fixed cost thresholds that block entry. Channels with many manufacturers and few retailers are found in for example mass retailer markets. The scale of operations of these retailers may effectively prevent potential new entrants (cf. Coughlan and Wernerfelt 1989). Increasing channel breadth, i.e., considering more than two or three firms at each channel level, however generally offers little additional insight. An exception forms Shugan's (1985) analysis of product assortments carried by three competing retailers (see 6.4). From a theoretical perspective most asymmetric channels, including so-called dual distribution, are unstable (Shugan and Jeuland 1988; McGuire and Staelin 1985). Additional consideration of competition with respect to distribution service may lead to new insights in this respect.

6.2.3 Retail format competition

Several chapters in this book argued that retailers' strategic decisions are driven by consumer demand for retail services (Betancourt and Gautschi 1990, 1992; Ratchford and Stoops 1988, 1992). For example, consumers who economize on time by relying on branded products with known, consistent quality, can also achieve time savings by relying on stores with consistent assortments. It has been widely acknowledged that the structure of retail industry is shaped more by competition than by any other factor. This section illustrates competition as a strong influence on retailers' strategic choices with respect to distribution service provision.

Among the oldest and probably the best-known models of distribution service differentiation is Hotelling's (1929) model of geographical or so-called horizontal differentiation between retailers. Hotelling's model, which still continues to be extended by several researchers, analyzes division of a homogeneous consumer market of size 1 among two retail outlets that sell the same undifferentiated good and can decide on location only. In equilibrium, both firms are located next to each other at the center of the market, and they each face half of total demand. Lal and Matutes (1989) elaborated and extended Hotelling's model to two retailers carrying one or two independent goods in a heterogeneous market where consumers differ in reference prices and transportation cost. Two possible equilibria result, one in which consumers with low reference prices can afford one good only, and one in which each retailer takes advantage of the consumer segment with high reference prices combined with high transportation cost and offers the two products as a bundle. In another variant of Hotelling's model Winter (1993) includes retailer service provision as a means to reduce consumer opportunity costs of shopping.

The previous section already mentioned that retailer competition usually is analyzed through modeling a channel with two retailers and one or two manufacturers - the multiple exclusive dealer channel, and the duopoly common retailers channel, respectively -. While the number of studies that deal with service competition among retailers is limited a relatively large part of them has considered retail assortment. Retailer assortment decisions that have been analyzed in the few studies addressing this subject include the number of items carried in the assortment, prices of these items, and associated other service elements.

Shugan (1988) analyzed the effect of differently composed assortments on retail prices. He distinguished between low-end and high-end products carried by single, dual, and multi-product outlets. Given consumer differences with respect to price sensitivity he concluded that the dual product outlet trades down low-end items and trades up high-end items, and consequently charges a lower price for the low-end product, and charges a higher price for high-end products than single product outlets. Shugan found that for thirteen product categories, retailers' assortments in a large shopping mall were differentiated to the extent that retailers shared hardly more than two variants for any product category. This finding can be interpreted as evidence that competing retailers tend to carry "partially differentiated assortments," in the sense that the assortment of each retailer consists

of a few common variants (i.e., those that are carried by all the retailers) and the rest being unique to the retailer. Another example concerns clothing stores' whose assortments may share a few similar variants, but many of the variants carried are usually different.

In another study Shugan (1989) investigated price and assortment decisions for three competing manufacturers who distribute their products directly to a heterogeneous consumer market. High quality products coincide with higher unit variable production costs while the market segment for high-quality products is generally relatively small. In the presence of economy producers this leads to higher prices, less sales, and lower marginal profitability for high-quality producers. Shugan found that quality and assortment size will therefore be negatively correlated. No attempt has been made to empirically support this finding.

Increasing the number of similar items in an assortment will increase consumers' cost of shopping across stores. The mere availability of multitude of variants actually confuses the consumers to such an extent that their tendency to "shop around" reduces. Less comparison shopping leads to less retail competition, reduced price sensitivity, and consequently higher profits for both manufacturers and retailers. This argument was used by Bergen, Dutta, and Shugan (1996) to model retailers' decisions concerning price, service, and whether or not to carry an additional brand in their assortment. A larger fraction of so-called nonshoppers, who do not value shopping around, leads to higher prices, higher service, and a larger number of stores carrying a new brand.

Recently, research has been done on the rationales behind the coexistence of two different retail formats that differ with respect to assortment composition and provision of other services. Messinger and Narasimhan (1997) model consumer store choice as a tradeoff between time-saving shopping convenience depending on assortment size, represented by the number of categories carried, average price, and other retail services that serve as a substitute for the consumer's shopping time. Based on time-series testing of their model they concluded that the increase one-stop shopping resulted from increased consumer valuation of time. A comprehensive analysis of the relationship between price, promotions and service has been given by Lal and Rao (1997). They argue that supermarkets that engage in promotional pricing (PROMO) will offer higher service levels than supermarkets that follow the Every Day Low Pricing (EDLP) strategy. The combination of higher

relative basket price and higher service level at the PROMO store draws in particular time-constrained consumers in addition to bargain-hunters, while the low basket price at the EDLP store draws mainly price-sensitive consumers in addition to time-constrained consumers. Overall, industry profits benefit from this store-format equilibrium.

One of the few studies that simultaneously consider retailer service provision and channel structure was done by Bell and Padmanabhan (1996). They analyze the role of horizontal service competition in asymmetric distribution channels in which the monopolist manufacturer integrates one retailer while the other retailer remains independent. They suggest as a rationale for dual distribution channel structure, that service differentiation, i.e., high-service integrated versus low-service independent retailers, reduces price competition, resulting in higher equilibrium retail prices and higher manufacturer profits. Consequently, a manufacturer may find it optimal to use a dual structure when an independent channel cannot support investment in service.

6.3 Channel coordination

In oligopolistic markets the primary goal of each distribution channel member, i.e., provision of desired time, place, possession, and form utilities for its customers at maximum profit, often cannot be assured unless the other channel members cooperate. Achievement of maximum channel output requires independent channel members coordinate their strategies as well as the functions they perform (Stern and El-Ansary 1992) with respect to price as well as service provision. Since distribution channels often consist of multiple independent suppliers and distributors who have differing objectives (Eliashberg and Michie 1984) it is difficult for manufacturers, or suppliers in general, to motivate distributors to behave according to their objectives. This section focuses on channel coordination given a decentralized multi-level distribution channel. It discusses the antecedents of channel control problems followed by several types of control mechanisms and their theoretical and practical significance.

6.3.1 Determinants of channel control problems

A decentralized distribution channel consists of multiple interdependent firms whose decisions are interrelated while their goals are only partially overlapping, at best. Consequently, each firm aims at realization of its own goals while its actions influence other firms' profits. The pursuit of individual firms' goals almost by definition results in suboptimal performance viewed from the perspective of the total distribution channel. In practice, virtually every channel member recognizes the desirability of total distribution channel performance optimization, for example in terms of profits. However, it is the allocation of the revenues associated with optimization of total channel performance that causes problems. Choice of channel structure is therefore often guided by the extent to which a firm desires to control the channel. Centralized distribution allows a firm to exercise control over the channel and skim channel profits, while a firm will choose decentralized distribution if it trusts the market will function at its best interest. Channel structure and channel control therefore represent interrelated problems.

Goal incongruence, which is implicitly present in decentralized distribution channels, is one of the major determinants of suboptimal total channel performance. The individual pursuit of their own goals by independent firms who do not take into consideration the effect of their actions on previous or subsequent firms in the channel, results in externalities. An externality arises "when the consumption of a good by a consumer directly affects the welfare of another consumer, or when a firm's production affects other economic agents" (Tirole 1993, p.7). The concept of externalities originated in transaction cost analysis (cf. Williamson 1975). Due to the existence of externalities maximization of total channel profits requires channel coordination[4].

[4] The existence of externalities does not necessarily lead to inefficiency. The Coase theorem "Regardless of the specific initial assignment of property rights, in market equilibrium the final outcome will be efficient - provided the initial legal assessment is well-defined and that transactions involving exchange are costless," (Coase 1960) implies that well-defined rights determine channel structure and eliminate the externality problem, provided incentives called side payments can be made if necessary. Several regulations, such as vertical restrictions can be seen as definition of property rights. For an application of the Coase Theorem to market channels see Norton (1987).

The most simple example of the occurrence of externality, the so-called *basic vertical externality* (Tirole 1993, p.174), has been the object of early research on channel coordination (e.g., Jeuland and Shugan 1983, 1988; Moorthy 1987a,b; Shugan 1985), and reads as follows. Assume a distribution channel with a monopolist manufacturer and an exclusive dealer where, under linear pricing, price is the only decision variable. The manufacturer charges a wholesale price, p_w, to the retailer, who in turn determines his retail price, p. Assume furthermore that the manufacturer incurs a variable cost c per unit. Any decision made by the retailer that increases his demand for the intermediate good by one unit generates an incremental profit of $(p_w - c)$ for the manufacturer. However, the retailer who maximizes his own profit does not take into account the manufacturer's incremental profit, and therefore tends to make decisions that lead to a quantity sold that can be considered too low from both a total channel and a consumer welfare perspective. In a multiple-level channel, each intermediary adds its own price-cost margin, resulting in an excessive margin for the entire channel that can exclude consumers who would be profitable clients for an integrated channel.

The control problem here consists in knowing how to reach the desired values of the decision variables so as to maximize the channel's aggregate, or vertically integrated, profit. The problem is that the retailer's marginal cost for the good (p_w) differs from the marginal cost that would be incurred by the centralized channel (c). The aggregate profit of the two-member independent channel is lower than the profit of the vertically integrated channel, due to relatively high price and low quantity sold, which gives the manufacturer an incentive to impose vertical restraints that eliminate this externality. Note that this externality is simply caused by the fact that two independent but interdependent channel members pursue their own economic goals, and not by power imbalance or irrational behavior. In this example it is the interdependence of channel members pursuing different goals that causes the need for coordination.

Moral hazard or "hidden action" is a concept from agency theory which captures the idea that a firm is able to take some action that is *unobservable* to another firm. Unobservability induces a firm to behave opportunistically, since it facilitates a firm's pursuit of it's own interest at the expense of other firms. Opportunistic behavior induces various externalities that affect organizations at different levels of the distribution channel. Moral hazard and unobservability are

particularly relevant concepts with respect to distribution service provision. Services possess characteristics, such as intangibility, simultaneity of production and consumption, and heterogeneity. Consequently, they possess a relatively low level of search attributes and high a level of experience attributes (Nelson 1974), and in some cases even credence attributes. Service performance therefore is often difficult, if not impossible, to assess with certainty and implies *difficult or high-cost monitoring*. Distribution service elements that are particularly vulnerable to moral hazard are quality maintenance and information. Horizontal moral hazard occurs for example with respect to the level of service provided by franchisees (cf. Lal 1990). When monitoring is costly or impossible franchisees may be tempted to behave opportunistically and provide less service than required. A franchisee offering better service than other franchisees of the same franchisor exerts a positive horizontal externality on these other retailers (spillover) because his service may positively influence the demand for the organization as a whole. A franchisee who cuts down on service exerts a negative horizontal externality on his fellow franchisees.

In a simple two-level manufacturer-and-retailer channel the basic vertical externality, also called downstream moral hazard, generally exists also for the retailer's choice of decision variables other than price, such as distribution service provision and promotional efforts. To the extent that these efforts increase final demand the manufacturer wants to encourage the retailer to supply them. In order to prevent the retailer from underprovision of services or promotional efforts the manufacturer induces the retailer to behave as desired by the manufacturer. Channel members, including consumers, are often uncertain about the service level actually provided. Even high-quality suppliers may not make the required service effort with respect to a specific buyer-seller relationship. Moral hazard applies less to several specific service elements, such as accessibility of location, which is relatively easy to monitor. Although assortment can be assessed objectively, consumers will experience difficulty in assessing large assortments.

Unobservability and associated moral hazard have been specifically addressed with respect to product quality problems, using signaling theory. A well-known example of the significance of quality uncertainty has been given by Akerlof (1970), who showed what happens if the neoclassical assumption of perfect information is relaxed. Assume buyers of used cars know only the average quality of cars sold, while retailers know the exact quality of a car they are selling. Buyers

consequently bid what they consider a fair price for a car, while sellers accept the average-quality price only for a car that is below average quality. If buyers knew beforehand that this would happen, they would lower their bid and only cars with quality just below the quality appropriate for this price would be sold. As a result only cars of the lowest quality would be sold at the lowest price. This downward bias on average quality is called the *adverse selection* or lemons problem.

The previous indicated that an important cause underlying channel coordination problems concerns conflicting interests of interdependent channel actors. Concepts that indicate the degree of goal-congruence are trust (e.g., Anderson and Narus 1990, Moorman, Zaltman, and Despandé 1992; Kumar, Scheer, and Steenkamp 1996), credible commitment (e.g., Anderson and Weitz 1992), satisfaction, and relationship quality. Transaction cost theory and agency theory view partner *opportunism* as a basic problem of channel control (John 1984). Variables that increase transaction costs, such as unobservability, complexity, performance ambiguity due to high complexity, a high degree of credence attributes, or a lack of trust, encourage opportunistic behavior by channel members. This intensifies all types of moral hazard and associated externalities, resulting in lower performance by other channel members and eventually lower total distribution channel performance. For example, technical complexity induces channel miscoordination caused by downstream moral hazard and associated vertical externality. Consider the case of a manufacturer who uses low quality technology and consequently enforces the retailer to pay for costly repairs.

Opportunism can occur with respect to a variety of other situations. A firm that has made *transaction-specific investments* in a certain relationship depends on continuation of that relationship because switching is costly and therefore is extremely vulnerable to opportunism, the so-called safeguarding problem (e.g., Heide and John 1990). A manufacturer takes a so-called hostage from a supplier who invests in relationship-specific goods or procedures (Smitka 1991). The manufacturer's credible threat to end the relationship reduces the likelihood that the dependent supplier will show opportunistic behavior. Agency theory refers to *information asymmetries* and differences in risk preferences as environmental uncertainty. Information asymmetries between retailers and manufacturers may cause retailers to take "wrong" decisions from a channel perspective (Gerstner and Hess 1995). This so-called environmental uncertainty causes control problems even

when channel members are willing to take a channel perspective (Dwyer and Oh 1987).

A variety of control mechanisms has been suggested in literature, that can be classified broadly as structural or incentive-based. Table 6.1 gives an illustrative overview of these coordination mechanisms that will be discussed in the next sections. Since the role of distribution service provision in channel coordination has remained largely underexposed many examples refer to price coordination only, but may generate useful insight into service coordination problems.

6.3.2 Structural coordination mechanisms

The institutional approach in marketing considers channel organization or more generally, relationship organization, as a distribution channel coordination mechanism. The three basic structures are (cf. Arndt 1981): *markets*, that are coordinated ex post through the price mechanism; *politics*, in which bargaining and voting can be used as means to achieve power, and *hierarchies* or bureaucracies that are coordinated ex ante by direct assignments, administrative rules and regulations.

Given so-called market failure, the divergence between interests can be reduced through bargaining or eventually through the use of other sources of *power*. Power is the main instrument that can be used to achieve channel coordination (Stern, El-Ansary, and Coughlan 1996). The resources that are possessed and controlled by a firm, such as assets, attributes and conditions within a relationship, generate dependence of another firm that values these resources but does not possess them. Social exchange theory (Anderson and Narus 1984; Kelly and Thibaut 1978; Thibaut and Kelley 1959) and resource dependency theory (Pfeffer and Salancik 1978) use power as a behavioral base for channel coordination problems. The latter theory argues that a firm has power over another firm to the extent that it controls resources that cannot or at a substantial higher cost be obtained elsewhere by the dependent firm. Social exchange theory argues that firms act according to two comparison levels: the quality of outcomes expected from past experiences with relationships with channel members (CL) and the quality of outcomes of the best alternative relationship available (CL_{alt}). The degree to which a channel member can affect the quality of other firms' outcomes is a source of

Table 6.1 *Instances of distribution channel coordination mechanisms.*

Generic mechanism	Moral hazard type	Specific coordination mechanisms
1. Structural	unilateral vertical	- Vertical coordination (e.g., Arndt '81; Williamson '75).
	unilateral vertical	- Channel decentralization (e.g., Coughlan & Lal '92).
	horizontal	- Collusion (e.g., Coughlan '85).
2. Behavioral	unilateral vertical	- Emphasizing tasks & activities (e.g., Celly & Frazier '96).
	unilateral vertical	- Monitoring (e.g., Lal '90).
	unilateral vertical	- Power-dependence (e.g., Anderson & Narus '84).
	unilateral vertical	- Social control (e.g., Coleman '90; Jaworski '88; Bergen et al. '92).
	unilateral vertical	- Selection procedures (e.g., Spekman '88).
3. Informal	horizontal + vertical	- Learning (e.g., Shugan '88; Coughlan & Mantrala '92, '94)
	horizontal + vertical	- Punishment strategies (e.g., Abreu '88; Lal '90)
	unilateral vertical	- Unobservability (e.g., Coughlan & Wernerfelt '89).
4. Incentive-based	unilateral vertical	- Two-part tariffs (e.g., Oi '71; Zusman & Etgar '81; Lal '90; Ingene & Parry '95a,b).
	unilateral vertical	- Royalty payments (e.g., Moorthy '90).
	unilateral vertical	- Quantity discounts (e.g., Jeuland & Shugan '83; Moorthy '87).
	unilateral vertical	- Side payments (e.g., Norton '87).
	unilateral vertical	- Resale price maintenance (e.g., Winter '93)
	unilateral vertical	- Price floors.
	unilateral vertical	- Pull discounts (Gerstner & Hess '95).
	unilateral vertical	- Transaction-specific investment (Williamson '75).
	unilateral vertical	- Customer satisfaction bonus & mnfr. assistance (Chu & Desai '95).
	unilateral vertical	- Service provision (Betancourt & Gautschi '96).
	bilateral vertical	- Marginal source (Holström '82).
	horizontal	- Service provision (Bell & Padmanabhan '96).

power. Transaction cost analysis adds another perspective on the same argument: high switching costs caused by idiosyncratic investment and associated asset specificity represent the power one firm has over the other.

The political economy framework (Zald 1970) adopted the concept of power as a force driving channel members. The framework links two central concepts, polity, which refers to the system and/or actors influencing decision making within an organization or society, and economy, which refers to the productive exchange system of an organization or society. For an overview of the political economy framework in marketing the reader is referred to Arndt (1981), Achrol, Reve, Stern (1983), and Stern and Reve (1980) who were the first to apply the framework to marketing channels. Distributors may exert considerable power due to their specialized market information and their taking title to products (Cespedes 1988), which make coordination all the more difficult.

Vertical integration is probably the best-known way to achieve channel coordination from a power perspective. By taking title of multiple consecutive firms in the distribution channel the company who owns the vertical system assures itself of the power necessary to coordinate the actions by the firms that have been acquired. The most obvious solution for many coordination problems is thus structural in nature. The basic vertical externality can, for example, be resolved by vertical integration. Vertical integration avoids the price distortion, due to double or triple, etc. marginalization (see also Gerstner and Hess 1995; Moorthy 1988; Bolton and Bonanno 1988; Lilien, Kotler and Moorthy 1992, p.419; Spengler 1950). However, like other coordination mechanisms vertical integration should be considered in terms such as efficiency and flexibility (Malone 1987; Niman 1992). Note that vertically integrated channels or hierarchies imply increased costs of bureaucracy. Hierarchies are more efficient when goal congruence and performance ambiguity are moderately high, while markets are more efficient when goal incongruence is low and performance ambiguity is high, i.e., the cost of monitoring is high (Ouchi 1980).

In practice, *markets* may function and coordinated behavior in noncooperative environments without formal (contractual) agreements, financial commitment, overt exercise of power, or close personal relationships can be observed. For example, coordination can be achieved through *monitoring* (Lal 1990a), which reduces information asymmetry and enables detection and subsequent reduction or

prevention of opportunism. The monitored party may however feel the monitoring indicates a lack of trust, which can damage the relationship (John 1984). If monitoring is difficult or even impossible and costly, selection procedures (Spekman 1988) can assist in reducing uncertainty with respect to partner capabilities, but they do not prevent the occurrence of opportunism. *Social control* (e.g., Bergen, Dutta, and Walker 1992; Coleman 1990, Jaworski 1988) may encourage relationship continuance and/or reduce opportunistic behaviors. Monitoring and social control are however overt behaviors that imply the use of power.

As an example of an *informal coordination* mechanism, *implicit understanding* assumes channel members are so smart to recognize that, although they have an incentive to seek their own short-term interests, they may be better off in the long run if they consider the other channel members' interests as well. Implicit understanding may involve the recognition of another channel member's potential power, as will be discussed below, but power does not have to be exercized in order to achieve channel coordination.

One rationale behind implicit understanding is channel member *learning* over time (Coughlan and Mantrala 1992, 1994; Shugan 1985). When over time channel members, e.g., a manufacturer and a retailer, learn each other's reaction functions, they have some control over each other's behavior and realize each other's recognition of control. Firms' understanding of their mutual influence over each other's margins eventually leads to higher total channel profits. Even when only one of two firms learns both firms are better off, in particular the firm that does not learn ("ignorance is bliss", Lee and Staelin 1997). Because mutual influence is not the same as complete control implicit understandings are not a perfect substitute for perfect coordination resulting from formal agreements and they generally result in relatively higher retail price and lower channel profits. Although the analysis does not take into account the effect of channel member's power on the division of channel profits this will not affect channel members' actual learning. In the real-world the level of channel profits will be somewhere in between profits in a channel with independent firms and a perfectly coordinated channel's profits. Shugan (1985) argues that this incomplete coordination may form an incentive to possibly illegal, explicit collusion.

When channel pricing agreements are not necessarily *observable* channel members have an incentive to cheat other channel members. This argument has been elaborated by Coughlan and Wernerfelt (1989). For example, assume two channels, each with one manufacturer and one retailer. In each channel the manufacturer can announce a transfer price and then secretly renegotiate a new agreement with the retailer that, given the other channel's transfer price, leads to much higher profits for both channel members. However, in symmetric channels, the other manufacturer has an incentive to do the same. The only possible outcome in the end thus consist of prices and quantities that are equal to those in a centralized channel, and consequently channel length becomes irrelevant. The actual degree of observability depends on legal restrictions, i.e., antitrust laws, and the number of parties involved in deal-making.

Recent economic theory offers another rationale for informal coordination, based on the use of *punishment strategies* (e.g., Abreu 1988). Punishment strategies imply that if any firm shows noncollusive behavior it is punished by a competing firm such that the losses incurred by this punishment prevent the firm from deviating from both firms' collective interest. Many punishment strategies have been formulated in game theory. Of course, a punishment threat has to be credible in order to work and will therefore never be implemented in equilibrium. A threatening firm thus has to be perceived as powerful. Not every firm will be capable of exerting a credible threat, since it may involve substantial costs. Lal (1990a) uses one of Abreu's punishment strategies, Mutually Assured Destruction (MAD), to explain alternating price promotions by competing firms carrying national brands, which he observed in mature consumer goods markets. He interprets these alternating price promotions as a long run strategy that is pursued by these firms to defend their market shares from a third, local brand. Since there exist switchers in the market it is in the two national firms' best interest to collude implicitly. Over a discounted infinite horizon alternate promotions yield future discounted profits that are as high as they would be with explicit collusion. The most severe punishment strategy for deviation is when the punishing firm lowers its price to zero or to marginal cost for a limited period of time. The deviating firm has to follow this price change to prevent even greater losses. Lal shows that this punishment strategy is credible, and will therefore never be implemented, since it leads to a perfect Nash equilibrium.

Distribution service provision can play an important role as an informal instrument for channel coordination. Referring to the definition of distribution service in chapter 2, distribution service can improve customers' decision making. Particularly information increases understanding of other channel members' performance, and reduces perceptions of uncertainty and complexity. Availability of desired products reduces uncertainty as well. Ultimately, this may lead to decreased goal incongruence. Consider in this respect standardization of products and procedures, that reduce complexity (cf. Mintzberg and Quinn 1996). The hedonistic shopping value generated by distribution service provision, such as a pleasant ambience, creates an atmosphere that favors mutual understanding and supports mutual trust. Finally, distribution service provision can reduce customers' distribution-related cost and as such it can be an incentive-based coordination instrument, which will be illustrated in the next section.

6.3.3 Incentive-based channel coordination mechanisms

Incentives are typically designed rewards to change channel members' behavioral orientation into a direction desired by the coordinating firm. Specific investments can be considered incentives, and there are many other ways of designing self-enforcing contracts (Telser 1980) which prevent channel members to opportunistically pursue short-term profits. In the marketing science literature the coordination of distribution channels when channel members are independent, profit-maximizing businesses is an important topic and focuses on channel structure in relation to incentive-based coordination efforts, mainly in the form of tariffs (e.g. Jeuland and Shugan 1983; Shugan and Jeuland 1988; Moorthy 1987a; Shugan 1985). Although one could argue that incentives for achieving channel coordination can be made in the form of service provision, only few studies have considered this. For example, Chu and Desai (1995) consider the problem of a manufacturer who wants to motivate retailers to increase their customers' satisfaction. The coordination mechanisms the manufacturer uses consists of a combination of providing rewards based on consumer satisfaction (bonus) together with providing retailers with investment assistance to improve consumer satisfaction (assistance). Manufacturer assistance consists of employee training and provision, free

consulting, parts availability, etc. The effect of both mechanisms depends on the retailer's short-term vs. long-term orientation. Among short-term retailer efforts are promotions, spot advertisements, and high-pressure selling. Long-term retailer efforts include providing adequate information about use and maintenance, quick and safe delivery, and quick response to problems. Manufacturer long-term efforts consist of high quality, brand-building advertising expenditures. The authors found, not surprisingly, that short-term oriented retailers can be coordinated better using relatively more bonus, while long-term oriented retailers need relatively more manufacturer assistance.

Incentive-based channel coordination mechanisms are particularly suited for analysis from a game-theoretic perspective. Game-theoretic research on channel coordination has focused almost exclusively on channels with monopoly in production. This section will therefore illustrate the main findings for the monopoly exclusive dealer channel and channels with competing retailers. The examples include mainly coordination in channels where price is the only decision variable and consequently unilateral, upstream or downstream, moral hazard exists. Research on coordination in channels with bilateral moral hazard, which particularly applies to channels with more than one service provider, is scarce but will be mentioned wherever appropriate. Finally, unless stated otherwise, the studies mentioned here consider channels in which the manufacturer is the channel price leader and the retailer(s) are followers.

Starting with *price* as the only decision variable, the essential problem underlying the basic vertical externality is the discrepancy between marginal cost of a centralized distribution channel and the retailers' marginal cost for the good - which is based on the wholesale price -, for a given channel structure. Several incentive schemes for achieving channel coordination in case of an unilateral vertical externality have been mentioned, mainly with price as the decision variable. Central to most of these approaches, which will be discussed subsequently, is for the manufacturer to set a wholesale price that causes the retailer's total marginal cost to equal the total channel's marginal cost if it were perfectly coordinated, thereby inducing the retailer to set a price that maximizes total channel profits.

A manufacturer can realize the integrated-channel profit without actual vertical integration by using a two-part tariff, instead of a one-part tariff or linear transfer price (Gal-Or 1987; McGuire and Staelin 1986; Moorthy 1987; Oi 1971;

Tirole 1993; Zusman and Etgar 1981), $T(q) = A + p_w q$, where A is the franchise fee. The distortion caused by the inequality of retailer marginal cost and channel marginal cost can be eliminated by taking $p_w = c$. In that case the retailer sets her final price as desired from a total channel perspective, so there is no externality. The retailer maximizes $(p-c)D(p) - A$, with $D(p)$ denoting consumer demand, and thus chooses $p = p^m$, the channel optimal, vertically integrated retail price. The retailer's profit equals $\Pi^m - A$, where $\Pi^m = (p^m - c)D(p^m)$. The manufacturer can then appropriate the retailer's profit by imposing a franchise fee equal to the channel profit $(A = \Pi^m)$. If the unilateral externality involves another input factor instead of price, such as promotional effort and observable service elements, a two-part tariff could also solve the coordination problem. In that case the retailer is also made the so-called "residual claimant" because he receives any marginal profit. In general, a two-part tariff can take into account the service efforts a supplier makes during his interactions with a retailer.

Jeuland and Shugan (1983) assume an exclusive dealer channel in which neither retailer nor manufacturer have control over the price decision and show that a jointly negotiated quantity discount schedule may also lead to cooperative behavior due to the profit-sharing mechanism underlying it. However, Moorthy (1987a) proved that quantity discounts are not necessary to achieve coordination in the particular channel modeled by Jeuland and Shugan. He argued that "... a wide variety of pricing schemes, including pricing schemes with quantity surcharges, can do the job" (p 375). A two-part tariff with a constant per unit charge is a special, more simple, case of the quantity discount schedule: $T(q) = A + (p_w - vq)q$, where $v = 0$. Quantity discounts seem particularly justified with respect to distribution service provision, since each transaction requires a certain amount of service.

Franchise fees may have serious drawbacks (Tirole 1993). For example when the retailer possesses information about the retail cost or retail demand that the manufacturer does not have and cannot obtain at reasonable cost through monitoring. In addition, a franchisor cannot assess with certainty, unless at very high cost, how much service each of his franchisees provides. This makes it difficult for the manufacturer to determine the franchise fee so as to appropriate the retailer's profit and necessitates the use of reliable screening devices by the manufacturer. Furthermore, when the retailer is risk-averse and the residual cost or

the final demand is random, the retailer may feel he bears too much risk. The retailer is given some insurance when the franchise fee is reduced and the wholesale price is increased above marginal cost. Finally, when there are several retailers, the total channel marginal cost may differ across retail outlets and a retailer buying at total channel marginal cost is not necessarily made a residual claimant.

Two-part tariffs and other forms of profit sharing should avoid price discrimination among retailers, since this violates the 1936 Robinson-Patman Act effective in the U.S. The violation of this Act, as well as the situation in which a retailer does not pass the discount to his customers, so-called channel pricing breakdown, can be avoided through the use of pull discounts (Gerstner and Hess 1995). Pull discounts are a mechanism for channel coordination through price discounts to consumers instead of retailers. Targeted pull discounts create a transaction cost differential between the targeted (high price conscious) and nontargeted (low price conscious) consumers and thus make demand more elastic, which makes price reductions and selling to the price conscious consumer segment more profitable for the retailer. This mechanism is even more effective when combined with wholesale discounts. Major drawbacks associated with the use of pull discounts are the assumption of manufacturer leadership and the necessity to accurately target the discount to price-conscious consumers and make it hard for other consumers to obtain the discount, which limits practical implementation in competitive markets. Finally, the manufacturer incurs a high cost of targeting and distributing the discounts directly to consumers.

A last mechanism for achieving channel coordination in the monopolist channel mentioned here involves resale price maintenance (RPM) (e.g., Tirole 1993). The manufacturer can sell the intermediate good to the retailer at a price equal to the vertically integrated optimal retail price $(p_w = p^m)$ and then impose resale-price maintenance $(p = p^m)$. The retailer makes zero profit and the manufacturer's profit equals the channel's aggregate profit, Π^m. A price ceiling $(p \leq p^m)$ or quantity forcing $(q \geq q^m)$ would suffice for the manufacturer's purpose as well, but a price floor would not. Once uncertainty is introduced RPM is not sufficient. When a retailer is risk-averse and faces retail-cost uncertainty with RPM he is not able to pass through retail-cost variations into the final, fixed, price and consequently bears all the risk associated with such variations. RPM induces

excessive monopolist manufacturer power, such as may be the case for goods with high brand equity, and its use is therefore prohibited as well by U.S. as by European legislation. Use of RPM could go with manufacturer requirements with respect to distribution service provision only if service provision can be monitored by the manufacturer at relatively low cost.

The discussion of channel coordination mechanisms sofar has restricted to bilateral monopoly or exclusive dealer channels. In competitive distribution channels the coordination problem is more complex and therefore more difficult to solve. In a channel with competing, nonidentical retailers total channel marginal costs will differ across retailers. Consequently, the channel-coordinating wholesale price will vary across retailers. In addition, the Robinson-Patman Act precludes sellers "from giving different terms to different resellers in the same reseller class" unless cost differences in serving those sellers can be shown, or a few other conditions apply (Jeuland and Shugan 1983, p. 256). Also, by U.S. and European law manufacturers cannot dictate prices to retailers. Because of the requirement to treat retailers comparably the manufacturer can extract profit from the retailers - using a fixed franchise fee - only to the extent that the least profitable retailer is able to meet.

In general, practical considerations are predominant in research on coordination of competing channels. Ingene and Parry (1995a) analyze channel coordination in a channel with one manufacturer selling an identical product to two competing retailers. Among the coordination mechanisms that are valid the authors focus on three simple wholesale pricing strategies. They justify their consideration of simple pricing strategies by stating that more complex wholesaling tariffs introduce "administrative, bargaining, and contract development costs" and may cause retailers to believe they are being "taken advantage of" (p.361). In addition, the difficulty of obtaining the information required in order to design an optimal policy increases with the complexity of the wholesale pricing policy (McGuire and Staelin 1983). The analysis showed that the optimal manufacturer pricing policy depends on differences in retailers' fixed costs. The required simplicity of the coordination mechanisms together with the restrictions on differential contracting inhibit the attainment of channel coordination in all circumstances. Because of the strict conditions that must be met - the difference between fixed fees charged to each retailer must fall between certain bounds and the absolute value of fixed fees is

limited due to minimum retail profitability constraints - a manufacturer may even prefer a noncoordinating price strategy to a channel coordinating menu of tariffs. In another, related, study Ingene and Parry (1995b) found that a single two-part tariff with fixed per unit wholesale cost equal to constant marginal production cost fully coordinates a multiple retailer channel when retailers have exclusive territories. They conclude that "the optimal two-part tariff wholesale pricing policy, consisting of an optimal unit fee (W) and an optimal fixed fee (w)" generates greater manufacturer profits than "a wholesale pricing policy that coordinates retailer behavior."

When *service provision* is included in the analysis as a decision variable and multiple subsequent channel members, for example manufacturer and retailer, provide service that affects consumer demand so-called bilateral moral hazard exists. The familiar incentive-based coordination mechanisms do not suffice in that case because both channel members have to be made residual claimants. This problem was solved first by Holström (1982) who showed channel coordination in an exclusive dealer channel can be achieved by introducing a third party, a so-called marginal source, who is willing to sign any contract that generates non-negative profit. The marginal source pays the manufacturer the market price charged by the retailer, i.e., the retail price. The retailer pays the marginal source according to a two-part tariff consisting of marginal cost per unit plus a fee that is determined such that the source's profit is zero. Accordingly, in practice middlemen can be observed that earn very small margins. For competing channels the coordination problem in case of multilateral moral hazard becomes a very complex one.

Wernerfelt (1994) developed a game-theoretical approach to decisions concerning allocation of service provision among vertical channel members. Both manufacturing and information exchange tasks can in theory be performed by different channel members. Wernerfelt's efficiency criterion states that in a bilateral channel the alternative for which both parties are better off, or maximization of joint payoff, should and usually will be preferred. In case joint payoff maximization implies inefficiency because gains for one player are lower than in another equilibrium that does not maximize joint payoffs, Wernerfelt argues that joint payoff maximization is more efficient than any other alternative equilibrium when players agree to share the gains through side payments by one player to the other, an argument similar to Norton's (1987). Although theoretically justified the efficiency

criterion has not yet proven applicable in practice since the actual side payments that should be made by channel members are difficult to determine. For obvious reasons independent firms in a distribution channel are not always prepared to make side payments in order to improve total channel performance. For example, a powerful channel member benefits from distribution service provision through an increase in his share of profits (Betancourt and Gautschi 1998).

A way of resolving the adverse selection problem mentioned in 6.3.1 is through warranty contracts or guarantees (cf. Lutz and Padmanabhan 1995, Moorthy and Srinivasan 1995, Padmanabhan and Rao 1993). Warranties assure compensation in case of product failure and therefore serve as a credible signal of product quality[1]. Consumers generally rely on inferential belief formation to assess the value of variables that are difficult to assess with certainty, such as quality and service. Inferential belief formation rests on assumed cue-attribute relationships. For example, multiple studies found a price-quality relationship (e.g., Gabor and Granger 1966; Gardner 1971; Shapiro 1973). Other variables that are thought to give information about the quality of a product are advertising (e.g., Nelson 1974; Schmalensee 1978), and the size of a firm.

Service competition between retailers evokes also horizontal externalities. Many retailer and manufacturer activities, such as personal selling and other service provision, and advertising, have a "public good nature" (Gerstner and Hess 1995) and are provided to all patrons of an outlet. Betancourt and Gautschi (1990) formally derived that provision of distribution services at no explicit prices evokes free-riding behavior by consumers in some cases. Consumers may have an incentive to visit a retailer who provides services that can be consumed prior to purchase, such as pre-sale information and advice, in order to obtain information, and then buy from a cheaper retailer who sells the same product but does not provide these services. This discourages retailers to provide service. In practice consumers are not completely informed, and products are differentiated to some extent at least, although this may not be enough to warrant provision of a minimum level of service.

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[1] A signal is a manipulable attribute or activity that conveys information at some cost to the revealer (Spence 1974). In order for a signal to be effective it should be observable and alterable, the underlying economic variable should differ between individuals or firms as well as differ in cost of revealing the differences in this variable (Devinney 1988).

One way to ensure an adequate provision of services by retailers is reduction or elimination of competition. A manufacturer can give retailers a property right on their services by protecting them against unfair competition, by restraints such as resale price maintenance and exclusive territories (Winter 1993). Resale price maintenance encourages consumers to buy at retailers that provide services because a better price is not found elsewhere. Exclusive territories grant a monopoly position to retailers and effectively eliminate consumer moral hazard and horizontal externality, provided consumers are not so mobile and electronic markets are insignificant. Retailers belonging to a franchise organization or a vertically integrated chain have an incentive to free-ride on other retailers who belong to the same organization. The problem of coordinating franchisees who have an incentive to free-ride has been analyzed by Lal (1990a). He found that monitoring is always necessary to improve coordination of competing franchisees and in some cases royalties are needed too.

Distribution service provision may also be a coordinating device in distribution channels where horizontal externality exists. The study by Bell and Padmanabhan (1996) in which they show that service provision serves as a rationale for dual distribution has already been mentioned. In distribution channels both unilateral (price) and multilateral horizontal and vertical (service) moral hazard may occur simultaneously. The decision how to motivate multiple channel members to allocate their service efforts so as to optimize total channel output or consumer satisfaction is essentially a coordination problem that is difficult to solve, let alone to achieve in real-world markets. Instead, the results mentioned here clearly show that channel members may be better off striving for channel power.

In addition to the control mechanisms mentioned in this chapter, many other approaches exist. For example, Celly and Frazier (1996) transfer the concepts of outcome-based coordination efforts and behavior-based coordination efforts from intraorganizational research to interorganizational channel relationships. A supplier's personnel exerts outcome-based coordination efforts to the extent that their personal communications with a distributor's personnel focus solely on economic results, such as sales growth and market share. To the extent that the supplier's personnel emphasizes "tasks and activities" that are expected to relate to economic results in their communications with distributor personnel their coordination efforts are behavior-based. Celly and Frazier develop a causal model

in which they explain the use of the two types of coordination effort from environmental, supplier, and distributor characteristics. They found that environmental uncertainty, supplier familiarity and distributor value added have a strong positive relationship with behavior-based coordination efforts, mainly because these efforts may reduce the distributor's cause-effect ambiguity and reduce perceived risk or increase payoffs for both parties. Supplier replaceability and supplier resource constraints relate negatively to behavior-based coordination efforts. Supplier replaceability and supplier resource constraints relate negatively to outcome-based coordination efforts and environmental uncertainty and distributor experience relate positively to outcome-based coordination efforts.

When the environment is extremely uncertain suppliers may tend to focus on outcome-based control because they are uncertain about the behavior-performance relationship, which is consistent with the study's findings. Stump and Heide (1996) further analyzed the antecedents of and interdependencies between different explicit control mechanisms for the specific investment control problem. They found among other things that relationship-specific investments induce qualification procedures as well as specific investments by the other party. The extent to which different control mechanisms are substitutes remains unclear.

6.4 Conclusions and research question

Despite the extensive body of research on distribution channel organization only few analytical studies address the role of distribution service provision in channel structure and coordination. The organizational dynamics theory, in Sheth, Gardner and Garrett's (1988) terminology, generally adopts an integrated perspective on explaining important channel practices and relationships while the analytical or game-theoretic approach identifies optimal channel coordination mechanisms or solves for the equilibrium form of contract, often from a microeconomic perspective. Although service provision is a basic function of intermediaries in distribution channels both approaches prefer mostly to focus on firms' pricing decisions and the vertical differentiation of distribution channels and largely overlooked the role of service provision in channel competition. Given the focus on price, service provision has been recognized as a constraint and as an instrument

that powerful channel members, in these studies usually the manufacturer, can use for achieving channel coordination.

Competition, together with channel members' cost structures, has been recognized as a major determinant of channel structure. Intense competition is very often not advantageous to individual channel members, and therefore favors all sorts of differentiation. This chapter mentions three categories of differentiation, namely channel differentiation, i.e., the addition of channel levels through the use of intermediaries, vertical product or service differentiation which reduces product substitutability, and horizontal or store differentiation which reduces price competition between stores. For manufacturers of highly substitutable products with low quality or low service, the use of channel intermediaries decreases competition and leads to higher prices and profits. Generally the use of channel intermediaries implies spinning off marketing functions that relate to service provision. Distribution service decisions consequently play a particularly important role with respect to store differentiation.

Channel coordination has remained a theoretical issue with strong practical relevance. This chapter identified several important sources of channel miscoordination, that all relate more or less to goal incongruence and uncertainty. The chapter identified three structural coordination forms; markets, power, or vertical integration. In practice, many channels are not explicitly coordinated (cf. Lee and Staelin 1997), for example due to exclusive technology, spatial barriers, or the complexity of channel structure. Mechanisms of informal coordination rest on the assumption that firms recognize, through experience, common sense or threat, that they may benefit in the long run from considering other firms' interests. New explanations for informal collusion should come from related fields, such as psychology and biology, since parallels exist with yet unresolved issues with respect to human or animal altruistic behavior. The role of distribution service provision in channel coordination has however remained largely uninvestigated. Service provision can function as an incentive for channel coordination. In addition, service provision can reduce uncertainty and information asymmetries and as such reduce the opportunism underlying channel miscoordination.

Several studies clearly show that powerful manufacturers in uncoordinated channels may be better off than in coordinated channels, for example when products are highly substitutable (McGuire and Staelin 1983, 1986), or when channel

coordination requires differential contracting of retailers which is restricted by law (Ingene and Parry 1995a, 1995b). Betancourt and Gautschi (1996) showed that the channel member controlling distribution service provision enjoys a higher share of profit margin in a decentralized channel. In certain channels, such as those involving perishable consumer goods, every member's service decisions affect the total product obtained by the consumer. The multilateral moral hazard problem involved renders the analysis very complex and will be the topic of future research. More generally, several psychological motivations for channel member behavior, such as personal commitment to a relationship, involving concepts like trust, relationship quality, and satisfaction have been recently uncovered as coordination mechanisms. Incorporation of these concepts into analytical, or game theory models of channel structure and coordination remains a future challenge.

A lot of questions remain with respect to service competition between distribution channels and allocation of service provision within channels. One of the most promising areas for research concerns retail format competition. A large part of service efforts in a channel is done in order to create availability for the final consumer. One could therefore assume that service competition will be most intense on the retail level. Analysis of competition between retail outlets serves to gain insight into the emergence of differentiated retail formats, in particular with respect to distribution service provision, and the relationship thereof with channel structure. Based on promising initial work done by early researchers who considered service provision a core task of distributive firms, such as Baumol and Ide (1956) and Bucklin (1966), recently a few analytical studies have been done on the role of retailer service and price decisions in channel competition and the consequences for the developments of differentiated retail formats. The next chapter develops a game-theoretic model of retail competition with respect to price, assortment, and other service. The model yields insight into the conditions with respect to channel cost structure and consumer preferences that encourage retailers to differentiate with respect to service provision.

Appendix: Game theory

The dominant conceptual paradigm employed in economics and marketing for examining the conduct of firms operating in oligopolistic markets is game theory (Moorthy 1985, 1993). For many industries today's competition involves a few competitors whose interests are interdependent, meaning that the consequences of the actions undertaken by one competitor depend on the other competitors' actions as well. Game theory applies to situations where actors are not only interdependent but have (partially) conflicting interests as well. Many real-world situations exist in which both strategic interdependence and conflict of interest occur simultaneously. For example, horizontal competition exists with respect to price, product quality, product line development, strategic entry decisions, and advertising spending (for an overview of applications, see Moorthy 1985, 1993). Vertical and horizontal competition in distribution channels among, respectively between manufacturers, retailers and other intermediaries has been modeled and analyzed predominantly using game theory. With respect to the channel decision, assume, for example, a monopolist manufacturer who distributes his products through an independent retailer. Both channel members act according to their own goals, e.g., profit maximization, which conflict with respect to for example quantity and selling price. These conflicting interests prevent optimization of total channel goals unless some form of coordination is achieved. Should the manufacturer vertically integrate the retailer, or is there a way for him to behave so that their actions are coordinated, despite their conflicting interests? Related problems include allocation of sales force compensation, and media scheduling.

This appendix gives a brief introduction to some important basic concepts in noncooperative game theory. For a detailed overview of game theoretic models for competitive marketing strategies the reader is referred to Moorthy (1985, 1993), a general overview of game theory is given in e.g., Gibbons (1992) and Osborne and Rubinstein (1996).

Game theory comprises noncooperative and cooperative or coalitional games. Noncooperative game theory examines the behavior of independent but interdependent individual actors (e.g., individuals or firms) that experience a conflict of interest and do not collude explicitly. Cooperative game theory examines

the formation and joint behavior of groups of actors (coalitions), independent from remaining players. The two major differences between noncooperative and cooperative game theory are a focus on individual players, respectively groups of players, and, although cooperative game theory is based on the individuals' preferences, it does not consider the details of how groups of players function internally, i.e. *how* coalitions form, and *how* their members choose joint actions.

Noncooperative game theory seems most appropriate for the analysis of distribution channel structures consisting of multiple interdependent actors. However, while noncooperative game theory is used to compare results for decentralized channels and vertically integrated or collusive channels, the formation of coalitions between several (but not all) firms in complex distribution channels could be modeled and analyzed using cooperative games. Since this goes beyond the scope of this book the discussion in this appendix is restricted to noncooperative game theory.

Game theory can be viewed as normative, descriptive or prescriptive, or a combination of these (Van Damme 1995). With descriptive game theory one documents how people make decisions in game situations, and prescriptive game theory results in advise aiming at improving players' decisions in game situations. Normative game theory, which has received most attention in literature, analyzes the consequences of strategic behavior by superrational players. This introduction proceeds with a discussion of normative game theoretic models. With respect to distribution channels normative game theoretic models analytically derive eventual equilibrium strategies with respect to marketing variables set by firms in the market, as well as the consequences thereof for market structure. Underlying these models are a set of assumptions about the behavior of competing firms and the information available to them.

Two central assumptions are that firms are both rational and intelligent. Rationality implies that firms make decisions by maximizing their subjective expected utility (Savage 1954). Assuming that firms are aimed at profit maximization their utility functions are linear in profits in an environment that is certain. In case of uncertainty, e.g., about the actions other firms will undertake, rational firms will compute expected utilities from different actions based on subjective estimates of the probability of uncertain events. Intelligence implies that firms recognize other firms as rational. A complete description of the game, i.e.,

rules of the game, includes the number of firms, their feasible sets of actions at every juncture in the game and their utilities for each combination of moves, the sequence of moves and the structure of information about the moves (Moorthy 1985). When the rules of the game are common knowledge among the players, and every player knows that every other player knows the rules, and every player knows that every other player knows that he knows the rules etc., the game is a game of complete information. When the rules of the game are not common knowledge, in particular when firms possess asymmetric information, the game is a game of incomplete information. Complete information does not imply perfect information. In a game with perfect information each player who is to move knows the full history of the play of the game thus far. Although most real-world games are games of incomplete and often imperfect information, many game-theoretic models assume complete and perfect information.

Noncooperative game theory predicts how rational and intelligent firms will compete. A strong solution concept that provides tight predictions in a broad class of games is the Nash equilibrium (Nash 1950). A Nash equilibrium (NE) is defined as: "a list of strategies, one for each firm, with the property that no firm would like unilaterally to change its strategy", where a strategy is a complete specification of the firm's actions in all the contingencies it might find itself in. In the Nash equilibrium no single player wants to deviate from his or her predicted strategy. In the equilibrium each firm's strategy is a so-called best-response to the other firms' strategies. More formally (Gibbons 1992), consider a game with n players, $G = \{S_1,...,S_n;u_1,...,u_n\}$, with S_i being the set of strategies for player i, and u_i the payoff function to player i, $u_i(s_1,...,s_n)$ if the players choose the strategies $(s_1,...,s_n)$. The strategies $(s_1^*,...,s_n^*)$ are a Nash equilibrium if, for each player i, s_i^* is (at least tied for) player i's best response to the strategies specified for the n -1 other players, $(s_1^*,...,s_{i-1}^*,s_{i+1}^*,...,s_n^*)$:

$$u_i(s_1^*,...,s_{i-1}^*,s_i^*,s_{i+1}^*,...,s_n^*) \geq u_i(s_1^*,...,s_{i-1}^*,s_i,s_{i+1}^*,...,s_n^*)$$

for every feasible strategy s_i in S_i, that is, s_i^* solves $\max_{s_i \in S_i} u_i(s_1^*,...,s_{i-1}^*,s_i,s_{i+1}^*,..,s_n^*)$.

A rational firm would choose its strategy as a best response to the strategies it assumes for others. An intelligent firm must assume strategies for other firms that are themselves best responses to the best-response strategy of the firm. Or, as Moorthy (1985) puts it: "*A firm will not be comfortable with its strategy choice unless it believes that its assumptions about the others' behavior are shared by the others. And a necessary condition for rational and intelligent firms to share a common view of how the game will be played is that that view be an equilibrium.*" A Nash equilibrium is a so-called pure-strategy Nash equilibrium if each firm's equilibrium strategy is a pure strategy, i.e., chosen with probability one. A mixed-strategy Nash equilibrium involves randomization among pure strategies.

The equilibrium concept can easily be misunderstood. Three essentials matter here (Moorthy 1985). First, an equilibrium is defined in terms of strategies, not moves. Furthermore, strategies are played simultaneously in any game. A simultaneous-move game cannot be explained by a dynamic process. Dynamics of the competitive situation can be part of the rules of the game (i.e., dynamic vs. static games), the rules determine the strategies and the strategies determine the equilibrium. Finally, the equilibrium that is obtained depends on how the game is modeled. Games with a finite number of strategies always have an equilibrium, be it pure or mixed (Nash 1950). For games with an infinite number of strategies the existence of equilibria is sometimes difficult to prove, and even more difficult to find. These games will be left unconsidered here.

A distinction is generally made among static games, where firms "meet only once" (Tirole 1993) and players simultaneously choose actions, and dynamic games, where players move sequentially. Well-known examples of static games of complete information are the Bertrand (1883) and Cournot (1838) models of competition in price and quantity, respectively among two firms. The Stackelberg model of duopoly (1934), in which a leader firm moves first and a follower firm moves second, represents a dynamic game of complete and perfect information.

One might question the usefulness and validity of normative game theory approaches for analyzing distribution channel structures. Game theory consists of "a bag of analytical tools that help understand the phenomena observed when decision makers interact", and game theoretic models are "highly abstract representations of classes of real-life situations" (Osborne and Rubinstein 1996). This abstractness makes these models relevant for the study of a wide variety of phenomena and gives

the opportunity to obtain clear insight into the processes and consequences of strategic interaction, but it obviously also has its drawbacks. Comparison of the game-theoretic approach to the institutional approaches that were illustrated in chapter 6, leads to the conclusion that the two types of approaches obviously reflect different kinds of strategic considerations. The solutions of a game theoretic model depend heavily on the assumptions (i.e., rules) underlying the particular game that is modeled. Therefore these solutions should be formulated and interpreted as conditions under which a certain equilibrium results. As "human players are not mental giants with nerves of steel...," make mistakes and therefore violate the perfect rationality assumption the major limitation of game theory involves its lack of predictive power as well as its questionable empirical relevance (Van Damme 1995, referring to Harsanyi 1977 and Raiffa 1982).

With respect to the intelligence assumption van Damme mentions that recent experiments (Plott 1987, Smith 1990) suggest that the equilibrium obtained in games with incomplete information may equal the equilibrium of the associated game with common knowledge of the rules. Van Damme also mentions research that considers limited rationality or learning, absence of rationality (as in evolution theory), and recent research that assumes bounded rationality and takes into account human cognitive limits as possible answers to the rationality problem. With respect to the latter category relevant research within the context of distribution channels has been done by e.g., Fershtman and Kalai (1993) who study attention allocation by a multimarket oligopolist with limited information handling capacity, and Rubinstein (1993) who analyzes the consequences of heterogeneity in information processing ability for a monopolist retailer. Since game theoretic models allow enormous flexibility, balancing a model's richness towards its robustness remains a challenge.

Chapter 7

Retail Assortment Provision and Service Competition*

7.1 Introduction

In the past three decades, retailers have been introducing many innovative retail concepts to possibly avoid head on price competition with other retailers and/or to attract a new segment of the market. The U.S. grocery industry has been witnessing many such retail innovations, such as warehouse clubs, category killers, EDLP grocery stores and of course mass merchandising by Wal-Mart. These retail formats differ from one another with respect to price, promotional strategy, depth and width of assortment, and other distribution services. In The Netherlands, similar retail formulas have emerged in the grocery industry, although the relatively small domestic market permits less variety in retail formats. These retail innovations exploit both segmentation and positioning strategies which in turn have dramatically changed consumer shopping behavior. As a consequence we see the emergence of new retail strategic dimensions resulting in alternative retail formats that successfully compete in the same product categories.

The research presented in this chapter explores one competitive dimension driven by the commitment to a consistent assortment within product categories. Extant research on retail strategies is concerned largely with three dimensions, namely, price, service and assortment depth and width. Recent research by

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* This chapter has been based on Krishnan, Trichy V., Kitty Koelemeijer, and Ram Rao (1999), "Consistent Assortment Provision in a Retail Environment," in review for Marketing Science.

Broniarczyk et al. (1998) has found that apart from the size of assortment there exists one more assortment related factor that affects consumers' choice. Their research shows that the availability of consumers' most preferred alternative in an assortment positively influences their perceptions of assortment size. Specifically, the presence of consumers' favorite alternative in an assortment was found to substantially reduce the impact of item reductions that in some cases even go unnoticed. We define a retailer's commitment to a consistent assortment as the consistency of assortment of brands/items carried within a product category. Note that this is different from a consistency of assortment across product categories. It is useful to understand exactly what the role of a consistent assortment in a product category is.

Consumers planning to visit a retailer who offers a consistent assortment know what assortment of brands they can expect to find once they are in the store. In contrast, when planning to visit a retailer who does not offer a consistent assortment, consumers cannot form rational expectations on the availability of specific brands. For example, a consumer planning to visit Ross Dress for Less, an apparel store, can expect to find name brands but not be certain about a specific brand because the store does not commit itself to a consistent assortment. On the other hand, the same consumer planning to visit a department store such as Foleys can rationally expect to find a specific brand which is part of the assortment that Foleys is committed to. Indeed, it is common to see the advertisements of Ross Dress for Less making the claim that it carries name brands at a lower price but without naming specific brands. In contrast, advertisements by Foleys explicitly name the brands carried. A similar observation can be made in other retail situations. For example, warehouse clubs such as Sam's Choice often carry merchandise across many categories including grocery items that are not consistently available at the store, while the grocery retailers such as Kroger consistently carry in almost each category the set of brands they are committed to. In The Netherlands, Albert Heijn represents a grocery chain that carries a highly committed assortment of 10,000 to 15,000 items, while grocery chains such as Aldi carry a much smaller and less committed assortment. Low-end top-selling products of well-known A-brands can be found in both supermarkets. However, consumers cannot be sure if Aldi carries the high-end products of that same A-brand that appeal to a smaller market segment and that Albert Heijn consistently carries.

Supermarkets such as Aldi draw customers and avoid intense competition with other chains through carrying a low-priced less consistent assortment together with a relatively large, but extremely inconsistent, assortment of non-food items.

The finding of Broniarczyk et al. (1998) implies that when a retailer commits to a consistent assortment consumers start forming expectations. This impact is similar to the positioning image induced in consumers by the commitment that EDLP retailers make with respect to prices as discussed in Lal and Rao (1997, see also the previous chapter). Thus, in both these situations the key factor is the expectations that these commitment strategies induce in consumers. It is important to note that Lal and Rao (1997) relate this commitment to EDLP to the retail positioning strategy under competition with a Hi-Lo store, particularly with respect to service. This prompts one to ponder whether an analogous relationship between commitment to consistent assortment and service strategy exists under competition between two retailers one of whom makes the commitment and the other does not.

The commitment to a consistent assortment is likely to entail higher costs. As we will argue later, and show empirically, the higher cost is primarily in the form of higher (variable) cost of goods. Although there are obvious advantages to the consumer if a retailer offers a consistent assortment, it is less obvious how a retailer committed to a consistent assortment who competes with another retailer who does not commit to a consistent assortment should compete on other dimensions such as price and service. Given competition between two asymmetric retailers one of whom has made a commitment to a consistent assortment and has a higher cost while the other has just the opposite, who would offer higher service in equilibrium? What would be their pricing strategies? In this chapter we identify the conditions under which the higher service goes with one or other type of retailer. We obtain sharper insights into this issue through an empirical examination of the Dutch domestic retail flower market.

The rest of this chapter is organized as follows. In the next section we develop a theoretical model and derive the conditions under which which of the two types of retailers would offer service in equilibrium. Specifically, we show when would the retailer committed to a consistent assortment alone offer service and when would the other retailer alone offer service. Following that, we provide an empirical illustration by fitting our model to the Dutch retail flower market. In the final

section, we conclude by explaining our results and giving directions for further research in this area.

7.2 Modeling retailer competition

We first state and describe the assumptions that provide the framework for the model. Following that we develop the model and derive the results. We make four assumptions, the first three of which describe the retail market of interest as related to commitment to a consistent assortment, cost of goods and service, while the fourth assumption describes the consumer segments in the market.

Assumption 1: The market is served by two retailers, R1 and R2 who carry a single identical product category. However, they differ in their assortment decisions. Retailer R1 is committed to a consistent assortment of goods in the category. In other words, consumers planning to visit R1 know what assortment they can expect to find in the store. In contrast, R2 is not committed to a consistent assortment of goods in the category. As a result, consumers planning to visit R2 do not know what assortment they can expect to find in the store.

Note that the assumption of a single product category reflects our interest in retail competition as it affects assortment decisions within a product category. As already remarked, in a store such as Sam's Choice, or Aldi, a consumer might not find, for example, the same set of brands of cereals over time. A similar situation exists with respect to apparel at Ross Dress for Less. Clearly, in practice these stores carry many product categories. Our assumption abstracts away from the decision of which categories a store might carry. Rather, we focus on whether the retailer is committed to a consistent assortment or not. The strategy of assortment consistency, being part of the positioning strategy, can be expected to apply to all categories carried by the store. To keep our analysis tractable and focussed we make the simplifying assumption that each retailer carries just one category.

Assumption 2: The cost of goods is lower for the retailer who is not committed to a consistent assortment, i.e. R2. This reflects the fact that a retailer could take advantage of lower prices that may become available on various brands (items) from time to time and buy only those brands for most part of their assortment if (s)he were not committed to carrying any specific set of brands. One

way this can occur in practice is through buying largely brands that are accompanied by trade deals. Indeed, it is believed that warehouse clubs such as Sam's Choice, or supermarkets such as Aldi, follow this type of buying strategy. Another example is in the apparel industry where retailers like Ross Dress for Less buy only those designer brands that are available at low prices at any given time.

Assumption 3: A retailer can provide service at one of two levels. Without loss of generality assume that a retailer can either provide service or not. Moreover, the cost of providing service is a fixed cost, denoted by F. This assumption of fixed cost of service reflects the fact that service cost does not vary with sales. For example, training salespersons or providing a better store ambience would entail a fixed cost.

Assumption 4: The market consists of three consumer types. The first type seeks consistency in assortment. It is best to think of this segment as wanting to be assured of finding certain brands in the store they plan to visit. In other words, for this consumer type the cost of visiting a store and not finding the desired set of brands is sufficiently large. We define consumers as belonging to segment 1 if they are of the foregoing type and desire a subset of the brands that R1 is committed to. Thus, segment 1 consumers are loyal to R1. Let x denote the fraction of the market that belongs to segment 1. The aggregate demand for this segment is therefore x. Type 1 consumers who do not desire the set of brands carried by R1 belong to a different segment. Without loss of generality we assume the size of this segment to be zero.

There is a fraction $(1-x)$ of consumers not belonging to segment 1. This fraction does not value consistent assortment. The aggregate demand of this set of consumers for each retailer is assumed to be a function of price and possibly service. We view service as encompassing such features as courteous salespersons, store ambience, etc. We assume that there is a type of consumers, denoted as segment 2, which values service. Let $h(1-x)$ be the fraction of consumers belonging to segment 2. The demand for this segment is based on both price and service at the two stores. We further assume that their valuation of service is sufficiently high that if only one store offers service they patronize that store. If both stores offer service, or neither offers service, then demand of segment 2 consumers depends on prices at the two stores. In order to maintain a clear distinction between the assortment commitment consumer segment and the service-prone segment, we argue that the

former values time-saving services, while the latter values labor-intensive services, such as provided by store-personnel (see also Pashigian and Bowen 1994). Finally, for type 3 consumers, belonging to segment 3, aggregate demand is only a function of prices at the two retailers.

Having stated the four assumptions that describe the market we are interested in, we are now in a position to formulate and solve the retailers problems with respect to price and service. Through analyzing retail competition, we want to determine the price at each store and whether either, both or neither retailer will offer service. It is important to note that we have specified only the decision on assortment consistency to be exogenous; i.e. R1 has and R2 has not made the commitment to consistency in assortment. We have however incorporated the institutional reality that by not committing to a consistent assortment, the retailer R2 keeps his/her cost of goods low. Thus, we are modeling a market in which one retailer follows a consistent assortment and higher cost strategy relative to a competitor who has a lower cost but not a consistent assortment. We are set to derive the equilibrium service levels and prices in the market

7.2.1 Solving the retailers' problems

Each retailer must make two decisions: whether to offer service or not, and what price to charge. Thus there are four possible situations: neither R1 nor R2 offers service, only R1 offers service, only R2 offers service, and both offer service. The pricing and hence the profit margin in each situation will vary accordingly. By analyzing the profits accruing to the retailers in all the four situations, we can determine which retailer(s) would offer service. We assume that each retailer maximizes profits and seek a Nash equilibrium to the competitive interaction. We first derive the profit functions of the retailers associated with each of the four possible situations.

7.2.1.1 Scenario 1: Neither R1 nor R2 offers service

By Assumption 4, a fraction x of consumers will choose retailer R1. The demand of the remaining fraction $(1-x)$ at each retail store is a function of the retail prices in the two stores. Specifically, let $p1$ and $p2$ be the prices at retailers R1 and R2

respectively. Then we assume that the market shares of the two retailers are given by:

$$m1 = \max\{x + \frac{1-x}{2}[1-\beta(p1-p2)], x\} \quad (1)$$

$$m2 = \min\{\frac{1-x}{2}[1+\beta(p1-p2)], 1-x\}, \quad (2)$$

where *m1* and *m2* are the market shares of R1 and R2, β is the aggregate price sensitivity parameter, and the max and the min functions ensure the correct boundary conditions[1]. Note that β is positive in our formulation. A high β implies that even for a small drop in price almost all the consumers in the price sensitive segment will prefer the lower priced retailer, and a β close to 0 implies that a retailer has to decrease the price substantially to attract the price sensitive segment. Note that in absence of any price difference, each retailer obtains half the price sensitive segment.

Note that we have assumed the demand function to be linear in price difference following past research (e.g., McGuire and Staelin (1985), Krishnan and Rao (1995)). This makes the mathematical results tractable. Further, with a linear function the market share equations 1 and 2 are continuous implying that *(p1-p2)* can take any value, positive or negative.

From equation 7.2 we can derive R2's profit function as follows.

$$\Pi 2(p2) = (p2-c2)m2$$
$$= (p2-c2)\frac{1-x}{2}\{1+\beta(p1-p2)\},$$

where *p1* is the price at R1, *c2* is the acquisition cost of goods for R2, and *p2* is the price at R2. To arrive at the optimal *p2*, we differentiate R2's profit function with respect to *p2* (treating *p1* as a constant):

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[1] For expositional ease, we will assume that the value of β is chosen such that the *max* or *min* function does not come into force. Hence, we drop these two function operators for the rest of the paper.

$$\Pi 2'(p2) = -(p2 - c2)\frac{1-x}{2}\beta + \frac{1-x}{2}\{1 + \beta(p1 - p2)\}.$$

Setting this equal to 0 and simplifying the resulting expression, we get that for a given $p1$,

$$p2^* = \frac{1}{2}(p1 + c2) + \frac{1}{2\beta}. \tag{3}$$

The profit to R1 is given by:

$$\Pi 1 = (p1 - c1)\left[x + \frac{1-x}{2}\{1 + \beta(p1 - p2)\}\right],$$

where $c1$ is the acquisition cost of goods for R1. To derive the optimal price at R1, we differentiate R1's profit function with respect to $p1$ (treating $p2$ as a constant).

$$\Pi 1' = \left[x + \frac{1-x}{2}\{1 - \beta(p1 - p2)\}\right] - (p1 - c1)\frac{1-x}{2}\beta. \tag{4}$$

Setting this equal to 0 and simplifying the resulting expression, we get that for a given $p2$,

$$p1^* = \frac{1}{2}(p2 + c1) + \frac{1+x}{2(1-x)}\frac{1}{\beta}. \tag{5}$$

Solving equations 5 and 3 simultaneously for $p1$ and $p2$, we get:

$$p2^* = \frac{1}{3}(c1 + 2c2) + \frac{1}{\beta}\frac{3-x}{3(1-x)}. \tag{6}$$

$$p1^* = \frac{1}{3}(2c1 + c2) + \frac{1}{\beta}\frac{3+x}{3(1-x)}. \tag{7}$$

Expressions 6 and 7 give us the optimal retail prices at R2 and R1 respectively when neither retailer offers service. By subtracting 6 from 7 we get:

$$p1^* - p2^* = \frac{1}{3}(c1-c2) + \frac{1}{\beta}\frac{2x}{3(1-x)}. \tag{8}$$

Since by construction *c1-c2* is positive, it is easy to see that the optimal price at R2 is lower than at R1. Further, the bigger the R2's cost advantage, the lower the price at R2, and the larger the segment that seeks reliable assortment in R1, the lower the price at R2. It is useful to use equations 5 and 8 and express the optimal profit margin at R1 in terms of the price difference between the two retail stores:

$$p1^* - c1 = \frac{1+x}{1-x}\frac{1}{\beta} - (p1^* - p2^*). \tag{9}$$

$\{p1^*, p2^*\}$ as given by expressions 7 and 6 are the Nash optimal prices in the sense that neither R1 would like to deviate from $p1^*$ given that R2 would price at $p2^*$ nor would R2 deviate from $p2^*$ given that R1 would price at $p1^*$. However, these equilibrium prices are under the condition that neither retailer offers service. In other words, $\{p1^*, p2^*\}$ are sub-game perfect Nash equilibrium prices.

Using the optimal prices and the corresponding market shares it is straightforward to evaluate the optimal profits as follows:

$$\Pi 1^* = \frac{1}{18\beta(1-x)}[3+[x\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2. \tag{10}$$

$$\Pi 2^* = \frac{1}{18\beta(1-x)}[3-[x\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2. \tag{11}$$

Expressions 10 and 11 are the optimal operating profits of R1 and R2 respectively when neither offers service. Note that *c1-c2* is positive and x is the segment that is loyal to R1.

7.2.1.2 Scenario 2: R1 offers service but R2 does not

Recall that when only one retailer offers service, by Assumption 4 the fraction *h(1-x)* of consumers will choose R1, the retailer offering service. Thus R1's loyal segment consists of two sets of consumers: those who seek consistent assortment, *x*, and those who seek service, *h(1-x)*. The price sensitive segment is of size *(1-x)(1-h)*.

Scenario 2 is very similar to scenario 1 except that the R1's loyal segment is *x* in scenario 1 while it is *x+h(1-x)* in scenario 2, the price sensitive segment is *(1-x)* in scenario 1 while it is *(1-x)(1-h)* in scenario 2, and R1's profits are decreased by *F*, the fixed cost of offering service. Going along the same lines as in scenario 1, it is easy to show that the optimal operating profits of R1 and R2 in scenario 2 are:

$$\Pi 1^{**} = \frac{1}{18\beta(1-x1)}[3+[x1\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2 \qquad (12)$$

$$\Pi 2^{**} = \frac{1}{18\beta(1-x1)}[3-[x1\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2, \qquad (13)$$

where $x1 = x + h(1-x)$. Note that by Assumption 3, the net profits to R1 are less by a fixed cost, *F*. In other words,

$$\text{Net profits of R1} = \text{Operating profits} - F = \Pi 1^{**} - F.$$

We make the distinction between the operating profits and the net profits for expositional ease.

7.2.1.3 Scenario 3: Both R1 and R2 offer service

In this scenario both R1 and R2 offer service. As a result, the service seeking segment will base its choice on price as stated in Assumption 4. In effect, if both retailers offer service the price sensitive segment is *1-x* , which is same as in scenario 1 in which neither retailer offers service. Thus, scenario 3 is identical to scenario 1 except that in Scenario 3 both retailers incur an additional fixed cost *F*. Hence the retailers optimal operating profits are simply as given by equations 7.10 and 7.11. That is,

$$\Pi 1^{****} = \Pi 1^{*} = \frac{1}{18\beta(1-x)}[3+[x\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2 \quad (14)$$

$$\Pi 2^{****} = \Pi 2^{*} = \frac{1}{18\beta(1-x)}[3-[x\{1+\beta(c1-c2)\}-\beta(c1-c2)]]^2 \quad (15)$$

Since their net profits are less by a fixed cost, F,

$$\text{net profits of R1} = \text{Operating profits} - F = \Pi 1^{*} - F.$$

$$\text{net profits of R2} = \text{Operating profits} - F = \Pi 2^{*} - F.$$

7.2.1.4 Scenario 4: R1 does not offer service but R2 offers service

By Assumption 4, the fraction $h(1\text{-}x)$ of consumers will choose R2. The price sensitive segment is of size $(1\text{-}h)(1\text{-}x)$. We will determine the equilibrium prices at the two retailers. Proceeding as in Scenario 1 we first derive the profit function for R2 which is as follows:

$$\Pi 2(p2) = [p2-c2]m2$$
$$= [p2-c2][h1-x)+\frac{(1-x)(1-h)}{2}\{1+\beta(p1-p2)\}],$$

where the notations are as discussed in scenario 1. Differentiating R2's profit function with respect to $p2$ and setting the resulting expression to zero and simplifying, we get that for a given $p1$,

$$p2^{****} = \frac{1}{2}(p1+c2)+\frac{1}{2\beta}\frac{1+h}{1-h}. \quad (16)$$

The profit to R1 is given by:

$$\Pi 1 = [p1-c1]\left[x+\frac{(1-x)(1-h)}{2}\{1-\beta(p1-p2)\}\right],$$

where the notations are as discussed in scenario 1. Differentiating R1's profit function with respect to *p1*, setting to zero and simplifying the resulting expression, we get that for a given *p2*,

$$p1^{****} = \frac{1}{2}(p2 + c1) + \frac{1 + x - h(1-x)}{2(1-x)(1-h)}\frac{1}{\beta}. \tag{17}$$

Simultaneously solving equations 17 and 16 for *p1* and *p2*, we get:

$$p2^{****} = \frac{1}{3}[c1 + 2c2] + \frac{1}{\beta}\frac{(1-x)(2+h) + (1+x)}{3(1-x)(1-h)}. \tag{18}$$

$$p1^{****} = \frac{1}{3}[2c1 + c2] + \frac{1}{\beta}\frac{(1-x)(1-h) + 2(1+x)}{3(1-x)(1-h)}. \tag{19}$$

As explained before, $\{ p1^{****}, p2^{****} \}$ form the sub-game perfect Nash equilibrium prices, i.e., the Nash equilibrium prices under the condition that R2 alone offers service. Subtracting $p2^{****}$ from $p1^{****}$ we get:

$$p1^{****} - p2^{****} = \frac{1}{3}(c1 - c2) + \frac{2\{x - h(1-x)\}}{3\beta(1-x)(1-h)}. \tag{20}$$

If *h* is zero, it is easy to see that expression 20 reduces to its equivalent expression 8 of scenario 1. Expression 8 implies that if neither retailer offers service, R2 will always have a price lower than R1. In contrast, by expression 20 if R2 alone offers service, however, R2's optimal retail price can be higher than that of R1 if the fraction of consumers seeking service, i.e., *h(1-x)*, is sufficiently larger than the fraction of consumers who seek consistent assortment, i.e., *x*. Looking at the expression 20, we get an intuitively appealing result that if R2 does not have any cost advantage over R1 and if the fraction of consumers loyal to R1 and R2 are equal (i.e., if *x* is equal to *h(1-x)*), then the retail prices at R1 and R2 will be equal.

We can derive the optimal operating profits of R1 and R2 as follows:

$$\Pi 1^{****} = \frac{1}{18\beta(1-x)(1-h)}[3-[\beta(c1-c2)-x\{1+\beta(c1-c2)\}+h(1-x)\{1-\beta(c1-c2)\}]]^2. \quad (21)$$

$$\Pi 2^{****} = \frac{1}{18\beta(1-x)(1-h)}[3+[\beta(c1-c2)-x\{1+\beta(c1-c2)\}+h(1-x)\{1-\beta(c1-c2)\}]]^2. \quad (22)$$

Note that the net profits of R2 is less by the fixed cost, F. In other words,

Net profits of R2 = Operating profits $- F = \Pi 2^{****} - F$.

Having derived the profits of both the retailers in the four situations, namely, neither R1 nor R2 offering service, R1 alone offering service, R2 alone offering service, and both R1 and R2 offering service, we will now find out what would R1 and R2 do and under what conditions. For convenience we give below the notations we have used for the various profit functions.

Scenario	Operating Profits		Net Profits	
	R1	R2	R1	R2
Neither R1 nor R2 provides service	$\Pi 1^{*}$	$\Pi 2^{*}$	$\Pi 1^{*}$	$\Pi 2^{*}$
Only R1 provides service	$\Pi 1^{**}$	$\Pi 2^{**}$	$\Pi 1^{**} - F$	$\Pi 2^{**}$
Both R1 and R2 provide service	$\Pi 1^{***}$	$\Pi 2^{***}$	$\Pi 1^{***} - F$	$\Pi 2^{***} - F$
Only R2 provides service	$\Pi 1^{****}$	$\Pi 2^{****}$	$\Pi 1^{****}$	$\Pi 2^{****} - F$

Since there are eight profit functions and five parameters, namely, x, β, $c1$-$c2$, h and F, looking for all the possible equilibrium market situations is very likely to lead to complicated results that would be difficult to interpret. Hence, we explore the sufficient conditions that favor an equilibrium in which only R1 will offer service and the conditions that favor an equilibrium in which only R2 will offer service. These two sets of conditions are formally provided in the following two propositions.

7.2.2 Proposition 1: When does R1 alone offer service?

If h > max{h1,h2} then for all F in (F1,F2) the sub-game perfect Nash equilibrium consists of R1 offering service and R2 not offering service, where 22

$$h1 = 1 - \frac{10}{[1+\beta(c1-c2)]^2(1-x)^2},$$

$$h2 = 1 - \frac{x(4-x)}{\beta(c1-c2)(1-x)^2}, \quad \text{and}$$

$$F1 = \max\{\Pi 2^{***} - \Pi 2^{*}, \Pi 2^{***} - \Pi 2^{**}\} < \Pi 1^{**} - \Pi 1^{*} = F2.$$

Proof: We have to show three subresults to prove Proposition 1. First, we have to show that if R1 alone offers service the operating profits (s)he would get will be greater than the fixed cost of offering the service, *F*. In other words,

$$F < \Pi 1^{**} - \Pi 1^{*} \Rightarrow \text{R1 will offer service if R2 does not.} \qquad (23)$$

Secondly, when R1 offers service, R2 should it find it less profitable to offer service. Given that R1 offers service, the operating profit to R2 when offering service is $\Pi 2^{***}$, and the operating profit to R2 when not offering service is $\Pi 2^{**}$. Since offering service involves a fixed cost of *F*, we need to have *F* greater than the increased operating profit R2 gets by offering service. That means,

$$F > \Pi 2^{***} - \Pi 2^{**} \Rightarrow \text{R2 will not offer service if R1 does.} \qquad (24)$$

The conditions 23 and 24 together imply that

$$\Pi 2^{***} - \Pi 2^{**} < F < \Pi 1^{**} - \Pi 1^{*} \Rightarrow \text{R1 will but R2 will not offer service} \qquad (25)$$

Substituting the profit expressions 10, 12, 13, and 15 respectively for $\Pi 1^{*}, \Pi 1^{**}, \Pi 2^{**}$ and $\Pi 2^{***}$, it can be shown that

$$h > 1 - \frac{10}{[1+\beta(c1-c2)](1-x)^2} = h1 \Rightarrow \Pi 2^{***} - \Pi 2^{**} < \Pi 1^{**} - \Pi 1^{*}.$$

Now, as the third subresult we have to prove that R2 will not offer service unilaterally. Noting that R2's operating profits when (s)he alone offers service is $\Pi 2^{****}$ and that his/her operating profits when neither retailer offers service is $\Pi 2^{*}$, we need to satisfy the condition that F, the fixed cost of offering service, is greater than the additional operating profits R2 gets by offering service alone, $\Pi 2^{****} - \Pi 2^{*}$. That is,

$F > \Pi 2^{****} - \Pi 2^{*} \Rightarrow$ R2 will not offer service if R1 does not (26)

Equations 23 and 26 together imply that

$\Pi 2^{****} - \Pi 2^{*} < F < \Pi 1^{**} - \Pi 1^{*} \Rightarrow$

R1 will but R2 will not unilaterally offer service.

Substituting from the profit equations 10, 12, 11, and 22 respectively for $\Pi 1^{*}, \Pi 1^{**}, \Pi 2^{*}$ and $\Pi 2^{****}$, it can be shown that

$$h > 1 - \frac{x(4-x)}{\beta(c1-c2)(1-x)^2} = h2 \Rightarrow \Pi 1^{**} - \Pi 1^{*} > \Pi 2^{****} - \Pi 2^{*}. \quad (27)$$

Combining the second and the third subresults, we get Proposition 1. ■

Discussion: Whether R1 alone will offer service depends on whether the fraction of price sensitive consumers which seeks service, h, is greater than certain minimum value, indicated by $h1$ and $h2$ in Proposition 1. Both the limits $h1$ and $h2$ are functions of x and $\beta(c1-c2)$, which are respectively the retailer R1's advantage (due to his/her commitment to consistent assortment) and disadvantage (due to his/her higher acquisition cost of goods) with respect to R2.

Looking at the function $h1$, it can be readily seen that $\partial h1/\partial x < 0$ for all x, i.e., with increase in x the value of $h1$ decreases monotonically. As x moves from 0 to 1,

$h1$ moves from $1-\frac{10}{[1+\beta(c1-c2)]^2}$ to $-\infty$. Hence, there exists some x beyond which $h1$ is always less than 0 and hence will be less than *any* h. Since h can take values between 0 and 1, this implies that for a given h and $\beta(c1-c2)$, there exists a $x1$ such that for all $x > x1$, the value of h will be greater than $h1$.

Differentiating $h2$ with respect to x, it can be shown that $\partial h2/\partial x < 0$ for all x, implying that with increase in x, the value of $h2$ decreases monotonically. As x moves from 0 to 1, $h2$ moves from 1 to $-\infty$. Hence, there exists some x beyond which $h2$ is always less than 0 and hence will be less than *any* h.In other words, for a given h and $\beta(c1-c2)$, there exists a $x2$ such that for all values of $x > x2$, the value of h will be greater than $h2$.

Putting these two results together and noting that the segment that seeks consistent assortment is loyal to R1, we get:

The bigger the R1's loyal segment the more likely R1 alone offers service.

This is the most interesting result of our theory. The intuitive explanation is as follows. Consider R1 and R2 when neither offers service to start with. If R1 has a higher loyal segment, (s)he is less likely to fight with R2 on price to avoid "free riding" by the loyal segment. This in turn implies that most of the price sensitive segment, which includes the segment that seeks service as well (see Assumption 4), choose R2 due to low price. Thus most of the service seeking segment chooses R2 when R1 has a bigger loyal segment. Hence, with the offering of service, R1 can expect to substantially increase his/her hold in the service seeking segment and thus has a lot more to gain. On the same token it is easy to see that in this situation R2 will have a lot less to gain by unilaterally offering service. The reason why R2 does not offer service if R1 offers service is that R1, who now has a much bigger loyal segment (i.e., $x+h(1-x)$), will have a higher price difference (see equation 6) which would drive more and more of the price sensitive segment to choose R2. This increases the profits of R2 which, along with the need to incur cost to offer service, will more than offset the possible gains (s)he could make by offering service.

Having discussed the result pertaining to the conditions favoring the equilibrium where R1 alone offers service, we now evaluate the conditions that favor the equilibrium where R2 alone offers service.

7.2.3 Proposition 2: When does R2 alone offer service?

If h3 < h < h4 then for all F in (F3,F4) it would be profitable for R2 to offer service and R1 not to offer service, where

$$h3 = \frac{\beta(c1-c2)(\beta(c1-c2)-2)(1-x)^2 - [9+3x^2-2x]}{(1-x)^2(1-\beta(c1-c2))^2},$$

$$h4 = 1 - \frac{x(4-x)}{\beta(c1-c2)(1-x)^2}, \qquad \text{and}$$

$$F3 = \max\{\Pi1^{**} - \Pi1^{*}, \Pi1^{***} - \Pi1^{****}\} < \Pi2^{****} - \Pi^{*} = F4.$$

Proof: Proof is along the lines of the proof provided for Proposition 1. First, we have to show that if R2 alone offers service the profits (s)he would get will be greater than the cost of offering the service, *F*. In other words,

$$F < \Pi2^{****} - \Pi2^{*} \Rightarrow \text{ R2 will offer service if R1 does not.} \qquad (28)$$

Secondly, when R2 offers service, R1 should it find it less profitable to offer service. Given that R2 offers service, the operating profits to R1 when offering service is $\Pi1^{***}$, and the operating profits to R1 when not offering service is $\Pi1^{****}$. Since offering service involves a fixed cost of *F*, we need to have *F* greater than the increased operating profits R1 gets by offering service. That means,

$$F > \Pi1^{***} - \Pi1^{****} \Rightarrow \text{ R1 will not offer service if R2 does.} \qquad (29)$$

The conditions 28 and 29 together imply that

$$\Pi1^{***} - \Pi1^{****} < F < \Pi2^{****} - \Pi2^{*} \Rightarrow \text{ R2 will but R1 will not offer service.} \qquad (30)$$

Substituting the profit expressions 11, 22, 14, and 21 respectively for $\Pi2^{*}, \Pi2^{****}, \Pi1^{***}$ and $\Pi1^{****}$, it can be shown that

$$h > \frac{\beta(c1-c2)(\beta(c1-c2)-2)(1-x)^2-[9+3x^2-2x]}{(1-x)^2(1-\beta(c1-c2))^2} = h3 \Rightarrow$$

$$\Pi1^{***}-\Pi1^{****} < \Pi2^{****}-\Pi2^{*}.$$

Now, as the third subresult we have to prove that R1 will not offer service unilaterally. Noting that R1's operating profits when (s)he alone offers service is $\Pi2^{**}$ and that his/her operating profits when neither retailer offers service is $\Pi1^{*}$, we need to satisfy the condition that F, the fixed cost of offering service, is greater than the additional operating profits R1 gets by offering service alone, $\Pi1^{**}-\Pi1^{*}$. That is,

$$F > \Pi1^{**}-\Pi1^{*} \Rightarrow \text{ R1 will not offer service if R2 does not.} \qquad (31)$$

Equations 28 and 31 together imply that

$$\Pi1^{**}-\Pi1^{*} < F < \Pi2^{****}-\Pi2^{*} \Rightarrow$$

R2 will but R1 will not unilaterally offer service.

Substituting from the profit equations 10, 12, 11, and 22 respectively for $\Pi1^{*}, \Pi1^{**}, \Pi2^{*}$ and $\Pi2^{****}$, it can shown that

$$h < 1-\frac{x(4-x)}{\beta(c1-c2)(1-x)^2} = h4 \Rightarrow \Pi2^{****}-\Pi2^{*} < \Pi1^{**}-\Pi1^{*}. \qquad (32)$$

Combining the second and the third subresults, we get Proposition 2. ■

Discussion: Whether R2 alone will offer service depends on whether the fraction of price sensitive consumers that seeks service, h, should be greater than $h3$ but less than $h4$. Let us analyze what these bounds are. Both $h3$ and $h4$ are functions of x and $\beta(c1-c2)$, which are respectively the retailer R2's disadvantage and advantage with respect to R1.

Consider the function $h3$. It can be derived that

$$\frac{\partial h3}{\partial \beta(c1-c2)} < 0 \quad \text{if } \beta(c1-c2) < 1,$$
$$> 0 \quad \text{if } \beta(c1-c2) > 1.$$

As $\beta(c1-c2)$ increases from 0 to 1, $h3$ moves from $-\frac{9+3x^2-2x}{(1-x)^2}$, a negative valued number, to close to $-\infty$. And, as $\beta(c1-c2)$ increases beyond 1, $h3$ increases monotonically from $-\infty$, becoming zero at some value of $\beta(c1-c2)$, say, at $\overline{\beta(c1-c2)}$. So, as long as $\beta(c1-c2)$ is less than $\overline{\beta(c1-c2)}$, $h3$ is less than zero which in turn implies that any h will be greater than $h3$. Let us closely look at $\overline{\beta(c1-c2)}$, the root of the equation $h3=0$. By solving $h3=0$, we get its positive root as follows.

$$\overline{\beta(c1-c2)} = 1 + \frac{\sqrt{4x^2-4x+10}}{1-x}.$$

At $x = 0$, the root is $1+\sqrt{10}$, which is 4.16. It can be shown that the first derivative of this root $\overline{\beta(c1-c2)}$ with respect to x is positive, indicating that as x increases, so does the value of the root. This implies that the root of the equation $h3=0$ is always greater than 4.16. Further, in our numerical simulation[2], we found that empirically if $\beta(c1-c2)$ exceed values around 2, the whole price sensitive segment of the market switches from one retailer to the other and hence a high value for the root $\overline{\beta(c1-c2)}$ does not come into picture in reality, implying in turn that $h3<0$ for all practical purposes. Since h is always positive, the condition that h has to be greater than $h3$ is always satisfied.

Looking at the function $h4$ it is readily seen that as $\beta(c1-c2)$ increases $h4$ increases monotonically. At $\beta(c1-c2)$ close to 0, $h4$ is close to $-\infty$.

[2] We did the simulation with x ranging from 0 to 1 in steps of 0.05, h ranging from 0 to 1 in steps of 0.05 and $\beta(c1-c2)$ ranging from close to 0 to 4 in steps of 0.05.

When $\beta(c1-c2)$ reaches $\frac{x(4-x)}{(1-x)^2}$, $h4$ becomes 0, and let this value of $\beta(c1-c2)$ be $\beta(c1-c2)_0$. Hence, for all values of $\beta(c1-c2)$ greater than $\beta(c1-c2)_0$, we have a positive valued $h4$ that increases monotonically with $\beta(c1-c2)$. Note that if such a $\beta(c1-c2)_0$ does not exist, then h will always be greater than $h4$ implying that the conditions favoring the equilibrium where R2 alone offers service do not exist. The existence of $\beta(c1-c2)_0$ depends on the value of x, the consistent assortment seeking segment that is loyal to R1. It is readily seen that the higher the x, the lower the chances for the existence of $\beta(c1-c2)_0$. In other words, a lower x and a sufficiently higher $\beta(c1-c2)$ will enable the existence of a $h4$ that would be greater than a given h. Put it differently, for a given h and x, there exists a $\underline{\beta(c1-c2)}$ such that for all values of $\beta(c1-c2) > \underline{\beta(c1-c2)}$, the value of h will be less than $h4$.

Putting these two results together and noting that $c1$ - $c2$ is the R2's cost advantage over R1 thanks to his/her not committing to a consistent assortment, we get:

The greater the R2's cost advantage the more likely R2 alone offers service.

The intuitive explanation for this result is as follows. Consider R1 and R2 when neither offers service to start with. If R2 has a high cost advantage, R2's price will be much lower than R1's with the result that most of the price sensitive segment, which includes the segment that seeks service (see Assumption 4), will choose R2. By offering service R2 will get now a loyal segment to serve, which will have two main effects. On one hand, this will enable R2 to have a higher profit margin through a higher price which is possible thanks to the higher reservation price of the loyal segment. On the other hand, the increase in price will make R2 lose some of the purely price sensitive segment to R1. However, if the cost advantage is high enough the loss of customers will be minimal compared to the higher profit margin since R2's price will still be much lower than R1's price. In other words, R2 can afford to lose some purely price sensitive customers to R1 if his/her cost advantage is high. This makes it profitable for R2 to alone offer service. The reason why R1 does not offer service if R2 offers is that R1, who now has a

less price based competition from R2, will have his/her profit margin higher. Moreover, in terms of market share loss (s)he didn't lose much to R2 since most of these customers were anyway shopping at R2 to start with. Hence, R1 will find it more profitable not to offer service if R2's cost advantage is high enough that R2 offers one.

At this juncture, it is worthwhile to mention that Lal and Rao (1997) derive a similar result. They show that if the cost advantage of the EDLP retailer is very high, (s)he is more likely to offer service. In this sense, our theory finds support with the previously established results.

Propositions 1 and 2 together give us a very interesting outcome: the retailer whose advantage is relatively stronger with respect to the other retailer's is more likely to offer service alone. The intuition is as follows. Each retailer serves the price sensitive segment of the market, although to a different degree. Offering of service by a retailer results in a higher price level which will increase the profit margin but will repel some of the price sensitive customers. If the repulsive force is large enough then offering of service is not profitable. But, how large it should be is determined by how strong the retailer currently is. If the retailer has a strong advantage (either in reliable assortment or in cost advantage) then the repulsive force will be comparatively negligible. Thus, in a market where there is a large segment that seeks consistent assortment and where the cost advantage of R2 is limited we will find the retailer committing to a consistent assortment providing the service as well.

We next set out to explore empirically whether in a real market the conditions and the corresponding equilibriums we have theorized hold good or not. Specifically, we are interested in the conditions that favor the equilibrium where R1 alone offers service, a very commonly observed phenomenon in many markets.

7.3 Empirical illustration

One way to validate a theoretical model is to see how stylized facts in a market may be reconciled with the model predictions. This approach is used by, for example, Lal (1990b). At the other extreme, model prediction may be tested against the empirical data through statistical analyses. An example of this approach for a game

theoretic model is Krishnan and Rao (1995). Between these two extremes, one approach is to make measurements of a particular market in order to fix the parameters of the theoretical model. Then, based on these parameter values, the theoretical predictions of the model can be evaluated and compared with the empirical observations of the same market.

What is a good way to fix the parameter of a particular model? Our approach is to directly measure them for a given market[3]. Where possible we use more than one method. And finally, we could estimate the robustness of the prediction around the measured values of the parameters.

Empirical support for a theoretic proposition is usually inhibited by the presence of other relevant, although independent, factors in a real market. For example, in the theory proposed in this chapter, we are interested in two retail formats, but there exist more formats in an actual retail market. The Dutch domestic flower market closely meets our theoretical market and can therefore be used to empirically validate our model findings. Although this market is taken as an example for illustrative purposes, the important institutional features we have modeled in this chapter, particularly, the product acquisition process, consumer segments (deal-prone, consistent assortment seeking, and personal service sensitive) and retail attributes including assortment and its consistency, price, and service, resemble closely other retail markets in Europe and the U.S.A.

This section is organized as follows. First, we describe relevant characteristics of the Dutch retail flower market, explaining in detail the two types of retailers existing in the market, with respect to their levels of assortment commitment and their acquisition costs, $c1$ and $c2$. We measure the level of commitment to consistent assortment in two ways; one from a survey of retailers (hereinafter called Retailer Survey) and the other from a survey of in-store customers shopping at these retail stores (hereinafter called Customer survey). A detailed description of these surveys has been given in chapters 4 and 5. We use the annual records and databases of various flower associations such as the Dutch Association of Flower Auctions and the Dutch Floricultural Wholesale Board to measure the acquisition costs.

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[3] Shankar (1997) uses time series data on sales and advertising in a pharmaceutical industry to estimate the parameters in his model.

Second, we measure the model parameters. Note that we have six parameters in the model, which are as follows. x is the size of the segment that seeks consistent assortment, h represents the segment that seeks service, β is the price sensitivity parameter, F is the fixed cost of service, and $c1$ and $c2$ are the acquisition costs of R1 and R2, the two retail types modeled. We have already mentioned our source for measuring the acquisition costs. For the other four parameters, we use three sources: experts in florists association, a household panel survey of sample size 1453 (hereinafter called Household Panel Survey, for a detailed description see chapter 5) and a survey conducted specifically for this chapter.

Third, we use the measured parameter values to obtain the equilibrium for our model. In particular, we are interested in finding out which of the four possible outcomes would be predicted by the model based on the observed parameter values, Recall that the four possible outcomes are: neither R1 nor R2 offers service, R1 alone offers service, both offer service, and R2 alone offers service. Finally, we compare the predicted outcome with our empirical observation of service provision in the market, which we measure from the Retailer Survey and the Customer Survey.

7.3.1 Dutch domestic retail flower market

This section briefly describes the Dutch retail flower market insofar this has not been done in previous chapter and explains how the two types of retailers serving this market differ with respect to offering consistent assortments (Assumption 1 in the model) and acquisition cost (Assumption 2). Consumers in this market spend yearly the equivalent of over 600 mil. dollars on fresh cut flowers[4]. Fresh cut flowers are a frequently purchased product that is bought by over 70% of the Dutch households, 25% of who buy cut flowers at least once every two weeks. The three consumer segments assumed in the model, namely, those who seek consistent assortment, those who seek service and those who are price sensitive, apply to the Dutch flower market as follows. Consumers buy cut flowers for different purposes,

[4] It is interesting to note that the global consumption of flowers is estimated around 45 billion U.S. dollars and that the Netherlands, Columbia, Israel, Italy and Kenya export the major requirements of the world flower market.

e.g., as a gift, for a special occasion, or for their own home's ambience, and will accordingly seek service, particular flower variants, or low prices. Thus the segments are based on both purchase occasion and type of consumer.

Cut flowers are distributed by over 4,000 independent retailers, who specialize in flowers and other related items[5]. The retailers can acquire cut flowers either through a wholesaler who in turn purchases the product at a flower auction, or directly at a flower auction. Auctions are held every day and the prices depend on varying supply and demand and fluctuate accordingly. Retailers who purchase through a wholesaler can only to a limited extent take advantage of the price variations, but they can select for most part what they want to carry in their assortments. They pay a higher price than what one can get at auction because of the added wholesaler margin. These are the R1 type retailer mentioned in the model. These are very similar in spirit to the U.S. department stores such as Foley's and the grocery stores such as Kroger.

Retailers who buy at the flower auction match R2 in our model. They can wait for a lower price at the auction and can acquire their flowers at low prices. However, they can not be choosy for a major part of their assortment. They are sure to buy some of the important flowers (i.e., the traffic builders) but in general are likely to choose whatever flowers are available at low prices at the auction. These retailers are very similar in spirit to the U.S. apparel stores such as Ross and the warehouse clubs such as Sam's Choice. According to the Dutch Florist Association, 50 to 60% of retailers are of the R2 type with an average annual turnover of 200,000 to 350,000 Dfl (equivalent to approximately 175,000 U.S. $ as of 1998). The R1 type retailers are less common and generally have a higher annual turnover. Note that wherever R1 retailers are located, they face severe competition from R2 type retailers.

In our model, R1 is assumed to offer a more consistent assortment compared to R2. To see if this is true in the Dutch retail flower market we use results from the Retailer Survey and the Customer Survey. For the Retailer Survey, we identified from a random sample of retail flower specialists 61 retailers who purchased cut flowers exclusively at an auction (R2 type) and 99 retailers who purchased cut

[5] Although several grocery chains also sell cutflowers their market share is small, about 15%.

flowers exclusively from wholesalers (R1)[6]. Each of these retailers was asked to mention the cut flowers (s)he *consistently* carried in his(her) assortment. They did this by choosing a maximum of 12 flowers from the top 15 flower types sold in The Netherlands. Note that Rose, Chrysanthemum, Tulip and Lily are the top four selling flower types. Based on the retailers' responses we found that the R1 type retailers carried the top 4 flowers more often and/or in more different varieties (i.e., more consistently) than the R2 retailers. Specifically, with respect to Rose 64.6% of the R1 type retailers said they carried them consistently while only 50% of the R2 type retailers said they did. The corresponding figures for Chrysanthemum are 83.8% and 72.1%, for Tulip 88.9% and 68.9%, and for Lily 69.7% and 52.5%.

For the Customer survey we interviewed a sample of 494 customers at R1 type stores and 376 customers at R2 type stores. Customers were asked to rate their retailer on a 7-point Likert-type scale on product quality, freshness, and appearance. The customers rated R1 significantly higher ($p<.001$) than R2. We thus find that in the Dutch flower market there are two types of retailers, R1 and R2, where R1 carries a more consistent assortment and retailer R2 has a lower acquisition cost. We next measure in this market the parameters of our theoretical model.

7.3.2 Determining model parameters

We measure the model parameters from four sources, namely, experts in the Dutch Florist Association, a Household Panel Survey, the annual record of various flower associations and an additional survey. Recall that the parameters x and h reflect the size of the consumer segments, the parameters $c1$ and $c2$ reflect the R1 type retailer's and the R2 type retailer's acquisition costs respectively, the parameter β reflects price sensitivity, and the parameter F reflects the fixed cost of service provision. To measure the segments' sizes, we made parallel use of the household panel data and the experts' opinion. The annual records of various associations helped us obtain information on the retailers' acquisition costs. The fixed cost of service was obtained from the experts. Finally, we carried out a survey specifically

[6] The two retailers types in the sample do not differ significantly in size-related measures, such as annual turnover and store selling space, nor differ significantly with respect to consumer perceptions of assortment size.

to evaluate the price sensitivity parameter. We now explain the measurement process in detail.

Consumer segments sizes: We measured this from two sources: experts in the florists association and consumer survey. In our model, x is the size of the segment that seeks consistent assortment, $h(1-x)$ is the size of the segment that seeks service, and $(1-x)(1-h)$ is the size of the price sensitive segment. The experts are of the opinion that $x = 0.3$ to 0.4 and $h(1-x) = 0.15$ to 0.2. Thus, it is estimated that the price sensitive segment makes up 50 to 60% of the market. Next, we used the results from the Household Panel Survey where the panel members (of size 1453) were asked to rate in order of importance some of the aspects of their flower purchasing process[7]. The attributes related to consistent assortment (the attributes were: specific flower, color and stem length, and quality) were marked to be important by almost 40% of the panel members. This coincides with the experts opinion on the value of x. Thus, x is set at 0.3 (to be conservative) and h at 0.175 / 0.7 = 0.25.

Cost advantage of R2 (auction buyers) over R1 (wholesaler buyers): Based on an annual investigation by the Dutch Floricultural Wholesale Board we learned that the average domestic wholesaler gross margins for cut flowers were 15.5 to 16.5%. In addition, because of their experience in auction buying, the R2-type retailers usually achieve a further 6.5% saving. In total, the R2 type retailers enjoy a 21% to 23% cost advantage over those retailers who buy from wholesalers. Note that this corresponds to $(c1-c2)/c1$ in the model. As per the Dutch Flower Auction Association, the yearly average auction price of a cut flower is around 0.50 Dfl, the monthly average price varying from 0.28 Dfl in August to 0.55 Dfl in December. Thus, it can be calculated that $c1$ is around 0.60 Dfl while $c2$ is around 0.47 Dfl.

Fixed cost of service: Based on the experts' input, we estimated that after adjusting for size related expenses, for a store with a turnover of 375000 units of flowers, it would cost 147000 Dfl (40000 for rent, 100000 Dfl for employees, and 7000 Dfl for interior decoration) annually to provide a superior service. Note that since each retailer type is certain to provide some sort of service, what we are interested in is the 'additional' service to be offered by a retailer in order to attract

[7] The data reported here were collected prior to the conjoint choice experiment datacollection procedure that has been described in chapter 5.

the service seeking segment. The additional service includes features such as employing better trained and more personnel, better store ambience, offering various types of bouquets, etc. In order to calculate the cost of this additional service, we obtained information on the cost of the minimum amount of service needed in this business, which came to 73500 Dfl to 83500 Dfl. Moreover, we found that 36750 Dfl to 41750 Dfl, or half of the minimum service costs, would account for the unique needs of being a R1 or R2 retailer type. Thus, in total 105250 (or 147000 - 41750) Dfl to 110250 (or 147000 - 36750) Dfl needs to be spent annually if a retailer (be it R1 or R2) wants to provide the additional service that is needed to attract the service seeking segment of the market. In other words, in a market whose size is 750000 units ("average turnover of a retailer" times "the number of retailers serving a market"), it costs 105250 Dfl to 110250 to provide the additional service that is needed to attract the service seeking segment of the population. For convenience, we normalize the cost of service with respect to the market size. Thus F is estimated to be 0.140 to 0.147 for a market of size 1.

Price sensitivity parameter: We carried out a small-scale survey to specifically measure the price sensitivity parameter. Our survey on consumer's tendency to choose stores based on price indicated that the market is in general price sensitive. In particular, we found that a 20% price difference between the two retailer types would cause 10% of the customers to switch and a 30% price difference would cause 25% of the customers to switch[8]. Note that the price sensitivity we measured is the market average in the sense that the survey group included both the loyal segment and the price sensitive segment. Since in our model the price sensitivity of the loyal group is set at 0, the price sensitivity of the price-sensitive segment (which is β) will be higher than the market average. In other words, the market level switching fractions have to be rescaled to estimate the price sensitive segment's switching fractions. This is done by dividing the measured switching fractions by the size of the potential switchers in the price sensitive segment, which is $(1-x)(1-h)/2$ (see equation 1). Thus, noting that x is 0.3 and h is 0.23, the survey results indicate that 40% of the customers in the potential price switching segment are likely to switch for a 20% discount and almost the whole

[8] This way of measuring price sensitivity has been suggested by many researchers (e.g., Dolan and Simon 1996).

segment is likely to switch for a 30% discount[9]. Since the average retail price is around 1.0 Dfl, the price sensitivity parameter β is estimated to be between 2 and 3, which is averaged to 2.5 for our purposes.

Having measured the model parameters from the market characteristics we next apply them in the proposed model and solve for the equilibrium.

7.3.3 Predicting the model equilibrium

We are interested in predicting which retailer type(s) would offer service in equilibrium given the specific values of the parameters measured in this market. Since four outcomes are possible (which are Scenario 1 where neither retailer offers service, Scenario 2 where R1 alone offers service, Scenario 3 where both offer service and Scenario 4 where R2 alone offers service) in the entire parameter space, strictly speaking we have to fit the measured values of the parameters to the four scenarios and keep evaluating them one after another till we hit the right scenario. Somewhat foreseeing what will come later, we start off with Scenario 2, i.e., we first see whether the measured parameter subspace favors the outcome where only retailer type R1 offers service.

We proceed as follows. Recall from proposition 1 that the subgame perfect Nash equilibrium of R1 alone offering service will be favored if $h > \max\{h1,h2\}$ and F is in $(F1,F2)$, where $h1$ and $h2$ are functions of x, β, and $c1 - c2$, and $F1$ and $F2$ are functions of profits of R1 and R2. As a first step we make use of the measured values of x, β, and $c1 - c2$ and calculate $h1$ and $h2$. Next, we check whether the measured value of h is greater than the maximum of $h1$ and $h2$. If it is found to be so, next we evaluate $F1$ and $F2$. Following that we check whether the measured value of F is within these two bounds. If it is found to be so, then we conclude that the measured parameter subspace does favor the subgame perfect Nash equilibrium of R1 alone offering service.

First we use the three parameters, namely, $c1 = 0.60$ and $c2 = 0.47$ (i.e., $c1 - c2 = 0.13$), $\beta = 2.5$, and $x = 0.3$ to calculate the two bounds stated in Proposition 1:

[9] This coincides with an expert's opinion that it is difficult to maintain a price difference of more than 20% in this retail flower market.

$$h1 = 1 - \frac{10}{[1+\beta(c1-c2)]^2(1-x)^2} = -12.48$$

$$h2 = 1 - \frac{x(4-x)}{\beta(c1-c2)(1-x)^2} = -8.304.$$

The bounds $h1$ and $h2$ are negative as a consequence of the size of the consistent assortment seeking segment (x) being larger relative to the cost advantage of the R2 type retailer ($c1$ - $c2$). Since h is positive it is obviously greater than the maximum of $h1$ and $h2$.

We next calculate the bounds for the fixed cost of service, $F1$ and $F2$, as applicable to Proposition 1. Replacing x by $x + h(1\text{-}x)$ in equations 7 and 6 so as to modify these two equations to enable evaluation of Scenario 2, and using equations 10, 12, 11, 13, 15, and 22 to calculate the profits to the two retailers under various relevant conditions, we get:

1. Retail price at R1, $p1^{**} = \frac{1}{3}(2c1+c2) + \frac{1}{\beta}\frac{3+(x+h(1-x))}{3(1-x)(1-h)} = 1.439.$

2. Retail price at R2, $p1^{**} = \frac{1}{3}(c1+2c2) + \frac{1}{\beta}\frac{3-(x+h(1-x))}{3(1-x)(1-h)} = 1.155.$

3. Additional profits to R1 by offering service alone $= \Pi1^{**} - \Pi1^{*} = 0.1624.$

4. Additional profits to R2 by offering service alone $= \Pi2^{****} - \Pi2^{*} = 0.1206.$

5. Additional profits to R2 by offering service along with R1
$= \Pi2^{***} - \Pi2^{**} = -0.15.$

Referring back to Proposition 1, we find that $F2 = \Pi1^{**} - \Pi1^{*} = 0.1624$, and that
$F1 = \max\{\Pi2^{****} - \Pi2^{*}, \Pi2^{***} - \Pi2^{**}\} = \max\{0.1206, -0.15\} = 0.1206.$

Given the bounds $F1$ and $F2$ and having estimated the fixed cost of service, F, from the experts opinion (which is 0.140 to 0.147) for this market, we see that

$$0.126 = F2 < F < F1 = 0.1624$$

Then, by Proposition 1, the equilibrium predicted by our model given these parameter values if that R1 alone will offer service. The model also predicts that retail price at R1 is higher than that at R2.

Thus, we have fixed the parameters and calculated the equilibrium outcome in the Dutch retail flower market. Next, we want to verify whether in this market R1 really offers higher service as compared to R2.

7.3.4 Service provision in the Dutch retail flower market

We found that the retailers who buy cut flowers at a wholesaler (i.e., R1 type) provide more product-related services than their counterparts. We measure this from two surveys, the Retailer Survey and the Customer Survey. From the first, we found that R1 type retailers sell a larger share of mixed flower bouquets and special work (72.40%) than R2 type retailers (55.82%) (t_{158}=4.605, p<.001). From the second survey, with 494 customers of R1 and 376 customers of R2, we found that the R1 outlets scored significantly (p<.001) and consistently higher with respect to service, including store ambience, personal attention by salesperson, salesperson's responsiveness, politeness, salesperson knowledge and skills, and even on pleasure associated with visiting the store. From the Customer Survey we also found that perceptions of price paid were higher at R1 (t_{864}=2.525, p=.012).

Thus we find that the equilibrium in our model is validated with respect to which retailer(s) would offer service on the Dutch retail flower market. In the next section we check for the robustness of our results.

7.3.5 Robustness of results and caveats

Note that the parameters were measured from surveys, annual records of various flower associations and expert opinion. One way to account for sampling and measurement errors is to check the robustness of our results with respect to possible deviations in the parameters. To check the robustness with respect to x, we fixed the other parameters, namely h, β and $c1$ - $c2$ at their measured values and varied the value of x to see within what range of x the equilibrium of R1 alone offering service is predicted by the model. We found that as long as x is greater than 0.23, the model predicts the equilibrium of R1 alone offering service. Similar exercise yielded a robustness range of 0.23 to 0.28 for h, and a robustness range of 0.29 to 0.40 for $\beta(c1-c2)$ [10]. Since we had carried out an extensive measurement process and since the experts we consulted are the best in the business, we are of the opinion that the 'true' market situation is less likely to be outside the robustness range we have obtained.

There are three caveats. The first caveat, which is actually applicable to all game theoretical models is that the equilibrium observed in the Dutch retail flower market, i.e., the retailer offering consistent assortment also offering service, may be entirely due to a different set of reasons. One way to investigate the proposed theory is to observe and see in many markets whether the proposed theory is confirmed. The second caveat is that we did not consider intra-retail type competition in our model. It is easy to conjecture that competition among R1 type retailers would result in further higher service and competition among R2 type retailers would result in further lower price. However, we leave this open for future research. Thirdly, in this paper we assumed that the consistent assortment seeking segment and the service seeking segment are independent of each other. One may wonder whether the consistent assortment seekers are likely to be service seekers too, which may explain the higher service level observed with the R1 type retailers. However, in that case, R1 type need not offer service at all because these customers will prefer R1 anyway because of its consistent assortment offering. Moreover, there do exist

[10] Since in the model the parameters β and $c1$ - $c2$ tend to act mostly as a composite variable, we decided to test them as a single parameter.

retailers (such as Home Depot and Lowes) who not only claim low price but offer excellent service as well (Stern, El-Ansary and Coughlan 1996).

7.4 Conclusions

Betancourt and Gautschi (1990) in their seminal paper provided a comprehensive framework to look at how retailers decide on what to offer as assortment, price and service. Broniarczyk et al. (1998) added one more dimension to this list, what we call as the commitment to assortment consistency, which is the consistency a retailer provides in his/her assortment items. Our focus in this chapter is on this new dimension and its relationship to provision of other distribution service elements. Specifically, we analyze the market served by two types of retailers one of whom provides consistent assortment (R1 type) and the other enjoying a lower acquisition cost (R2 type). Examples of the former include department stores such as Foley's and grocery stores such as Kroger and Albert Heijn, while examples of the latter include stores such as Ross Dress for Less, warehouse clubs such as Sam's Choice, and discounters such as Aldi. Our interest in this market is to find out which retailer type(s) would offer service in equilibrium. Will it be the retailer enjoying the loyal patronage of consistent assortment seeking consumers, will it be the retailer who has lower acquisition cost, will it be both, or will it be neither? We used the game theoretic approach and employed the sub-game perfect Nash equilibrium concept to solve this problem. We found that the retailer who has a relatively stronger advantage will offer service in equilibrium. For example, if the R1 type retailer's advantage is *relatively* strong with respect to the R2 type retailer's advantage then R1 alone would offer service. In other words, in a market characterized by a retailer who has a large segment seeking consistent assortment and a retailer having an average cost advantage, only the former type will be in a position to offer service. In addition, we show that stable asymmetric distribution channel structures can emerge as a result of service competition, following Bell and Padmanabhan (1996).

We empirically validated our model by examining the Dutch retail flower market. In this market we observed two types of retailers, R1 and R2, where R1 carries an assortment that is more consistent than what R2 carries, while R2 has a lower acquisition cost. We carefully measured our model's various parameters in

this market and evaluated whether the outcome predicted by our model for the measured parameters is consistent with the observed retailer behavior with respect to service provision. Indeed we found that only the retailer offering consistent assortment is offering service in this market, an outcome that is in agreement with the model prediction for the given parameter values. This validates our proposed theory. The result implies that the cost advantage enjoyed by the R2 type retailer is not sufficiently high while at the same time the consumers exhibit a strong demand for consistent assortment.

Our theory adds one more piece to solving the puzzle of what types of conditions lead a retailer to offer service. Another contribution is that this is the first study that, to our knowledge, analyzes the impact of the assortment consistency on retail strategy and the ensuing retail structure.

Part V
Conclusions and Discussion

Chapter 8

Summary, Conclusions, and Directions for Future Research

8.1 Summary and conclusions

The creation of availability constitutes the core of marketing. This book focuses on an important instrument with which availability is created, distribution service. The concept of distribution service has received little, often fragmented, attention in multiple fields, including marketing, logistics, economics, operations research, and organizational behavior. The minor attention for distribution service as a concept is amazing considering the variety in retail formats that has emerged over time and the large price surcharges consumer segments are willing to pay for high levels of distribution service. The reader is challenged to compare the prices of unbranded products, such as clothing, drapes, and cut flowers, sold in outdoor markets with the prices of (exactly) the same products sold in specialized stores. Apparently, consumers are willing to pay much more for products when presented in attractive stores where they can shop around and compare alternatives in a nice atmosphere and get personal advice.

Chapter two identifies three different approaches with respect to conceptualization and analysis of distribution service. The logistics approach to distribution service emphasizes generation of service outputs by physical distribution systems that provide customers, and ultimately end-users, with time, place, and possession utilities, as well as maintenance of form utility. It focuses on the performance of an organization's or a distribution channel's physical distribution system, which is often reflected in so-called logistics performance indicators that

are subsequently used in models for logistics system optimization. The logistics approach to distribution service predominantly follows the institutional school of marketing theory. From an economic perspective distribution service provision results in reduced implicit costs associated with product acquisition and use. The economic focus is generally on channel members' strategic decision making with respect to service provision and consumption, and the consequences of these strategic interactions, in particular with respect to distribution costs and channel structure. Finally, behavioral approaches to distribution service focus on the behavior of individual organizations and consumers in a distribution channel and analyze relationships between channel actors and their consequences for channel structure by means of psychological, sociological, as well as other behavioral theories.

This book has adopted an integrative approach to distribution service. On the basis of all previously identified approaches a new definition has been formulated of distribution service as "supporting or facilitating service output of a distribution channel's physical distribution process that (1) reduces customer cost of product acquisition and/or use through creation of time and place utility and maintenance of form utility, and/or (2) improves consumer decision making effectiveness, and/or (3) increases customers' hedonic shopping value". This definition of distribution service differs from other definitions in that it is more comprehensive and as such provides a better starting point for analysis of distribution service. It integrates perspectives from logistics, economics, and behavioral science and in addition highlights the significance of distribution service provision for marketing processes. Many other definitions of distribution service can be considered special cases of this definition. On the basis of the definition five general distribution service elements have been distinguished, matching Betancourt and Gautschi's (1990) classification of distribution service elements, i.e., assortment, information, delivery at the right time and in the right form, accessibility of location, and ambience.

The concept of distribution service as defined in chapter two relates to a number of issues that deserve further attention. Parts II, III, and IV of this book each address such an issue through theoretical and empirical modeling and analysis. The research on which each part has been based has in common a focus on individual channel member decision making in a competitive retailing environment. The three empirical studies that have been done differ with respect to (a) their

scope, which ranges from operational to strategic; (b) the particular channel member under consideration, i.e., consumer, retailer, or both; (c) the particular distribution service elements that are emphasized, and (d) the specific behavioral variables analyzed, i.e., assortment choice, post-purchase evaluation processes, and retail format decisions. The empirical applications in chapters four, five, and seven all concern the Dutch domestic cut flower market.

In the second part of the book retail assortment stands out as an essential distribution service element. Chapter three addresses the theory underlying consumer evaluation of and choice from assortments. Starting with analysis of consumer need for assortments, it provides a theoretical framework in which consumption goals, situational, and contextual variables, including retailer distribution service provision, are determinants of consumer evaluation of and choice from assortments. The interaction between assortment composition and consumer choice is explicitly recognized. The chapter results in a model of consumer assortment choice and presents a number of propositions with respect to the role of consumption goal and purchase context on consumer choice of and from assortments. Several of these hypotheses are tested in the subsequent chapter. Chapter four empirically analyzes the influences of assortment composition, consumption goal, the competitive environment, and distribution service provision on consumer store and item choice. An experimental research design was used and associated multiple choice tasks were presented to members of a household consumer panel. It has been shown in chapter four that extended multinomial logit modeling of the experimental choice data provides a tool for optimization of retail assortments. Using quantification of substitution, complementarity, and asymmetric dominance effects, assortment simulations were done that give insight into the effects of retailer assortment composition on sales. It appeared that other distribution service elements, such as ambience and location, play a subordinate role in consumer choice relative to assortment composition and price.

The third part of the book investigates the role of retail distribution service provision in consumer post-purchase evaluation processes, resulting in feelings of satisfaction or dissatisfaction. Chapter five extends existing research on consumer post-purchase evaluation. Distribution service provision and evaluation refer to the creation of availability through supplier-customer interactions. Therefore, supplier variables have to be included in the analysis as determinants of consumer evaluation

of exchange episodes, in addition to consumer variables. The retailer-level variables that have been hypothesized to influence consumer satisfaction include retailer strategic orientation, retailer-supplier trust, and retailer distribution system performance indicators. Datacollection was done in two stages. A sample of specialized cut flower retailers was interviewed first, followed by pre- and postpurchase interviews with their customers. Multilevel random ANOVA showed that a significant part of measure variance can be attributed to unique and systematic retailer influences. However, consumer perceptions of retailer distribution service performance and consumer satisfaction/dissatisfaction appear to be highly idiosyncratic. Consumer perceptions of distribution service performance appeared to have a positive direct as well as a positive indirect effect on consumer satisfaction/ dissatisfaction. Multilevel regression analysis using a two-level random-intercept model showed that customers of service oriented retailers generally have higher perceptions of distribution service performance and experience lower distribution-related cost. In addition, higher retailer trust in her supplier coincides with higher consumer perceptions of product quality and presentation. For a subsample consisting of retailers who purchase at the same supplier type - the flower auction - retailer-supplier trust also related negatively to consumer perceptions of distribution cost. Retailer assessed values of distribution system indicators were not or only weakly significantly related to consumer perceptions of distribution service provision.

The fourth part of the book focuses on the role of distribution service in vertical and horizontal strategic interactions between channel members, particularly between manufacturers and retailers, and its consequences for the emergence of different channel structures and retail formats. Chapter six starts with an overview of rationales for vertical differentiation of distribution channels in markets with different competitive structures. It appears that competition, more specifically channel members' cost efficiency and distribution service effectiveness, is a major determinant of channel structure. The strategic interactive nature of channel members' decision making in oligopolistic markets favors game-theoretic analysis and modeling of channel member price and non-price decisions as determinants and consequences of channel structure. The chapter identifies several findings that point out the relevance of distribution service provision for reducing price competition and thereby achieving some form of channel coordination. However, the dynamics

associated with distribution service competition and the consequences thereof for channel structure have been included in many distribution channel models only implicitly. The importance of distribution service as a decision variable deserves particular attention with respect to retail format competition.

Chapter seven analyzes retail competition with respect to price and distribution service and its consequences for the emergence of differentiated retail formats. The study adds another dimension to breadth and depth of assortments by addressing the issue of retailer commitment to carrying a consistent assortment within a product category, i.e., the consistency with which a retailer carries specific brands and items within a product category, and its relationship to retailer price and service decisions. A game-theoretic model was developed of a market with two retailers, one who commits to offering a consistent assortment and consequently incurs higher cost of goods, while the other does not. The model identifies the conditions under which an equilibrium results in which either one or both of the retailers will offer additional service and what would be their pricing strategies. In addition to model development a contribution of this chapter is an empirical test of the proposed theory on the basis of data from the Dutch retail flower market. The equilibrium predicted by the model i.e., only the retailer offering consistent assortment is offering additional service, was found to be consistent with observed and empirically assessed retailer and consumer behavior.

8.2 Research implications

This book argued that distribution service is a complex multidimensional concept which can be provided by a trader to his customers, but also can be incorporated in and transferred through physical products. Examples of the latter are abundant and concern mostly so-called convenience products, such as ready-to-eat foods, vending machines, etcetera. Distribution service introduces many research issues with relevance for many fields of interest. This book identified and integrated three different approaches to distribution service that relate to different stages of customer and supplier decision making. The research that was subsequently done has competition as its central issue. In this section the research presented in this book is discussed in a broader perspective.

8.2.1 Consumer choice and retail structure

The assortment is a dominant element of distribution service because it refers to all three functions of distribution service mentioned in the definition presented in chapter 2. Assortments facilitate shopping and as such reduce shopping costs, they assist consumer decision making through simple comparison of different products, and may provide hedonic shopping value. Consumer store and item choice behavior depends on a number of situational and personal factors, including the particular consumption goal pursued, the characteristics of specific items that are present in the assortment, competing assortments, and other distribution service provision by the retailer and competing stores.

Retailers exert influence on both desired outputs and the consumption activities performed by consumers, largely through advertising, and distribution service provision. More specifically, context effects play a role throughout the consumer's decision making process. Once the consumer has entered the store, he or she encounters product presentation and experiences personal selling efforts, as well as other distribution service, all of which may induce context effects and consequently influence decision making. Retailers thus have significant opportunity to alter consumers' consideration and choice sets and consequently influence choice. Ample examples exist of salespersons who allow for consumers' tendency for extremeness aversion and asymmetric dominance by offering three alternatives, one of which is a decoy. Retailers thus can exert considerable influence on consumer behavior through their in-store presentation of products, advertising, and personal selling. The role of retailers in satisfying *and* creating consumer demand, that is improving consumer decision making effectiveness, increasing shopping value, and decreasing shopping cost, has been illustrated in several parts of this book. Hopefully, the research reported contributes to an increased awareness among retailers of the possibilities that exist to improve their profitability through improved service provision.

Given her knowledge of customers and competitors each retailer should determine her own assortment. The approach that was followed in chapter four allows retailers to simulate and subsequently evaluate different assortment compositions with respect to consumer demand. In addition, the estimation results give clear guidelines with respect to the number of each item to hold in stock. When

inventory costs and product margins are known the estimated parameters from the extended multinomial logit model can be input to profit optimization using mathematical programming techniques. Quantification of the effects of distribution services, including possible trade-offs between the various service aspects, on customer preference formation and choice can provide valuable input to distribution channel models. The results of the studies presented in chapters four and five form a starting point in this respect. Worth mentioning is the enormous increase in Efficient Consumer Response (ECR, Coopers and Lybrand 1996) implementations in which channel inventories are driven by end-consumer demand. In ECR systems assortment optimization will soon be considered necessary in order to increase merchandise effectiveness and channel efficiency. The results of the choice experiment reported in chapter four are a step towards this direction.

In addition to affecting consumer choice behavior retailer distribution service provision influences consumer postpurchase evaluation of their shopping experience. The results presented in chapter five showed that retailer distribution service provision has considerable influence on consumer postpurchase evaluations. The adopted approach enables quantification of distinctive retailer effects on consumer behavioral variables. Consumers' quality evaluations and perceptions of disconfirmation of expectations appear to be less idiosyncratic than consumer feelings of satisfaction/dissatisfaction. Retailers should therefore carefully select the behavioral variables they monitor with respect to their distribution service performance.

Distribution service provision by retailers constitutes a powerful force driving developments in channel structure and retail formats. The different types of retail outlets that exist in a particular market are the result of the simultaneous decisions made by many retailers concerning assortment composition, other distribution service provision, and price. Consumer demand for distribution service constitutes an important factor underlying the emergence of retail assortments. The model presented in chapter seven gives insight into the dynamics of intertype retail competition. It shows the interrelationships between price and service competition and identifies conditions under which specific retailers will carry consistent assortments and provide additional distribution service. The model was validated using real-world data and, despite its restrictive assumptions, proves to be predictive of a specific market structure. Similar models can be used to gain insight

into the effect of structural developments in certain markets, such as the one described below.

8.2.2 A special application

It has generally been recognized that there exists a specific market for supermarkets that allow consumers to purchase a basket of products in one shopping trip. With respect to non-food department stores[1] exist that offer similar opportunities for one-stop shopping. Virtually all aspects of distribution service that have been discussed in this book apply in particular to the considerations concerning approval of a recent merger between two department stores in the Netherlands. In a recent case - 166/Vendex-KBB - the Netherlands Competition Authority (NCA) states that, based on qualitative arguments, department stores do not meet a specific consumer need for one-stop shopping for non-food products and consequently no specific market exists for department stores. The Competition Authorities in Great Britain and Germany have concluded similarly with respect to recent mergers. In the United States the proper authority has decided otherwise in several cases. In the reflections underlying the NCA's decision the specific distribution service package provided by department stores and the consequences thereof for market definition have been explicitly recognized. The NCA argues, however, that a hypothetical department store monopolist would not be able to sustain a small but significant and profitable price increase because of competition from specialty stores. Based on this, one can wonder what rationales underlie the existence of department stores.

Given a consumer's need for one-stop shopping for goods and/or pure services, the large and varied assortment carried by a department store provides an additional, contextual factor that influences consumer purchase decisions. The NCA resolution mentions that department stores offer large and varied assortments that encourage impulse purchases and create shopping value to consumers. This has in fact been mentioned as one of the strongest competitive advantages of department stores, and is in agreement with the theory in chapter 3 and the results of the

[1] According to the Netherlands Competition Authority a department store is a store which continuously and simultaneously carries at least eight different, more or less unrelated product assortments (NCA 1998).

research presented in chapter 4. In addition, the resolution states that the large and varied assortment carried by a department store provides information to consumers that can be easily collected and used for improvement of their decision making[2]. These seem plausible rationales for the existence of department stores only when they lead to increased purchases relative to more specialized assortments, which is not the case according to the NCA. Scale advantages incurred by department stores would favor large stores with large assortments but should have lead to the emergence of category killers instead of department stores when the need for one-stop shopping of non-food products is insignificant.

Chapter 3 argued that consumer need for one-stop shopping and associated choice of assortment is dependent on the specific consumption goal, as well as other situational and contextual factors. As such, consumer need for one-stop shopping varies across time and occasions and accordingly substitutability and complementarity are subjective concepts. Department stores may therefore cater a different market segment, in terms of consumption goals, than specialized stores. Alternatively, department stores may compete with specialized stores for a specific consumer segment. This issue deserves additional examination.

The NCA argues that quantification of competition between department stores and specialized stores is troublesome and consequently relies on qualitative arguments with respect to the decision whether or not to approve concentration of specific retailers. The research reported in chapter 4 offers possibilities for quantification of the existence of complementarity between seemingly unrelated items in an assortment. Such analysis will shed light on the question whether consumers value one-stop shopping for specific non-food products and can support decision making with respect to merger approval. Similarly, multiple choice experiments and cross-effects models can be used to quantify substitutability between department stores and specialty stores, which might very well be asymmetric.

A high threshold of entering the "department store market" exists due to high costs associated with establishment and operation of a department store. One could therefore argue that through merger department stores monopolize certain distribution service elements, particularly assortment. It remains unclear whether a large monopolist department store that operates in a market with competition from

[2] Note in this respect that many specialized stores offer personal expert advice.

many specialized retailers may either not be able to sustain a higher price for individual items in the assortment due to competition, or will decide to maintain a competitive price level for other reasons, such as price elasticity of demand or maximization of market share instead of maximization of profits. Game-theoretical models, such as discussed in chapter 6 and developed in chapter 7, of competition between department stores and between a department store and specialized stores can generate insight into the conditions under which a department store will or will not show undesirable behavior.

8.3 Future research challenges

Distribution service is a multidimensional concept, its provision affects many types of consumer and organizational behavior and underlying needs, wants, and desires. The research reported in this book discussed a number of questions with respect to the relationship between distribution service provision and competition between retail formats. In particular, it considered the role of distribution service in consumer evaluation of products and stores and in retailer decision making. The new definition of distribution service that has been developed in chapter two mentions the role of distribution service in reducing consumers' distribution- related cost, improving the effectiveness of decision making, and increasing hedonistic shopping value. The book has addressed each of these consumer benefits associated with distribution service provision. However, many more research questions that deserve further analysis can be formulated in this respect. These concern among other things the relationship between distribution service provision and consumer behavior, the role of distribution service with respect to the development of new retail formats, and the role of distribution service in distribution channel optimization.

With respect to consumer behavior specific questions that can be asked include for example the determinants of consumer need for convenience and the relationship between distribution service elements and consumers' emotional shopping experience. The influence of information provision, being an important distribution service element, on consumer decision making processes is another issue that deserves attention. Technological developments, in particular new media

such as the Internet and electronic retailing bring about structural changes in the costs and benefits associated with consumer shopping behavior (cf. Alba et al. 1997). In the near future comparison of alternative products and outlets may involve a first stage in which the personalized software preselects items on detailed criteria such as price, color, and size, followed by a final selection by the individual consumer. Search engines and so-called personal assistants will allow consumers to comprehend larger assortments and distinguish item differences at a more detailed level at lower cost. The rapidly increasing adoption of new media, in particular the Internet, will thus change consumers' existing cognitive structures and probably shake existing competitive relations and ultimately distribution channel structures.

Consumer pre- and post-purchase evaluation processes generally result from interactions with the store and its personnel. Distribution service provision is part of these interactions. New retailing formats involve new ways of supplier-customer interactions. Examples of research themes in this respect include, "How does electronic retailing influence consumer choice behavior," "What are the mechanisms behind retailer-consumer interactions," and "What is the specific role of individual distribution service elements, such as personal advice, in these interactions?" In addition, since electronic retailing does not allow consumers to evaluate a number of experience attributes, consumers need cues for inferential belief formation, such as strong brand names (including store names) and guarantees (as with postal ordering). These issues require detailed investigation into the role of individual distribution service elements and their interrelationships in consumer decision making.

Future research on distribution service provision relates to development of new products and retail formats. The increased need for convenience and other time and effort-saving service outcomes has already lead to many new product introductions and new retail formulas in which distribution service plays an important role. In particular products in which service has been incorporated, such as fast food and TV-dinners, deserve more attention. Given the multitude of existing store formats and branded products one might argue that innovation challenge concerns distribution service in particular. Research could therefore consider the relationships between specific consumer service needs and distribution service provision by different types of retail outlets.

Channel optimization requires careful assessment of channel performance. This book's definition of distribution service and its role in distribution channel competition aims among other things at broadening the perspective on channel performance. The retail stage forms a natural starting point for analysis of the role of distribution service provision in distribution channel structure and coordination. Assortment decisions are generally among the most difficult and important decisions faced by retailers. Recent interest in ECR has led to an increased focus on assortment management, both from the perspective of cost reduction, and from the perspective of demand management. "Efficient Assortment" has been recognized as a critical element of ECR and implies careful assortment design, balancing the total distribution channel costs of carrying specific items against their role in creating and satisfying final consumer demand. The research in this book focused on the multilateral influences between assortment composition and consumer choice. Decisions on shelf space allocation of items in the assortment are interrelated to assortment decisions. In the introduction to a recent special issue of the Journal of Retailing on Assortment Planning Kahn (1999) argues that since shelf space is among the scarcest resources in retailing most research on retailing has focused on optimization of shelf space allocation (e.g., Corstjens and Doyle 1981; Bultez and Naert 1988; Bultez, Gijsbrechts, Naert, and Vanden Abeele 1989; Chiang and Wilcox 1997; Urban 1998). One might argue that shelf space and assortment decisions are interdependent. Research on retail assortment composition should be extended to include the interactions between assortment composition and shelf space allocation with respect to consumer preferences and choice.

In practice, ECR can be considered a driving force behind cooperation within and among distribution channels, even when they consist of independent actors, and as such becomes an instrument for achieving channel coordination. Since it is very difficult to develop and realize a simple coordination mechanism for a complex real-life distribution channel, organizations that participate on the same channel level in different channels, such as grocery retailers, focus increasingly on channel optimization through cooperation and information exchange. Distribution service provision has thereby been recognized as important instrument for achieving better channel performance. Consider for example recent information sharing by large supermarket organizations in order to increase the benefits resulting from implementation of ECR. Improvement of channel performance by not merely

reacting to in-store consumer demand but by management of consumer demand requires detailed knowledge of consumer decision making with respect to products and assortments. Likewise, successful implementation of an integrated perspective on channel optimization requires insight into the behavioral mechanisms underlying strategic interactions between channel actors at different channel stages, including competitors dynamics as well as supplier-buyer relationships. The development of new game-theoretic models is required to yield insight into the role of distribution service in structural developments with respect to retail formats, channel structure, and channel coordination.

References

Betancourt, Roger R. and David Gautschi (1988). The Economics of Retail Firms. *Managerial and Decision Economics* 9 (June): 133-142.

Betancourt, Roger R. and David Gautschi (1990). Demand Complementarities, Household Production, and Retail Assortments. *Marketing Science* 9 (2): 146-161.

Betancourt, Roger R. and David Gautschi (1992a). The Demand for Retail Products and the Household Production Model. New Views on Complementarity and Substitutability. *Journal of Economic Behavior and Organization* 17: 257-275.

Betancourt, Roger R. and David Gautschi (1992b). The Outputs of Retail Activities: French Evidence. *Applied Economics* 24: 1043-1052.

Betancourt, Roger R. and David Gautschi (1993a). Two Essential Characteristics of Retail Markets and Their Economic Consequences. *Journal of Economic Behavior and Organization* 21: 277-294.

Betancourt, Roger R. and David Gautschi (1993b). The Outputs of Retail Activities: Concepts, Measurement and Evidence from U.S. Census Data. *The Review of Economics and Statistics*: 294-301.

Betancourt, Roger R. and David Gautschi (1998). Distribution Services and Economic Power in a Channel. *Journal of Retailing* 74 (Spring): 37-60.

Bettman, James R. (1979), *An Information Processing Theory of Consumer Choice*. Reading, MA, Addison-Wesley.

Bettman, James R. (1988). Presidential Address: Processes of Adaptivity in Decision Making. In: Michael J. Houston (ed.), *Advances in Consumer Research* 15. Provo, UT, Association for Consumer Research, 1-4.

Bettman, James R. and Mita Sujan (1987). Effects of Framing on Evaluation of Comparable and Noncomparable Alternatives by Expert and Novice Consumers. *Journal of Consumer Research* 14 (September): 141-154.

Bienstock, Carol C., John T. Mentzer, and Monroe Murphy Bird (1997). Measuring Physical Distribution Service Quality. *Journal of the Academy of Marketing Science* 25 (1): 31-44.

Bishop, D.W. and P.A. Witt (1970). Sources of Behavioral Variance During Leisure Time. *Journal of Personality and Social Psychology* 16: 352-360.

Bitner, Mary Jo (1992). Servicescapes: The Impact of Physical Surroundings on Customers and Employees. *Journal of Marketing* (April): 57-71.

Bode, Ben (1990). *Studies in Retail Pricing*. PhD Thesis, Erasmus University.

Bolton, P. and G. Bonanno (1988). Vertical Restraints in a Model of Vertical Differentiation. *Quarterly Journal of Economics* 103 (August): 555-570.

Bookbinder, James H. and Maureen E. Lynch (1997). Customer Service in Physical Distribution: A Utility-Function Approach. *International Journal of Physical Distribution & Logistics Management* 27 (9/10): 540-558.

Bowersox, Donald J., D.J. Closs and Omar K. Helfferich (1986). *Logistical Management*. New York, MacMillan.

Boyd, Harper W. and Sidney J. Levy (1963). New Dimension in Consumer Analysis. *Harvard Business Review* 41 (November-December): 129-140.

Broniarczyk, Susan M. and Joseph W. Alba (1994). The Importance of the Brand in Brand Extension. *Journal of Marketing Research* 31 (May): 214-228.

Broniarczyk, Susan, Wayne D. Hoyer, and Leigh McAlister (1998). Consumer Perceptions of the Assortment Offered in a Grocery Category: The Impact of Item Reduction. *Journal of Marketing Research* 35 (May): 166-176.

Broniarczyk, Susan, and Leigh McAlister (1995). Arranging Category Displays to be Congruent With Consumers' Mental Representations: The Effect of Choice on Perceptions of Variety Offered. *Advances in Consumer Research* 22: 291-292.

Brown, Tom J., Gilbert A. Churchill, and J. Paul Peter (1993). *Research Note: Improving the Measurement of Service Quality*. Journal of Retailing 69 (Spring): 127-139.

Bryk, Anthony S. and Stephen W. Raudenbusch (1992). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Newbury Park, CA, Sage.

Bucklin, Louis P. (1965). Postponement, Speculation and the Structure of Distribution Channels. *Journal of Marketing Research* 2 (February): 26-32.

Bucklin, Louis P. (1966). *A Theory of Distribution Channel Structure*. Berkeley: Institute of Business and Economic Research, University of California.

Bucklin, Louis P. (1972), *Competition and Evolution in the Distributive Trades*. Englewood Cliffs, NJ, Prentice Hall.

Bucklin, Louis P., Venkatraman Ramaswamy, and Sumit K. Majumdar (1993). *Determinants of Distribution Channel Structure in Industrial Business Markets: An Empirical Analysis*. International Journal of Research in Marketing 10.

Bucklin, Louis P., Venkatram Ramaswamy, and Sumit K. Majumdar (1996). Analyzing Channel Structures of Business Markets via the Structure-Output Paradigm. *International Journal of Research in Marketing* 13: 73-87.

Bucklin, Randolph E. and V. Srinivasan (1991). Determining Interbrand Substitutability Through Survey Measurement of Consumer Preference Structures. *Journal of Marketing Research* 28 (February): 58-71.

Bultez, Alain, Els Gijsbrechts, Philippe Naert, and Piet VandenAbeele (1989). Asymmetric Cannibalism in Retail Assortments. *Journal of Retailing* 65 (2): 153-192.

Bultez, Alain and Philippe Naert (1988). SHARP: Shelf Allocation for Retailers' Profit. *Marketing Science* 7 (Summer): 211-231.

Burns, L.D., R.W. Hall, D.E. Blumenfeld, and C.F. Daganzo (1985). Distribution Strategies that Minimize Transportation and Inventory Costs. *Operations Research* 33 (3): 469-490.

Carpenter, Gregory S., Lee G. Cooper, Dominique M. Hanssens, and David F. Midgley (1988). Modeling Asymmetric Competition. *Marketing Science* 7 (4): 393-412.

Carman, James M. (1990). Consumer Perceptions of Service Quality: An Assessment of the SERVQUAL Dimensions. *Journal of Retailing* 66 (Spring): 33-55.

Carpenter, George S., Lee G. Cooper, Dominique M. Hanssens, and David F. Midgley (1988). Modeling Asymmetric Competition. *Marketing Science* 7 (Fall): 393-412.

Carson, Richard T, Jordan J. Louviere, Don A. Anderson, Phipps Arabie, David S. Bunch, David A. Hensher, Richard M. Johnson, Warren F.Kuhfeld, Dan Steinberg, Joffre Swait, Harry Timmermans, James B. Wiley,(1994). Experimental Analysis of Choice. *Marketing Letters* 5: 351-368.

Celly, Kirti Sawhney and Gary L. Frazier (1996). Outcome-Based and Behavior-Based Coordination Efforts in Channel Relationships. *Journal of Marketing Research* 33 (May): 200-210.

Celsi, Richard L. and Jerry C. Olson (1988/7). The Role of Involvement in Attention and Comprehension Processes. *Journal of Consumer Research* 15 (September): 210-224.

Centraal Bureau voor de Statistiek (1971). *Statistical Yearbook of the Netherlands*. The Hague, CBS.

Centraal Bureau voor de Statistiek (1999). *Statistisch Jaarboek*. Voorburg/Heerlen, CBS.

Cespedes, Frank (1988). Control Versus Resources in Channel Design: Distribution Differences in One Industry. *Industrial Marketing Management* 17: 215-227.

Chamberlin, E. (1933). *The Theory of Monopolistic Competition*. Cambridge, Mass., Harvard University Press.

Chi, Michelene T.H., Robert Glaser, and M.J. Farr (1988). *The Nature of Expertise*. Hillsdale, NJ, L. Erlbaum Associates.

Cialdini, Robert B. (1984). *Influence: The Psychology of Perusasion*. Glenview, Ill, Scott Foresman.

Chiang, Jeongwen and Ronald T. Wilcox (1997). A Cross-Category Analysis of Shelf-Space Allocation, Product Variety, and Retail Margins. *Marketing Letters* 8 (2): 183-191.

Choi, S. Chan (1991). Price Competition in a Channel Structure with a Common Retailer. *Marketing Science* 10: 271-296.

Choi, S. Chan (1996). Price Competition in a Duopoly Common Retailer Channel. *Journal of Retailing* 72 (2): 117-134.

Chow, Garland, Trevor D. Heaver, and Lennart E. Henriksson (1994). Logistics Performance: Definition and Measurement. *International Journal of Physical Distribution & Logistics Management* 24 (1): 17-28.

Christensen-Zsalanski, J.J. and C.F. Willham (1991). The Hindsight Bias: A Meta Analysis. *Organizational Behaviour and Human Decision Processes* 48: 147-168.

Christopher, Martin, Philip Schary and Tage Skjott-Larsen (1979). *Customer Service and Distribution Strategy*. London, Associated Business Press.

Chu, Wujin and Preyas S. Desai (1995). Channel Coordination Mechanisms for Customer Satisfaction. *Marketing Science* 14 (4): 343-359.

Churchill, Gilbert A. and Carol Surprenant (1982). An Investigation into the Determinants of Consumer Satisfaction. *Journal of Marketing Research* 19: 491-504.

Coase, Ronald H. (1960). The Problem of Social Cost. *Journal of Law and Economics* October: 1-44.

Cohen, Joel B. and Kunal Basu (1987). Alternative Models of Categorization: Toward a Contingent Processing Framework. *Journal of Consumer Research* 13 (March): 455-472.

Cohen, M.A. and H.L. Lee (1988). Strategic Analysis of Integrated Production-Distribution Systems: Models and Analysis. *Operations Research* 36: 216-228.

Cohen, M.A., W.P. Pierskalla, and H.C. Yen (1981). Analysis of Ordering and Allocation Policies for Multi-Echelon, Age-Differentiated Inventory Systems. In: L.B. Schwartz (ed), *Multi-Level Production/Control Inventory Systems: Theory and Practice*. Amsterdam, North-Holland, 353-378.

Coleman, James S. (1990). *Foundations of Social Theory*. Cambridge, MA, Harvard University Press.

Coopers and Lybrand (1996). *European Value Chain Analysis Study - Final Report*. 73 pp.

Corey, E. Raymond, Frank V. Cespedes, and V. Kasturi Rangan (1989). *Going to Market: Distribution Systems for Industrial Products*. Boston, MA, Harvard Business School Press.

Corstjens, Marcel and Peter Doyle (1981). A Model for Optimal Shelf Space Allocation. *Management Science* 28 (Oct.): 822-833.

Coughlan, Anne T. (1985). Competition and Cooperation in Marketing Channel Choice: Theory and Application. *Marketing Science* 4: 100-129.

Coughlan, Anne T. and Rajiv Lal (1990). Retail Pricing: Does Channel Length Matter? *Managerial and Decision Economics* 13: 201-214.

Coughlan, Anne T. and Murali K. Mantrala (1992). Dynamic Competitive Pricing Strategies. *International Journal of Research in Marketing* 9: 91-108.

Coughlan, Anne T. and Murali K. Mantrala (1994). Dynamic Competitive Retail Pricing Behavior with Uncertainty and Learning. *Managerial and Decision Economics* 15: 3-20.

Coughlan, Anne T. and Birger Wernerfelt (1989). On Credible Delegation by Oligopolists: A Discussion of Distribution Channel Management. *Management Science* 35: 226-239.

Coupey, Eloise (1994). Restructuring: Constructive Processing of Information Displays in Consumer Choice. *Journal of Consumer Research* 21: 83-99.

Cournot, A. (1838). Recherches sur les Principes Mathematiques de la Théorie des Richesses. English edition (ed. N. Bacon): *Researches into the Mathematical Principles of the Theory of Wealth.* New York, MacMillan (1897).

Creusen, Mariëlle E.H. and Jan P.L. Schoormans (1997). The Nature of Differences between Similarity and Preference Judgments. A Replication with Extension. *International Journal of Research in Marketing* 14: 81-87.

Cronin, J. Joseph, Jr. and Steven A. Taylor (1992). Measuring Service Quality: A Reexamination and Extension. *Journal of Marketing* 56 (July): 55-68.

Cronin, J. Joseph, Jr. and Steven A. Taylor (1994). SERVPERF Versus SERVQUAL: Reconciling Performance-Based and Perceptions Minus Expectations Measurement of Service Quality. *Journal of Marketing* 58 (January): 125-131.

Cunningham, M.T. and D.A. Roberts (1974). The Role of Customer Service in Industrial Marketing. *European Journal of Marketing* 8 (1): 15-28.

Currim, Imran S. (1982). *Predictive Testing of Consumer Choice Models not Subject to Independence of Irrelevant Alternatives.* Journal of Marketing Research 19 (May): 208-222.

Day, George S., Allan D. Shocker, and Rajendra K. Srivastava (1979). Customer-Oriented Approaches to Identifying Product-Markets. *Journal of Marketing* 43 (Fall): 8-19.

De Bont, Cees J.P.M. (1992). *Consumer Evaluations of Early Product Concepts.* Delft, Delft University Press.

DeSarbo, Wayne S., L. Huff, M.M. Rolandelli, and J. Choi (1994). On the Measurement of Perceived Service Quality. In R.T. Rust and R.L.Oliver (eds.), *Service Quality: New Directions in Theory and Practice.* Thousand Oaks, CA, Sage.

Deuermeyer, B.L. and L.B. Schwartz (1981). A Model for the Analysis of System Service Level in Warehouse-Retailer Distribution Systems: The Identical Retailer Case. In: L.B. Schwartz (ed), *Multi-Level Production/Control Inventory Systems: Theory and Practice.* Amsterdam, North-Holland, 163-193.

Devinney, Timothy M. (1988). Price, Advertising, and Scale as Information-Revelation Mechanisms in Product Markets. In: T.M. Devinney (ed.), *Issues in Pricing: Theory and Research.* Lexington, Mass., Lexington Books, 63-81.

Dhar, Ravi and Steven J. Sherman (1996). The Effect of Common and Unique Features in Consumer Choice. *Journal of Consumer Research* 23 (December): 193-203.

Dickson, Peter R. and Alan G. Sawyer (1990). The Price Knowledge and Search of Supermarket Shoppers. *Journal of Marketing* 54 (July): 42-53.

Doney, Patricia and Joseph P. Cannon (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing* 61 (April): 35-51.

Donovan, Robert J. and John R. Rossiter (1982). Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing* 58 (1): 34-57.

Dorfman, R. and P.O. Steiner (1954). Optimal Advertising and Optimal Quality. *American Economic Review* 44: 826-836.

Dwyer, F. Robert and Sejo Oh (1987). Output Sector Munificence Effects on the Internal Political Economy of Marketing Channels. *Journal of Marketing Research* 24 (November): 347-358.

Ehrlich, Isaac and Lawrence Fisher (1982). The Derived Demand for Advertising: A Theoretical and Empirical Investigation. *American Economic Review* 72 (June): 366-388.

Eliashberg, Jehoshua and Donald A. Michie (1984). Multiple Business Goal Sets As Determinants of Marketing Channel Conflict: An Empirical Study. *Journal of Marketing Research* 21 (February): 75-88.

Emerson, Carol J. and Curtis M. Grimm (1996). Logistics and Marketing Components of Customer Service: An Empirical Test of the Mentzer, Gomes, and Krapfel Model. *International Journal of Physical Distribution & Logistics Management* 26 (8): 29-42.

Etgar, Michael (1978a). Selection of an Effective Channel Control Mix. *Journal of Marketing* 42 (July): 53-58.

Etgar, Michael (1978b). The Effects of Forward Vertical Integration on Service Performance of a Distributive Industry. *The Journal of Industrial Economics* 26 (3): 249-255.

Etgar, Michael and Pinhas Zusman (1982). The Marketing Intermediary as an Information Seller: A New Approach. *Journal of Business* 55 (4): 505-515.

Farquhar, Peter H. and A.R. Pratkanis (1993). Decision Structuring with Phantom Alternatives. *Management Science* 39: 1214-1226.

Federgruen, Awi and Paul Zipkin (1984). Approximations of Dynamic, Multilocation Production and Inventory Problems. *Management Science* 30 (1): 69-84.

Fershtman, Chaim (1982). Price Dispersion in Oligopoly. *Journal of Economic Behavior and Organization* 3: 389-401.

Fershtman, Chaim and E. Kalai (1993). Complexity Considerations and Market Behavior. *Rand Journal of Economics* 24: 224-235.

Finn, David W. and Charles W. Lamb (1991). An Evaluation of the SERVQUAL Scale in a Retail Setting. In: Rebecca H. Holman and Michael R. Solomon (eds.), *Advances in Consumer Research*, Vol. 18. Provo, UT, Association for Consumer Research, 483-490.

Fischhof, B. (1975). Hindsight • Foresight: The Effect of Outcome Knowledge On Judgment Under Uncertainty. *Journal of Experimental Psychology: Human Perception and Performance* 1: 288-299.

Fotheringham, A. Stewart (1988). Consumer Store Choice and Choice Set Definition. *Marketing Science* 7: 299-310.

Frazer, Cynthia and John W. Bradford (1983). Competitive Market Structure Analysis: Principal Partitioning of Revealed Substitutabilities. *Journal of Consumer Research* 10 (June): 15-30.

Frazer, Cynthia and John W. Bradford (1984). Competitive Market Structure Analysis: A Reply. *Journal of Consumer Research* 11 (December): 842-847.

Frazier, Gary L., Kirti Sawhney, and Tassu Shervani (1990). Intensity, Functions, and Integration in Channels of Distribution. In: V.A. Zeithaml (ed.), *Review of Marketing*. Chicago, American Marketing Association, 263-298.

Gabor, A. and C. Granger (1966). Price as an Indicator of Quality. *Economica* 33: 43-70.

Gal-Or, Esther (1985). First Mover and Second Mover Advantages. *International Economic Review* 26: 649-653.

Gal-Or, Esther (1987). *Dualistic Vertical Restraints*. Working Paper 650, Graduate School of Business, University of Pittsburg.

Ganesan, Shankar (1994). Determinants of Long-Term Orientation in Buyer-Seller Relationships. *Journal of Marketing* 58 (April): 1-19.

Gardner, D. (1971). Is There a Generalized Price-Quality Relationship? *Journal of Marketing Research* 8: 241-243.

Gensch, Dennis H. (1987). A Two-Stage Disaggregate Multiattribute Choice Model. *Marketing Science* 6: 223-231.

Gensch, Dennis H. and Wilfred W. Recker (1979). The Multinomial, Multi-Attribute Logit Choice Model. *Journal of Marketing Research* 16 (February): 124-132.

Gerstner, Eitan and James D. Hess (1995). Pull Promotions and Channel Coordination. *Marketing Science* 14 (1): 43-60.

Geyskens, Inge, Jan-Benedict E.M. Steenkamp, Lisa K. Scheer, and Nirmalya Kumar (1996). The Effects of Trust and Interdependence on Relationship Commitment: A Trans-Atlantic Study. *International Journal of Research in Marketing* 13 (4): 303-317.

Gibbons, Robert (1992). *A Primer in Game Theory*. Hertfordshire, Harvester Weathsheaf.

Gilmour, Peter (1977). Customer Service: Differentiating by Market Segment. *International Journal of Physical Distribution* 7 (3): 141-148.

Glenberg, Arthur M. (1997). What Memory is For. *Behavioral and Brain Sciences* 20 (1): 1-55.

Goldstein, Harvey (1995). *Multilevel Statistical Methods*. London, Arnold.

Graonic, M.D. and A.D. Shocker (1993). On the Transferability of Feature/Level Preferences Across Competing Brands Serving the Same Purpose. In: Leigh McAlister and

Michael J. Rothschild (eds.), *Advances in Consumer Research 20.* Provo, UT, Association for Consumer Research, 389-394.

Green, Paul E. and V. Srinivasan (1978). Conjoint Analysis in Consumer Research: Issues and Outlook. *Journal of Consumer Research* 5(September): 103-121.

Green, Paul E. and V. Srinivasan (1990). Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice. *Journal of Marketing* 54 (October): 3-19.

Grewal, Dhruv and Julie Baker (1994). Do Retail Store Environmental Factors Affect Consumers' Price Acceptability? An Empirical Examination. *International Journal of Research in Marketing* 11: 107-115.

Grönroos, Christian (1990). *Service Management and Marketing.* Lexington, MA, Lexington Books.

Grossman, G. and C. Shapiro (1984). Informative advertising with Differentiated Products. *Review of Economic Studies* 51: 63-82.

Gutman, Jonathan (1982). A Means-End Chain Model Based on Consumer Categorization Processes. *Journal of Marketing* 46 (Spring): 60-72.

Harsanyi, J.C. (1977). *Rational Behavior and Bargaining Equilibrium in Games and Social Situations.* Cambridge University Press, Cambridge.

Hauser, John R. and Birger Wernerfelt (1990). An Evaluation Cost Model of Consideration Sets. *Journal of Consumer Research* 16 (March): 393-408.

Heide, Jan B. and George John (1988). The Role of Dependence Balancing in Safeguarding Transaction-Specific Assets in Conventional Channels. *Journal of Marketing* 52 (January): 20-35.

Helson, Harry (1964). *Adaptation-Level Theory: An Experimental and Systematic Approach to Behavior.* New York, Harper & Row.

Henderson, James M. and Richard E. Quandt (1958). *Microeconomic Theory: A Mathematical Approach.* New York, McGraw-Hill.

Henscher, David A. and Lester W. Johnson (1981). *Applied Discrete Choice Modeling.* London, Croom Helm.

Heskett, James L. (1994). Controlling Customer Logistics Service. *International Journal of Physical Distribution & Logistics Management* 24 (4): 4-10.

Hirschmann, Elizabeth C. (1980). Attributes of Attributes and Layers of Meaning. In: J.C. Olson (ed.), *Advances in Consumer Research* 7. Provo, UT, Association for Consumer Research, 7-12.

Hoch, S.J. and Y.W. Ha (1986). Consumer Learning: Advertising and the Ambiguity of Product Experience. *Journal of Consumer Research* 13: 221-233.

Holbrook, Morris B. and Elizabeth C. Hirschman, (1982). *The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun.* Journal of Consumer Research 9 (September): 132-240.

Holström, Bengt (1982). *Moral Hazard in Teams.* Bell Journal of Economics 13: 324-340.

Hotelling, H. (1929). Stability in Competition. *Economic Journal* 39: 41-57.

Houston, David A. and Steven J. Sherman (1995). Cancellation and Focus: The Role of Shared and Unique Features in the Choice Process. *Journal of Experimental Social Psychology* 31 (July): 357-378.

Houston, David A., Steven J. Sherman, and Sara M. Baker (1989). The Influence of Unique Features and Direction of Comparison on Preferences. *Journal of Experimental and Social Psychology* 25: 121-141.

Houston, David A., Steven J. Sherman, and Sara M. Baker (1991). Feature Matching, Unique Features, and the Dynamics of the Choice Process: Predecision Conflict and Postdecision Satisfaction. *Journal of Experimental Social Psychology* 27 (September): 411-430.

Hovland, C.L., O.J. Harvey, and M. Sherif (1957). Assimilation and Contrast Effects in Reactions to Communications and Attitude Change. *Journal of Abnormal and Social Psychology* 55: 244-252.

Huber, Joel and Noreen M. Klein (1991). Adapting Cutoffs to the Choice Environment: The Effects of Attribute Correlation and Reliability. *Journal of Consumer Research* 18 (December): 410-420.

Huber, Joel and John M. McCann (1982). The Impact of Inferential Beliefs on Product Evaluations. *Journal of Marketing Research* 19(August): 324-33.

Huber, Joel, John W. Payne, and Christopher Puto (1982). Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypotheses. *Journal of Consumer Research* 9 (June): 90-98.

Huber, Joel and Christopher Puto (1983). Market Boundaries and Product Choice: Illustrating Attraction and Substitution Effects. *Journal of Consumer Research* 10 (June): 31-44.

Huber, Joel and Murphy A. Sewall (1982). The Effect of Item Similarity on Aggregate Choice: Modeling Dominance and Substitution Effects. Working Paper, Fuqua School of Business. Duke University.

Huffman, Cynthia and Michael J. Houston (1993). Goal-Oriented Experiences and the Development of Knowledge. *Journal of Consumer Research* 20 (September): 190-207.

Huffman, Cynthia D., Barbara Loken, and James Ward (1990). Knowledge and Context Effects on Typicality and Attitude Judgments. In: Marvin E. Goldberg, Gerald Gorn, and Richard W. Pollay (eds.), *Advances in Consumer Research* 17. Provo, UT, Association for Consumer Research, 257-265.

Hunt, H. Keith (1977). CS/D - Overview and Future Research Directions. In: H. Keith Hunt (ed.), *Conceptualization and Measurement of Consumer Satisfaction and Dissatisfaction.* Cambridge, MA, Marketing Science Institute.

Hutchison, W.M., Jr. and J.F. Stolle (1968). How to Manage Customer Service. *Harvard Business Review* 46 (Nov.-Dec.): 85-96.

Hutchinson, J. Wesley, Kalyan Raman, and Murali Mantrala, (1994). Finding Choice Alternatives in Memory: Probability Models of Brand Name Recall. *Journal of Marketing Research* 31 (Nov.): 441-461.

Iacobucci, Dawn, Amy L. Ostrom, B.M. Braig, and A. Bezjian-Avery (1996). A Canonical Model of Consumer Evaluations and Theoretical Bases of Expectations. In: Teresa A. Swartz, David E. Bowen, and Stephen W. Brown (eds.), *Services Marketing and Management* 5. Greenwich, JAI Press, 1-44.

Ingene, Charles A. and Mark E. Parry (1995a). Channel Coordination When Retailers Compete. *Marketing Science* 14 (4): 360-377.

Ingene, Charles A. and Mark E. Parry (1995b). Coordination and Manufacturer Profit Maximization: The Multiple Retailer Channel. *Journal of Retailing* 71 (2): 129-151.

Innis, Daniel E. and Bernard J. LaLonde (1994). Customer Service: The Key to Customer Satisfaction, Customer Loyalty and Market Share. *Journal of Business Logistics* 15 (1): 1-27.

Isenberg, Daniel J. (1981). Some Effects of Time-Pressure on Vertical Structure and Decision Making in Small Groups. *Organizational Behavior and Human Performance* 27 (February): 119-134.

Jackson, Donald W., Janet E. Keith, and Richard K. Burdick (1984). Purchasing Agents' Perceptions of Industrial Buying Center Influence: A Situational Approach. *Journal of Marketing* 48 (Fall): 75-83.

Jacoby, Jacob, James J. Jaccard, Imran Currim, Alfred Kuss, Asim Ansari, and Tracy Troutman (1994). Tracing the Impact of Item-by-Item Information Accessing on Uncertainty Reduction. *Journal of Consumer Research* 21 (September): 291-353.

Jaworski, Bernard J. (1988). Toward a Theory of Marketing Control: Environmental Context, Control Types and Consequences. *Journal of Marketing* 52 (3): 23-39.

Jeuland, Abel P. and Steven M. Shugan (1983). Managing Channel Profits. *Marketing Science* 2 (3): 239-272.

Joachimsthaler, Erich A. and John L. Lastovicka (1984). Optimal Stimulation Level - Exploratory Behavior Models. *Journal of Consumer Research* 11: 830-35.

John, George (1984). An Empirical Investigation of Some Antecedents of Opportunism in a Marketing Channel. *Journal of Marketing Research* 21 (August): 278-289.

Johnson, Michael D. (1984). Consumer Choice Strategies for Comparing Noncomparable Choice Alternatives. *Journal of Consumer Research*11 (December): 741-753.

Johnson, Eric J. and Robert J. Meyer (1984). Compensatory Choice Models of Noncompensatory Processes: The Effect on Varying Context. *Journal of Consumer Research* 11 (June): 528-541.

Kahn, Barbara E. (1999). Introduction to the Special Issue: Assortment Planning. *Journal of Retailing* 73: 289-293.

Kahn, Barbara E. and Donald R. Lehmann (1991). Modeling Choice Among Assortments. *Journal of Retailing* 67 (Fall): 274-299.

Kahn, Barbara E. and Leigh McAlister (1997). *Grocery Revolution. The New Focus on the Consumer*. Reading, MA, Addison-Wesley.

Kahneman, Daniel, J.L. Knetsch, and R. Thaler (1991). The Endowment Effect, Loss Aversion, and the Status Quo Bias. *Journal of Economic Perspectives* 5: 193-206.

Kasper, Hans and Jos Lemmink (1989). After Sales Service Quality: Views Between Industrial Customers and Service Managers. *Industrial Marketing Management* 18: 199-208.

Kelley, Harrold and John W. Thibaut (1978). *Interpersonal Relations: A Theory of Interdependence*. New York, John Wiley and Sons.

Klein, Noreen M. and Janet E. Oglethorpe (1987). Cognitive Reference Points in Consumer Decision Making. In: Melanie Wallendorf and Paul Anderson (eds.), *Advances in Consumer Research* 14. Provo, UT, Association for Consumer Research, 183-196.

Klein, Noreen M. and Manjit S. Yadav (1989). Context Effects on Effort and Accuracy in Choice: An Enquiry into Adaptive Decision Making. *Journal of Consumer Research* 15 (March): 411-421.

Koelemeijer, Kitty (1994). *Dienstverlening bij de Afzet van Snijbloemen*. Den Haag, Productschap Tuinbouw.

Koelemeijer, Kitty, Jos Lemmink, and Martin Wetzels (1994). Customer Service: Scope and Quality Measurement Comparisons Between Objective and Subjective Performance Indicators. *Proceedings Workshop on Quality Management in Services IV*. Marne-La-Vallee.

Koelemeijer, Kitty, and Harmen Oppewal (1999). Assessing the Effects of Assortment and Ambience: A Choice experimental Approach. *Journal of Retailing* 75 (Fall): 319-345.

Kotler, Philip (1980). *Marketing Management: Analysis, Planning and Control*. 4th ed. Englewood Cliffs, NJ, Prentice-Hall.

Kotler, Philip (1986). *Principles of Marketing*. 3rd ed., Englewood Cliffs, NJ, Prentice-Hall.

Krishnamurthi, Lakshman, S.P. Raj and K. Sivakumar (1995). Unique Inter-Brand Effects of Price on Brand Choice. *Journal of Business Research* 34: 47-56.

Krishnan, Trichy V., Kitty Koelemeijer, and Ram C. Rao (1999). Consistent Assortment Provision and Service Provision in a Retail Environment. *In revision for Marketing Science*.

Krishnan, Trichy V. and Ram C. Rao (1995). Double Couponing and Retail Pricing in a Couponed Product Category. *Journal of Marketing Research* 32 (November): 419-432.

Kyj, M.J. (1987). Customer Service as a Competitive Tool. *Industrial Marketing Management*, 16, 225-230.

Lai, Albert Wenben (1994). Consumption Schemata: Their Effects on Consumer Decision Making. In Chris T. Allen and Deborah Roedder-John (eds.), *Advances in Consumer Research* 21. Provo, UT, Association for Consumer Research, 489-494.

Lal, Rajiv (1990a). Improving Channel Coordination Through Franchising. *Marketing Science* 9 (4): 299-318.

Lal, Rajiv (1990b). Price Promotions: Limiting Competitive Encroachment. *Marketing Science* 9 (3): 247-262 of 319-360.

Lal, Rajiv and Carmen Matutes (1989). Price Competition in Multimarket Duopolies. *RAND Journal of Economics* 20 (4): 516-537.

Lal, Rajiv, and Ram Rao (1997). Supermarket Competition: The Case of Everyday Low Pricing. *Marketing Science* 16 (Winter): 60-80.

LaLonde, Bernard J., M.C. Cooper, and T.G. Noordewier (1988). *Customer Service: A Management Perspective*. Oak Brook, The Council of Logistics Management.

LaLonde, Bernard J. and Paul H. Zinszer (1976). *Customer Service: Meaning and Measurement*. Chicago: National Council of Physical Distribution.

Lambert, D.M. and D.E. Zemke (1982). The Customer Service Component of the Marketing Mix. In: *NCPDM Annual Conference Proceedings*. San Francisco, National Council of Physical Distribution Management, 1-24.

Lancaster, Kevin J. (1966). A New Approach in Consumer Theory. *The Journal of Political Economy* 74 (2): 132-57.

Lancaster, Kevin J. (1971). *Consumer Demand, A New Approach*. New York, Columbia University Press.

Lattin, James M. and Leigh McAlister (1985). Using a Variety-Seeking Model to Identify Substitute and Complementary Relationships among Competing Products. *Journal of Marketing Research* 22 (August): 330-339.

Lazari, Andreas G. and Donald A. Anderson (1994). Designs of Discrete Choice Set Experiments for Estimating both Attribute and Availability Cross Effects. *Journal of Marketing Research* 31 (August): 375-383

Lee, Eunkyu and Richard Staelin (1997). Vertical Strategic Interaction: Implications for Channel Pricing Strategy. *Marketing Science* : 185-207.

Lee, Hau and Seungjin Wang (1999). Decentralized Multi-Echelon Supply Chains: Incentives and Information. *Management Science* 45 (5): 633-640.

Lefkoff-Hagius, Roxanne and Charlotte H. Mason (1993). Characteristic, Beneficial, and Image Attributes in Consumer Judgments of Similarity and Preference. *Journal of Consumer Research* 20 (June): 100-110.

Lemmink, Jos, Martin Wetzels, and Kitty Koelemeijer (1996). Manufacturer-Distributor Relationships and Channel Service Quality. *International Journal of Logistics Management* 7 (2): 33-42.

Levy, Michael (1981a). Diminishing Returns for Customer Service. *International Journal of Physical Distribution & Materials Management* 11(1): 14-24.

Levy, Michael (1981b). Customer Service: A Managerial Approach to Controlling Marketing Channel Conflicts. *International Journal of Physical Distribution & Materials Management* 11 (7): 38-52.

Levy, Michael J. (1981c). Toward and Optimal Customer Service Package. *Journal of Business Logistics* 2 (7): 87-108.

Levy, Michael, J. Webster and Roger A. Kerin (1983). Formulating Push Marketing Strategies: A Method and Application. *Journal of Marketing* 47 (Winter): 25-34.

Levy, Michale and Barton Weitz (1995). *Retailing Management.* Chicago, Richard D. Irwin.

Lilien, Gary, Philip Kotler, and Sridhar Moorthy (1992). *Marketing Models.* Englewood Cliffs, NJ, Prentice Hall.

Loken, Barbara and James C. Ward (1990). Alternative Approaches to Understanding the Determinants of Typicality. *Journal of Consumer Research* 17 (September): 111-126.

Loosschilder, Gerard. H., Edward Rosbergen, Marco Vriens, and Dick R. Wittink (1995). Pictorial Stimuli in Conjoint Analysis to Support Product Styling Decisions. *Journal of the Market Research Society* 37 (1): 17-34.

Louviere, Jordan J. (1988). *Analyzing Decision Making: Metric Conjoint Analysis.* Sage University Paper Series on Quantitative Applications in the Social Sciences, no. 07-067. Beverly Hills, Sage Publications.

Louviere, Jordan J. and Gary J. Gaeth (1987). Decomposing the Determinants of Retail Facility Choice Using the Method of Hierarchical Information Integration: A Supermarket Illustration. *Journal of Retailing* 63 (1): 25-48.

Louviere, Jordan J. and George Woodworth (1983). Design and Analysis of Simulated Consumer Choice or Allocation Experiments: An Approach Based on Aggregate Data. *Journal of Marketing Research* 20 (November): 350-367.

Lovelock, Christopher H. (1991). *Services Marketing.* Englewood Cliffs, NJ, Prentice-Hall.

Luce, R. Duncan (1959). *Individual Choice Behavior.* New York, John Wiley.

Luce, R. Duncan (1977). The Choice Axiom after Twenty Years. *Journal of Mathematical Psychology* 15: 215-233.

Lutz, Nancy A. and V. Padmanabhan (1995). Why do we Observe Minimal Warranties? *Marketing Science* 14 (4): 417-441.

Lynch, John G., Howard Marmorstein, and Michael F. Weingold (1989). Choices from Sets Including Remembered Brands: Use of Recalled Attributes and Prior Overall Evaluations. *Journal of Consumer Research* 15: 169-184.

Machlup, F. and Martha Taber (1960). Bilateral Monopoly, Successive Monopoly and Vertical Integration. *Economica* 27 (May): 101-119

Mallen, B. (1977). *Principles of Marketing Channel Management.* Lexington, Lexington Books.

Malone, T. (1987). Modeling Coordination in Organizations and Markets. *Management Science* 33 (10): 1317-1332.

Mano, Haim and Richard L. Oliver (1993). Assessing the Dimensionality and Structure of the Consumption Experience: Evaluation, Feeling, and Satisfaction. *Journal of Consumer Research* 20 (December): 451-466.

Manrodt, Karl B. and Frank W. Davis, Jr. (1993). The Evolution to Service Response Logistics. *International Journal of Physical Distribution & Logistics Management* 23 (5): 55-64.

Marks, Lawrence E. (1974). *Sensory Processes: The New Psychophysics.* New York, Academic Press.

Mazursky, D. and J. Jacoby, (1986). Exploring the Development of Store Images. *Journal of Retailing* 62 (2): 145-165.

McAlister, Leigh (1979). Choosing Multiple Items from a Product Class. *Journal of Consumer Research* 6 (December): 213-224.

McAlister, Leigh (1982). A Dynamic Attribute Satiation Model of Variety Seeking Behavior. *Journal of Consumer Research* 9 (September):154-165.

McAllister, Leigh, and Etgar Pessemier (1982). Variety Seeking Behavior: An Interdisciplinary Review. *Journal of Consumer Research* 9 (December): 311-322.

McFadden, Daniel, K. Train, and W.B. Tye (1977). An Application of Diagnostic Tests for the Independence of Irrelevant Alternatives Property of the Multinomial Logit Model. *Transportation Research Record* 637: 39-46.

McGrath, Mary Ann (1989). An Ethnography of a Gift Store: Trappings, Wrappings, and Rapture. *Journal of Retailing* 65 (4): 421-449.

McGuire, Timothy W. and Richard Staelin (1983). An Industry Equilibrium Analysis of Downstream Vertical Integration. *Marketing Science* 2: 161-190.

McGuire, Timothy W. and Richard Staelin (1986). Channel Efficiency, Incentive Compatibility, Transfer Pricing, and Market Structure: Equilibrium Analysis of Channel Relationships. *Research in Marketing* 8: 181-223.

Mehrabian, A. (1980). *Basic Dimensions for a General Psychological Theory.* Cambridge, MA, Oelgeschlager, Gunn, and Hain.

Mehrabian, A. and J.A. Russell (1974). *An Approach to Environmental Psychology.* Cambridge, MA: MIT Press.

Mentzer, John T., Roger Gomez, and Robert E. Krapfel, Jr. (1989). Physical Distribution Service: A Fundamental Marketing Concept? *Journal of the Academy of Marketing Science* 17 (1): 53-62.

Mentzer, John T., Stephen M. Rutner, and Ken Matsuno (1997). Application of the Means-End Value Hierarchy Model to Understanding Logistics Service. *International Journal of Physical Distribution &Logistics Management* 27 (9/10): 630-643.

Messinger, Paul R. and Chakravarthi Narasimhan (1997). A Model of Retail Formats Based on Consumers' Economizing on Shopping Time. *Marketing Science* 16 (1): 1-23.

Meulenberg, Matthew G. (1997). Evolution of Agricultural Marketing Institutions: A Channel Approach. In: B. Wierenga et al. (eds.), *Agricultural Marketing and Consumer Behavior in a Changing World.* 95-109.

Mintzberg, Henry (1994). *The Fall and Rise of Strategic Planning.* Harvard Business Review, January/February, 107-114.

Mintzberg, Henry and J.B. Quinn (1996). *The Strategy Process: Concepts, Contexts, Cases.* Englewood Cliffs: Prentice Hall.

Mishra, Debi, Jagdip Singh, and Van Wood (1991). An Empirical Investigation of Two Models of Patient Satisfaction. *Journal of Ambulatory Care Marketing* 4 (Winter): 17-36.

Mishra, Sanjay, U.N. Umesh, and Donald E. Stem, Jr. (1993). Antecedents of the Attraction Effect: An Information-Processing Approach. *Journal of Marketing Research* 30 (August): 331-349.

Monroe, Kent B. and Joseph D. Chapman (1987). Framing Effects on Buyers' Subjective Product Evaluations. In: Melanie Wallendorf and Paul Anderson (eds.), *Advances in Consumer Research* 14. Provo, UT, Association for Consumer Research, 193-197.

Montgomery, D.C. (1984). *Design and Analysis of Experiments.* New York, John Wiley and Sons.

Moorman, Christine, Gerald Zaltman, and Rohit Despandé (1992). Relationships Between Providers and Users of Market Research: The Dynamics of Trust Within and Between Organizations. *Journal of Marketing Research* 29 (August): 314-329.

Moorthy, K. Sridhar (1985). Using Game Theory to Model Competition. *Journal of Marketing Research* 22 (August): 262-282.

Moorthy, K. Sridhar (1987a). Managing Channel Profits: Comment. *Marketing Science* 6 (4): 375-379.

Moorthy, K. Sridhar (1987b). Strategic Decentralization in Channels. *Marketing Science* 7: 335-355.

Moorthy, K. Sridhar (1988). Product and Price Competition in a Duopoly. *Marketing Science* 7 (2): 141-168.

Moorthy, K. Sridhar (1993). Competitive Marketing Strategies: Game-Theoretic Models. In: J. Eliashberg and G.L. Lilien (eds.), *Handbooks in OR & MS.* Vol. 5, 143-190.

Moorthy, K. Sridhar and Peter Fader (1985). Strategic Interaction Within a Channel. In: L. Pellegrini and S.K. Reddy (eds.), *Retail and Marketing Channels: Economic and Marketing Perspectives on Producer Distributor Relationships.* New York, Routledge.

Moorthy, K. Sridhar and Kannan Srinivasan (1995). Signaling Quality With a Money-Back Guarantee: The Role of Transaction Costs. *Marketing Science* 14 (4): 442-466.

Morgan, Robert M. and Shelby D. Hunt (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing* 58 (July): 20-38.

Murphy, G.L., and Medin, D.L. (1985). The Role of Theories in Conceptual Coherence. *Psychological Review* 92: 289-316.

Murphy, Gregory L. and Jack C. Wright (1984). Changes in Conceptual Structure with Expertise: Differences Between Real-World Experts and Novices. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 10 (January): 144-155.

Nahmias, Steven (1982). Perishable Inventory Theory: A Review. *Operations Research* 30 (4): 680-708.

Narasimhan, C. and Subrata Sen (1992). Measuring Quality Perceptions. *Marketing Letters* 3 (2): 147-156.

Narayana, Chem L. and Rom. J. Markin (1975). Consumer Behavior and Product Performance: An Alternative Conceptualization. *Journal of Marketing* 39: 1-6.

Nash, J. (1950). Equilibrium Points in n-Person Games. *Proceedings of the National Academy of Sciences* 36: 48-49.

Nederlandse Mededingingsautoriteit (1998). *Besluit Zaak166/Vendex-KBB*. Den Haag.

Negungadi, Prakash (1990). Recall and Consumer Consideration Sets: Influencing Choice Without Altering Brand Evaluations. *Journal of Consumer Research* 17: 263-276.

Nelson, P. (1974). Advertising as Information. *Journal of Political Economy* 78: 729-754.

Niman, Neil B. (1992). Modeling Coordination in Organizations and Markets. *Management Science* 38 (12): 1819-1824.

Noordewier, Thomas G., George John, and Nevin (1990). Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships. *Journal of Marketing* 54 (4): 80-93.

Nooteboom, B. (1985). A Mark-up Model of Retail Margins. *Applied Economics* 17: 647-667.

Nooteboom, B., A. Kleijweg, and R. Thurik (1988). Normal Costs and Demand Effects in Price Setting: A Study of Retailing. *European Economic Review* 32: 999-1011.

Nooteboom, B., and A.R. Thurik (1987). Retail Margins During Recession and Growth. *Economics Letters* 17: 281-284.

Norton, Seth W. (1987). *The Coase Theorem and Suboptimization in Marketing Channels*. Marketing Science 6 (3), 268-285.

Oi, Walter (1971). A Disneyland Dilemma: Two-Part Tariffs for a Mickey-Mouse Monopoly. *Quarterly Journal of Economics* 85: 77-96.

Oi, Walter Y. (1992). Productivity in the Distributive Trades: The Shopper and the Economics of Massed Reserves. In: Zvi Griliches (ed.), *Output Measurement in Service Sectors*. Chicago, University of Chicago Press, 161-194.

Oliver, Richard L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. Journal of Marketing Research 17 (November): 460-469.

Oliver, Richard L. (1981). Measurement and Evaluation of Satisfaction Processes in Retail Settings. *Journal of Retailing* 57 (Fall): 25-48.

Oliver, Richard L. and William O. Bearden (1983). The Role of Involvement in Satisfaction Processes. *Advances in Consumer Research* 10: 495-507.

Oliver, Richard L. and Wayne S. DeSarbo (1988). Response Determinants in Satisfaction Judgments. *Journal of Consumer Research* 14: 495-507.

Oppewal, Harmen (1995). *Conjoint Experiments and Retail Planning: Modeling Consumer Choice of Shopping Center and Retailer Reactive Behaviour*. PhD-Thesis, Eindhoven University, 254 p.

Oppewal, Harmen, and Harry Timmermans (1991). Context Effects and Decompositional Choice Modeling. *Papers in Regional Science* 70 (2): 113-131.

Oppewal, Harmen, Jordan J. Louviere, and Harry J.P. Timmermans(1997). Modeling the Effects of Shopping Center Size and Store Variety on Consumer Choice Behaviour. *Environment and Planning A* 29: 1073-1090.

Osborne, Martin J. and Ariel Rubinstein (1994). *A Course in Game Theory*. Cambridge MA, The MIT Press.

Ouchi, William G. (1980). Markets, Bureaucracies, and Clans. *Administrative Science Quarterly* March: 129-141.

Ozment, J. and D.N. and Chard (1986). Effects of Customer Service on Sales: An Analysis of Historical Data. *International Journal of Physical Distribution & Materials Management* 16 (3): 14-28.

Padmanabhan, V. and Ram C. Rao (1993). Warranty Policy and Extended Service Contracts: Theory and an Application to Automobiles. *Marketing Science* 12 (3): 230247.

Paivo (1971). *Imagery and Verbal Processes*. New York, University of Illinois Press.

Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing* 49 (Fall): 41-50.

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* 63 (1): 12-37.

Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1991). Refinement and Reassessment of the SERVQUAL Scale. *Journal of Retailing* 67 (4): 420-450.

Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1993). Research Note: More on Improving Service Quality Measurement. *Journal of Retailing* 69 (1): 140-147.

Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1994). Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Future Research. *Journal of Marketing* 58 (January): 111-124.

Parducci, A., R.C. Calfee, and L.M. Marshall (1960). Context Effects in Judgment of the Mean, Midpoint, and Median of the Stimuli. *Journal of Experimental Psychology* 60: 65-71.

Park, C. Whan, E. Iyer and Daniel C. Smith (1989). The Effect of Situational Factors on In-Store Grocery Shopping Behavior: The Role of Store Environment and Time Available for Shopping. *Journal of Consumer Research* 15 (March): 422-433.

Park, C. Whan and Daniel C. Smith (1989). Product-Level Choice: A Top-Down or Bottom-Up Process. *Journal of Consumer Research* 16 (December): 289-299.

Pashigian, B. Peter and Brian Bowen (1994). The Rising Cost of Time of Females, the Growth of National Brands and the Supply of Retail Services. *Economic Inquiry* 32 (January): 33-65.

Payne, John W., James R. Bettman, and Eric J. Johnson (1988). Adaptive Strategy Selection in Decision Making. *Journal of Experimental Psychology: Learning, Memory and Cognition* 14 (July): 534-552.

Perreault, William D., Jr. and Frederick A. Russ (1976). Physical Distribution Service in Industrial Purchase Decisions. *Journal of Marketing* 40: 3-10.

Perreault, William D., Jr. and Frederick A. Russ (1977). Improving Physical Distribution Service Decisions With Trade-off Analysis. *International Journal of Physical Distribution & Materials Management* 7 (3): 117-127.

Pfeffer, Jeffrey and Gerald R. Salancik (1978). *The External Control of Organizations: A Resource-Dependence Perspective*. New York: Harper.

Pieters Rik, Kitty Koelemeijer, and Henk Roest (1995). Assimilation Processes in Service Satisfaction Formation. *International Journal of Service Industry Management* 6 (3): 17-33.

Pisharodi, R.M. and C.J. Langley, Jr. (1991). Interset Association between Measures of Customer Service and Market Response. *International Journal of Physical Distribution & Logistics Management* 21 (2): 32-47.

Plott, C.R. (1987). Dimensions of Parallelism: Some Policy Applications of Experimental Methods. In: A.E. Roth (ed.), *Laboratory Experimentation in Economics: Six Points of View*. Cambridge MA, Cambridge University Press.

Porter, Michael (1980). *Competitive Strategy*. New York, Free Press.

Prosser, Robert, Jon Rasbash, and Harvey Goldstein (1991). *ML3 Users' Guide*. London, Institute of Education, University of London.

Punj, Girish N. and Richard Staelin (1983). A Model of Consumer Information Search for New Automobiles. *Journal of Consumer Research* 9: 366-80.

Raiffa, Howard (1982). *The Art and Science of Negotiation*. Cambridge, MA, Harvard University Press.

Rangan, V. K. (1987). The Channel Design Decision: A Model and an Application. *Marketing Science* 6 (2): 156-174.

Rangan, V. Kasturi, Melvyn A.J. Menezes, and E.P. Maier (1992). Channel Selection for New Industrial Products: A Framework, Method, and Application. *Journal of Marketing* 56 (July): 69-82.

Ratchford, Brian T. and Glenn T. Stoops (1988). A Model and Measurement Approach for Studying Retail Productivity. *Journal of Retailing* 64 (Fall): 241-263.

Ratchford, Brian T. and Glenn T. Stoops (1992). An Econometric Model of a Retail Firm. *Managerial and Decision Economics* 13: 223-231.

Ratneshwar, S., Cornelia Pechmann, and Allan D. Shocker (1996). Goal-Derived Categories and the Antecedents of Across-Category Consideration. *Journal of Consumer Research* 23 (December): 240-250.

Ratneshwar, S. and Allan D. Shocker (1988). The Application of Prototypes and Categorization Theory in Marketing: Some Problems and Alternative Perspectives. In: Michael J. Houston (ed.), *Advances in Consumer Research* 15. Provo, UT, Association for Consumer Research,280-285.

Ratneshwar, S. and Allan D. Shocker (1991). Substitution in Use and Role of Usage Context in Product Category Structures. *Journal of Marketing Research* 28 (August): 281-295.

Ratneshwar, S., Allan D. Shocker, and David W. Stewart (1987). Toward Understanding the Attraction Effect: The Implications of Product Stimulus Meaningfulness and Familiarity. *Journal of Consumer Research* 13: 520-533.

Reichheld, F.F. and W. Earl Sasser, Jr. (1990). Zero Defections: Quality Comes to Services. *Harvard Business Review* September-October: 105-111.

Reve, Torger and Louis W. Stern (1986). The Relationship between Interorganizational Form, Transaction Climate, and Economic Performance in Vertical Interfirm Dyads. In: L. Pellegrini and S.K. Reddy (eds.), *Marketing Channels*, 75-102.

Roberts, John H. and James M. Lattin (1991). Development and Testing of a Model of Consideration Set Composition. *Journal of Marketing Research* 28 (November): 429-440.

Rosch, Eleanor, Carolyn B. Mervis, Wayne D. Gray, David M. Johnson, and Penny Boyes-Braem (1976). Basic Objects in Natural Categories. *Cognitive Psychology* July: 382-439.

Rosch, E.M. and E.J. Shoben (1983). *The Effect of Context on the Structure of Categories.* Cognitive Psychology 15: 346-378.

Rosenbaum, Barbara A. (1981). Service Level Relationships in a Multi-Echelon Inventory System. *Management Science* 27 (8): 926-945.

Ross, William T., Jr. and Elizabeth H. Creyer (1992). Making Inferences about Missing Information: The Effects of Existing Information. *Journal of Consumer Research* 19 (June): 14-25.

Rowe, Debra and Christopher P. Puto (1987). Do Consumers' Reference Points Affect Their Buying Decisions? In: Melanie Wallendorf and Paul Anderson (eds.), *Advan-*

ces in Consumer Research 14. Provo, UT, Association for Consumer Research, 188-192.

Rubinstein, A. (1993). On Price Recognition and Computational Complexity in a Monopolistic Model. *Journal of Political Economy* 101: 473-484.

Russell, J.A. and G. Pratt (1980). A description of the Affective Quality Attributed to Environments. *Journal of Personality and Social Psychology* 38 (August): 311-32-2.

Rust, Roland T., Duncan Simester, Roderick J. Brodie, and V. Nilikant (1995). Model Selection Criteria: An Investigation of Relative Accuracy, Posterior Probabilities, and Combinations of Criteria. *Management Science* 41 (February): 322-333.

Savage, L. (1954). *The Foundations of Statistics*. New York, Dover.

Schary, Philip and B. Becker (1973). The Marketing-Logistics Interface. *International Journal of Physical Distribution* 3 (4): 247-288.

Schmalensee, Richard A. (1972). *The Economics of Advertising*. Amsterdam, North-Holland.

Schmalensee, Richard A. (1978). A Model of Advertising and Product Quality. *Journal of Political Economy* 86: 485-503.

Schmidt, C.P. and S. Nahmias (1985). (S-1,S) Policies for Perishable Inventory. *Management Science* 31 (6): 719-728.

Schurr, Paul H. and Julie L. Ozanne (1985). Influences on Exchange Processes: Buyers' Preconceptions of a Seller's Trustworthiness and Bargaining Toughness. *Journal of Consumer Research* 11 (March): 939-953.

Schwartz, L.B., B.L. Deuermeyer and R.D. Badinelli (1985). Fill-Rate Optimization in a One-Warehouse N-Identical Retailer Distribution System. *Management Science* 31 (4): 488-498.

Seidl, Christian and Stefan Traub (1996). Rational Choice and the Relevance of Irrelevant Alternatives. *CentER Discussion Paper* no. 9691. Tilburg, Tilburg University Center for Economic Research.

Shankar (1997). Pioneers' Marketing Mix Reactions to Entry in Different Competitive Game Structures: Theoretical Analysis and Empirical Illustration. *Marketing Science* 16 (3): 271-293.

Shapiro, B. (1973). Price Reliance: Existence and Sources. *Journal of Marketing Research* 10: 286-294.

Sharma, Arun and Douglas M. Lambert (1990). Segmentation of Markets Based on Customer Service. *Physical Distribution and Logistics Management* 20 (7): 19-27.

Sherif, M. and C.I. Hovland (1961). *Social Judgment: Assimilation and Contrast Effects in Communication and Attitude Change*. New Haven, Yale University Press.

Sheth, Jagdish N., David M. Gardner, and Dennis E. Garrett (1988). *Marketing Theory: Evolution and Evaluation*. New York, John Wiley & Sons.

Sheth, Jagdish N. and Rajendra S. Sisodia (1999). Revisiting Marketing's Lawlike Generalizations. *Journal of the Academy of Marketing Science* 27 (1): 71-87.

Shocker, Allan D., Moshe Ben-Akiva, Bruno Boccaro, and Prakash Nedungadi (1991). Consideration Set Influences on Consumer Decision-Making and Choice: Issues, Models and Suggestions. *Marketing Letters* 2 (3):181-197.

Shugan, Steven M. (1980). The Cost of Thinking. *Journal of Consumer Research* 7 (September): 99-111.

Shugan, Steven (1985). Implicit Understandings in Channels of Distribution. *Management Science* 31: 435-460.

Shugan, Steven M. (1988). Pricing When Different Outlets Offer Different Assortments of Brands. In: Timothy Devinney (ed.), *Issues in Pricing: Theory and Research.* Lexington, MA, Lexington Books, 289-312.

Shugan, Steven M. (1989). Product Assortment in a Tripoly. *Marketing Science* 35 (3): 304-320.

Shugan, Steven M. and Abel P. Jeuland (1988). Competitive Pricing Behavior in Distribution Systems. In: T.M. Devinney (ed.), *Issues in Pricing: Theory and Research.* Lexington, MA, Lexington Books, 219-237.

Silk, Alvin J. and Glen L. Urban (1978). Pre-Test Market Evaluation of New Packaged Goods: A Model and Measurement Methodology. *Journal of Marketing Research* 15: 171-191.

Simonson, Itamar (1989). Choice Based on Reasons: The Case of Attraction and Compromise Effects. *Journal of Consumer Research* 16 (September): 158-174.

Simonson, Itamar and Amos Tversky (1992). Choice in Context: Trade-off Contrast and Extremeness Aversion. *Journal of Marketing Research* 29 (August): 281-296.

Sindra, Indrajit (1994). A Conceptual Model of the Role of Situational Type on Consumer Choice Behavior and Consideration Sets. In: Chris T. Allen and Deborah Roedder-John (eds.), *Advances in Consumer Research* 21. Provo, UT, Association for Consumer Research, 477-482.

Smead, Raymond J., James B. Wilcox, and Robert E. Wilkes (1981). How Valid are Product Descriptions and Protocols in Choice Experiments? *Journal of Consumer Research* 8 (June): 37-42.

Smith, V.L. (1990). *Experimental Economics: Behavioral Lessons for Microeconomic Theory and Policy*. Nancy L. Schwartz Memorial Lecture. J.L.Kellogg Graduate School of Management.

Smith, Richard H., Ed. Diener, and Douglas H. Wedell (1989). Intrapersonal and Social Comparison Determinants of Happiness: A Range-Frequency Analysis. *Journal of Personality and Social Psychology* 56 (3): 317-325.

Smith, E. E. and D.L. Medin (1981). *Categories and Concepts*. Cambridge, MA, Harvard University Press.

Smith, Gerald E., Meera P. Venkatraman, and Lawrence H. Wortzel (1995). Strategic Marketing Fit in Manufacturer-Retailer Relationships: Price Leaders Versus Merchandise Differentiators. *Journal of Retailing* 71 (3): 297-315.

Smitka, Michael J. (1991). *Competitive Ties*. New York, Columbia University Press.

Spekman, Robert E. (1988). Strategic Supplier Selection: Understanding Long-Term Buyer Relationships. *Business Horizons* 31 (4):75-81.

Spence, A. (1973 of 1974). Job Market Signaling. *Quarterly Journal of Economics* 87: 355-374.

Spengler, J. (1950). Vertical Integration and Anti-Trust Policy. *Journal of Political Economy* 58 (August): 347-352.

Spiggle, Susan and Murphy A. Sewall (1987). A Choice Sets Model of Retail Selection. *Journal of Marketing* 51 (April): 97-111.

Spreng, Richard A., Scott B. MacKenzie, and Richard W. Olshavsky (1996). A Reexamination of the Determinants of Consumer Satisfaction. *Journal of Marketing* 60 (July): 15-32.

Srivastava, Rajendra K. (1981). Usage-Situational Influences on Perceptions of Product Markets: Theoretical and Empirical Issues. In: Kent Monroe (ed.), *Advances for Consumer Research* 8. Chicago: Association for Consumer Research, 106-111.

Srivastava, Rajendra K., Mark I. Alpert, and Allan D. Shocker (1984). A Customer-Oriented Approach for Determining Market Structures. *Journal of Marketing* 48: 32-45.

Srivastava, Rajendra K., Robert Leone, and Allan D. Shocker (1981). Market Structure Analysis: Hierarchical Clustering of Products Based Upon Substitution in Use. *Journal of Marketing* 45: 38-48.

Steenkamp, Jan Benedict E.M. (1989). *Product Quality: An Investigation into the Concept and How it is Perceived by Consumers*. Assen, Van Gorcum.

Stefflre, V. J. (1971). *New Products and New Enterprises: A Report of an Experiment in Applied Social Science*. Irvine, CA, University of California, (March).

Stern, Louis and Adel I. El-Ansary (1992). *Marketing Channels*. Englewood-Cliffs, NJ, Prentice Hall.

Stern, Louis W., Adel I. El-Ansary, and Anne Coughlan (1996). *Marketing Channels*. Englewood Cliffs, NJ, Prentice-Hall.

Stern, Louis and Torger Reve (1980). Distribution Channels as Political Economies: A Framework for Comparative Analysis. *Journal of Marketing* 44 (Summer): 52-64.

Stigler, George J. (1951). The Division of Labor is Limited by the Extent of the Market. *Journal of Political Economy* June: 185-193.

Stump, Rodney L. and Jan B. Heide (1996), Controlling Supplier Opportunism in Industrial Relationships. *Journal of Marketing Research* 33 (4): 431- .

Sujan, Mita (1985). Consumer Knowledge: Effects on Evaluation Strategies Mediating Consumer Judgments. *Journal of Consumer Research* 12 (June): 31-46.

Sujan, Mita and James R. Bettman (1989). The Effects of Brand Positioning strategies on Consumers' Brand and Category Perceptions: Some Insights from Schema Research. *Journal of Marketing Research* 26 (November): 454-467.

Sujan, Mita and Christine Deklava (1987). Product Categorization and Inference Making: Some Implications for Comparative Advertising. *Journal of Consumer Research* 14 (December): 372-378.

Swait, Joffre and Jordan J. Louviere (1993). The Role of the Scale Parameter in the Estimation and Comparison of Multinomial Logit Models. *Journal of Marketing Research* 30: 305-314.

Tauber, E.M. (1972). Why Do People Shop? *Journal of Marketing* (October): 46-49.

Telser, L.G. (1980). A Theory of Self-Enforcing Agreements. *Journal of Business* 53 (1): 27-44.

Tibaut, John W. and Harrold Kelley (1959). *The Social Psychology of Groups*. New York, John Wiley and Sons.

Tirole, Jean (1993). *The Theory of Industrial Organization*. Cambridge, MA, MIT Press.

Torgerson, Warren S. (1958). *Theory and Methods of Scaling*. New York, Wiley.

Tversky, Amos (1972). Elimination by Aspects: A Theory of Choice. *Psychological Review* 79 (July): 281-299.

Tversky, Amos and Daniel Kahneman (1974). Judgment under Uncertainty: Heuristics and Biases. *Management Science* 18 (September): 1124-1131.

Tversky, Amos and Daniel Kahneman (1991). Loss Aversion in Riskless Choice: A Reference Dependent Model. *Quarterly Journal of Economics* 107: 1039-1061.

Tversky, Amos and Eldar Shafir (1992). Choice under Conflict: The Dynamics and Deferred Decision. *Psychological Science* 3 (November):358-361.

Tversky, Amos and Itamar Simonson (1993). Context-dependent Preferences. *Management Science* 39 (October): 1179-1189.

Tyagi, Rajesh (1997). A Methodology for Cost versus Service Tradeoffs in Wholesale Location-Distribution Using Mathematical Programming and Analytic Hierarchy Process. *Journal of Business Logistics* 18 (2): 77-99.

Uhl, Kenneth P. and Gregory D. Upah (1983). The Marketing of Services: Why and How is it Different? In: Jagdish N. Sheth (ed.), *Research in Marketing* Vol. 6. Greenwich, Conn., JAI Press, 231-257.

Uhr, Ernest B., Ernest C. Houck, and John C. Rogers (1981). Physical Distribution Service. *Journal of Business Logistics* 2 (2): 158-169.

Urban, Glen L., Philip L. Johnson, and John R. Hauser (1984). Testing Competitive Market Structures. *Marketing Science* 3: 83-112.

Urban, Timothy L. (1998). An Inventory-Theoretic Approach to Product Assortment and Shelf-Space Allocation. *Journal of Retailing* 74 (1): 15-35.

Van Damme, Eric (1995). *Game Theory: The Next Stage*. Tilburg, CentER Discussion Paper, Tilburg University, 43 pp.

Vorst, Jack C.A.J. van der, Adrie J.M. Beulens, and Paul van Beek (2000). Modelling and Simulating Multi-Echelon Food Systems. *European Journal of Operational Research* forthcoming.

Vriens, Marco, G. Loosschilder, E. Rosbergen, and D.R. Wittink (1994). Het Nut van Foto-Realistische Pictoriele Stimuli in ConjuncteAnalyse. In: Jaarboek van de Nederlandse Vereniging van Marktonderzoekers,145-163.

Wagner, W. (1977). Formalization of the Customer Service Function in Distribution. *International Journal of Physical Distribution* 7 (3): 159-175.

Wagner, W.B. and Raymond LaGarce (1981). Customer Service as a Marketing Strategy. *Industrial Marketing Management* .. (February): 31-41.

Wansink, Brian (1996). Can Package Size Accelerate Usage Volume? *Journal of Marketing* 60 (July): 1-14.

Ward, James C., Mary Jo Bitner and John Barnes (1992). Measuring the Prototypically and Meaning of Retail Environments. *Journal of Retailing* 69 (2): 194-220.

Warlop, Luc and S. Ratneshwar (1993). The Role of Usage Context in Consumer Choice: A Problem Solving Perspective. In: Leigh McAllister and Michael J. Rothschild (eds.), *Advances in Consumer Research.* Provo, UT, Association for Consumer Research, 377-382.

Weiss, H.J. (1980). Optimal Ordering Policies for Continuous Review Perishable Inventory Models. *Operations Research* 28 (2): 365-274.

Wernerfelt, Birger (1994). An Efficiency Criterion for Marketing Design. *Journal of Marketing Research* 31 (November): 462-470.

Wernerfelt, Birger (1995). A Rational Reconstruction of the Compromise Effect: Using Market Data to Infer Utilities. *Journal of Consumer Research* 21 (March): 627-633.

Westbrook, Robert A. (1987). Product/Consumption-Based affective Responses and Postpurchase Processes. *Journal of Marketing Research* 24(August): 258-270.

Westbrook, Robert A. and William C. Black (1985). A Motivation-Based Shopper Typology. *Journal of Retailing* 61 (1): 78-103.

Westbrook, Robert A. and Richard L. Oliver (1991). The Dimensionality of Consumption Emotion Patterns and Consumer Satisfaction. *Journal of Consumer Research* 18 (June): 84-91.

Wetzels, Martin, Ko de Ruyter, Jos Lemmink, and Kitty Koelemeijer(1995). Measuring Customer Service Quality in International Marketing Channels: A Multimethod Approach. *Journal of Business & Industrial Marketing* 10 (5): 50-59.

Willett, R.P. and P.R. Stephenson (1969). Determinants of Buyer Response to Physical Distribution Service. *Journal of Marketing* 6 (August): 279-283.

Williamson, Oliver E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications.* New York, The Free Press.

Williamson, Oliver E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics* 22 (October): 233-261.

Winter, Ralph A. (1993). Vertical Control, and Price Versus Non-price Competition. *Quarterly Journal of Economics* February: 61-76.

Woodside, Arch, Lisa L. Frey, and Robert T. Daly (1989). Linking Service Quality, Customer Satisfaction and Behavioral Intention. *Journal of Health Care Marketing* 9 (December): 5-17.

Wortzel, Lawrence H. (1987). Retailer Strategies for Today's Mature Marketplace. *The Journal of Business Strategy* Spring: 45-56.

Wortzel, Lawrence H. and Meera P. Venkatraman (1991). *Manufacturer and Retailer Relationships: Replacing Power With Strategic Marketing Partnerships*. MSI Working Paper 91-129.

Wright (1975). Consumer Choice Strategies: Simplifying Vs. Optimizing. *Journal of Marketing Research* 12 (February): 60-67.

Yi, Youjae (1990). A Critical review of Consumer Satisfaction. In: Valarie A. Zeithaml (ed.), *Review of Marketing* 1990. Chicago, IL, American Marketing Association, 68-123.

Zaichkowsky, Judith Lynne (1985). Measuring the Involvement Construct. *Journal of Consumer Research* 12 (December): 341-352.

Zald, Mayer N. (1972 of 1970). *Organizational Change: The Political Economy of the YMCA*. Chicago, University of Chicago Press.

Zeithaml, Valarie A. (1981). How Consumer Evaluation Processes Differ Between Goods and Services. Reprinted in C. Lovelock (1991), *Services Marketing*. Englewood Cliffs, Prentice Hall.

Zeithaml, Valarie (1988). Consumer Perceptions of Price, Quality and Value: A Means-End Model and Synthesis of Evidence. *Journal of Marketing* 52 (3): 2-22.

Zusman, Pinhas and Michael Etgar (1981). The Marketing Channel as an Equilibrium Set of Contracts. *Management Science* 27 (3): 284-302.

Samenvatting

De essentie van marketing betreft het creëren van verkrijgbaarheid. De creatie van verkrijgbaarheid betreft het overbruggen van verschillen tussen hoeveelheid en kwaliteit van producten op het tijdstip van productie en de door de finale consument gewenste tijd en plaats van consumptie, hoeveelheid en kwaliteit van het product. Dit boek richt zich op een belangrijk instrument voor het realiseren van verkrijgbaarheid, namelijk dienstverlening met betrekking tot de distributie van producten.

Hoofdstuk 1 geeft een overzicht van het begrip distributie service, de theoretische en praktische relevantie en ontwikkelingen in de tijd. Aan distributie service als concept is in de verschillende relevante aandachtsgebieden, zoals marketing, logistiek, economie en operationele analyse, slechts weinig aandacht besteed. Diverse ontwikkelingen aan de vraag- en aanbodzijde van de markt benadrukken de noodzaak tot aandacht voor deze vorm van dienstverlening.

Distributie service is een complex multidimensionaal concept. Een producent of tussenpersoon kan deze service aan haar klanten leveren, maar de service kan ook ingebed zijn in en overgedragen worden door het fysieke product. Teneinde tot een duidelijke conceptualisering van distributie service te komen analyseert hoofdstuk 2 drie verschillende theoretische benaderingen met betrekking tot de definitie en analyse van distributie service.

De logistieke benadering beschouwt distributie service als de uitkomst van de fysieke distributie operatie. Vanuit deze optiek creëert distributie service nut naar tijd en plaats alsmede behoud van nut van vorm voor actoren in een distributiekanaal en uiteindelijk voor de finale consument. De prestatie van het fysieke distributie systeem van een organisatie of een distributiekanaal wordt weergegeven door middel van logistieke prestatie-indicatoren. Volgens de economische benadering resulteert het verlenen van distributie service in een verlaging van de impliciete kosten met betrekking tot productverwerving en productgebruik voor de klant. Centraal in deze benadering staat de strategische

besluitvorming met betrekking tot het verlenen van service door ondernemingen in relatie tot de structuur van distributiekanalen. De gedragsbenadering tenslotte richt zich op het gedrag van individuele actoren in distributiekanalen met betrekking tot de productie en consumptie van dienstverlening en beschouwt de gevolgen daarvan voor consumentengedrag en ketenstructuur door middel van voornamelijk psychologische en sociologische theorieën.

In hoofdstuk 2 wordt een nieuwe definitie van distributie service geformuleerd op basis van de eerder beschreven benaderingen die als basis dient voor de rest van het boek. Onder distributie service wordt in het vervolg verstaan "de dienstverlening die voortvloeit uit het fysieke distributie proces in een distributiekanaal en die (1) de kosten van productverwerving en/of gebruik door consumenten reduceert door middel van het creëren van nut naar tijd en plaats en behoud van nut van vorm, en/of (2) de effectiviteit van de besluitvorming door consumenten verbetert, en/of (3) de hedonistische waarde die consumenten aan het winkelen toekennen doet toenemen". Deze definitie integreert de visie van de drie bovengenoemde aandachtsgebieden op distributie service en benadrukt de relevantie voor de marketing. Er zijn vijf verschillende elementen van distributie service onderscheiden, nl. assortiment, informatie, levering op de juiste tijd en in de juiste vorm, toegankelijkheid van de locatie en sfeer.

In de delen II, III en IV van dit proefschrift worden verschillende aandachtspunten betreffende distributie service belicht door middel van theoretische en empirische modelvorming en analyse. De delen hebben gemeenschappelijk een gerichtheid op besluitvorming door individuele actoren in distributiekanalen waarin sprake is van concurrerentie op detailhandelsniveau. In het empirische gedeelte van elk onderzoek wordt gebruik gemaakt van gegevens die betrekking hebben op de binnenlandse markt voor snijbloemen in Nederland.

Het assortiment is een belangrijk distributie service element omdat het betrekking heeft op elk van de in bovenstaande definitie genoemde drie functies van distributie service. De voorkeur van de consument voor one-stop-shopping is een drijvende kracht achter winkelkeuze en is een belangrijke factor voor de structurering van distributiekanalen en het ontstaan van nieuwe winkelformules. In deel II staat het detailhandelsassortiment centraal. Hoofdstuk 3 behandelt de theorie betreffende de vraag naar, evaluatie van en de keuze uit assortimenten door consumenten. De analyse resulteert in een theoretisch kader waarin de door de consument nagestreefde consumptie doelen, de kenmerken van specifieke artikelen in het assortiment, kenmerken van concurrerende assortimenten en andere situationele en contextuele variabelen optreden als determinanten van

consumentenkeuze van en uit assortimenten. Aandacht wordt besteed aan zg. context effecten, die betrekking hebben op de interactie tussen assortiments-samenstelling en consumentenkeuze. Op basis van de theorie worden proposities geformuleerd. Een aantal van deze proposities wordt getoetst in hoofstuk 4.

In hoofdstuk 4 worden de invloeden van assortimentssamenstelling, consumptie doel, de concurrentie omgeving en andere elementen van distributie service op consumenten winkel- en productkeuze gekwantificeerd. Voor de empirische toepassing wordt gebruik gemaakt van een experimenteel onderzoeksontwerp en zijn daarmee samenhangende keuzetaken aan consumenten voorgelegd. Door middel van multinomiale logitmodellen zijn substitutie, complementariteits-, en asymmetrische dominantie effecten van de individuele items in het assortiment op de consumentenkeuze vastgesteld. De service elementen sfeer en locatie blijken een ondergeschikte invloed te hebben op de consumentenkeuze in vergelijking met de samenstelling van assortimenten en de prijs van producten daarin. Op basis van de resultaten zijn assortimentssimulaties gedaan die inzicht geven in de effecten van de assortimentssamenstelling op de verkopen. De in dit hoofdstuk gepresenteerde modellen en technieken zijn bij uitstek geschikt voor het optimaliseren van detailhandelsassortimenten.

De rol van dienstverlening door de detailhandel in evaluatieprocessen na aankoop door consumenten vormt het onderwerp van hoofdstuk 5. Een model is ontwikkeld waarin, naast consumentenvariabelen, de leveranciers-specifieke variabelen strategische oriëntatie, vertrouwen van de detaillist in zijn toeleverancier en de prestatie van het fysieke distributie systeem van de detaillist zijn opgenomen als determinanten van consumententevredenheid. De geformuleerde hypotheses zijn getoetst door middel van een empirisch onderzoek onder detaillisten en hun klanten, die zowel voor als na aankoop zijn geïnterviewd.

Er zijn drie dimensies geïdentificeerd die de perceptie door consumenten van de service prestatie van hun detaillist opspannen, te weten persoonlijke interactie en sfeer, productkwaliteit en presentatie, en informatieverschaffing. De data zijn geanalyseerd met behulp van multilevel regressieanalyse. Door middel van deze techniek worden de unieke systematische variantie zowel op het niveau van de detailhandel als op het niveau van de consument vastgesteld. De resultaten van het onderzoek laten zien dat een zeer groot deel van de variatie in de consumentenbeoordeling van de afzonderlijke dimensies van de dienstverlening en de consumententevredenheid door individuele factoren wordt bepaald. Analyse toont verder aan op welke wijze individuele detaillisten invloed kunnen uitoefenen op de consumentenevaluatie na de aankoop.

Het vierde deel van dit proefschrift beschouwt de rol van distributie service in verticale en horizontale strategische interacties tussen actoren in het distributiekanaal, voornamelijk tussen producenten en detaillisten, tussen detaillisten en consumenten, en tussen detaillisten onderling, en behandelt de gevolgen daarvan voor ketenstructuren en winkelformules. Hoofdstuk 6 behandelt de oorzaken van verticale differentiatie van distributiekanalen in markten met verschillende concurrentiestructuren. Concurrentie, meer specifiek met betrekking tot kostenefficiëntie en de effectiviteit van de dienstverlening, is een belangrijke determinant van ketenstructuur. De analyse resulteert in verschillende bevindingen die inzicht geven in de relevantie van distributie service voor het reduceren van prijsconcurrentie en het bewerkstelligen van ketencoördinatie.

De strategische interactieve aard van besluitvorming door actoren in de keten is bij uitstek geschikt voor speltheoretische analyse. Hoofdstuk 7 modelleert concurrentie tussen detaillisten met betrekking tot prijs en distributie service en analyseert de gevolgen daarvan voor het ontstaan van verschillende winkelformules. Het onderzoek voegt een dimensie toe aan de breedte en diepte van het assortiment en beschouwt de consistentie waarmee een detaillist specifieke merken en artikelen binnen een productcategorie aanbiedt in zijn assortiment in relatie tot prijs- en service beslissingen. Een speltheoretisch model is ontwikkeld voor een markt met twee detaillisten, die verschillen in de mate waarin zij een consistent assortiment voeren en derhalve in de daarmee samenhangende kosten. Het model identificeert de voorwaarden waaronder een evenwicht resulteert waarin geen, één of beide detaillisten een hoog service niveau bieden en analyseert hun prijsvorming. Het model wordt getoetst door middel van een empirische toepassing op basis van gegevens uit de Nederlandse snijbloemenmarkt. Het door het model voorspelde evenwicht – de detaillist die een consistent assortiment aanbiedt levert tevens een hoog serviceniveau – is in overeenstemming met waargenomen en empirisch vastgesteld detaillisten- en consumentengedrag.

Ter afsluiting van het proefschrift worden implicaties van de onderzoeksresultaten besproken alsmede suggesties voor verder onderzoek. De relevantie van de bevindingen en de gebruikte methodologie wordt toegelicht aan de hand van een recente beslissing door de Nederlandse Mededingingsautoriteit inzake een fusie tussen twee grootwinkelbedrijven.

Curriculum Vitae

Kitty Koelemeijer was born in Doetinchem (The Netherlands) in 1963. She graduated at Wageningen University cum laude, with majors in marketing and marketing research, and business administration and minors in operations research and macro economics. She was an assistant professor at Wageningen University and at Tilburg University. Currently she is managing director of her own company, Adfontes Inc., and a research fellow at the Center for Supply Chain Management at Nyenrode University.