

Development of an Assortment-Planning Model for Fashion-Sensitive Products

CHAPTER I: INTRODUCTION

Problem Justification of Study

Realistic assortment planning for a particular market or product has become a difficult task in today's consumer environment. Market competition has increased, consumers want more product variety, and consumer needs from a product have become complex and various. Assortment planning for textile and clothing products is especially complex due to the unique structure of the production pipeline. Hunter and Valentino (1995) identified the following structure uniqueness of the textile and clothing pipeline: (a) complicated Stock Keeping Unit (SKU) estimation; (b) strong effect of fashion; (c) domination of textile suppliers and retail buyers over manufacturers in contrast to the automobile, appliance, and electronic businesses; and (d) difference of product ordering procedures between large retail companies and small retail companies. This research focused on problems related to the complication of the SKU estimation.

Hunter and Valentino (1995) stated that the problems associated with fashion merchandise are more complex than basic merchandise and require sophisticated analyses of fashion and color trends. To reduce the uncertainty of the merchandising decision, retail buyers search for information from several sources: (a) past sales history, (b) their own experience, (c) opinion from business partners, (d) trend analysis by trade publications, (e) magazines, (f) internal and external search (*e.g.*, consumers' and sales persons' voices), and (g) competitor's sales situation (Francis & Brown, 1985-86; Hirshiman & Marzursky, 1982; Kline & Wagner, 1994; Regan, Kincade, & Sheldon, 1998; Webster & Wind, 1972; Wilkie, 1994). Many sophisticated information-search techniques have been applied to the forecast of consumer wants for product development in recent years; however, retail buyers have difficulties in organizing, analyzing, and implementing the resulting data. The hardest task is to make quantitative decisions for production orders from qualitative data because of the complexity of the analysis process and the difficulty of integrating qualitative theories (*e.g.*, fashion theory) to quantitative

demand forecasting. Therefore, forecasting consumer demand of fashion-sensitive products for a season still depends heavily on retail buyer's intuition, which is subjective to their experience (Achabal & McIntyre, 1993; Kang, 1995; Kline & Wagner, 1994; Mazursky & Hirshman, 1987; Miller & Drake, 1987; Shim & Kotsipulos, 1991).

“Retail buyers often tell that the most difficult job of forecasting consumer demand is determination of Stock Keeping Unit (SKU) classification in the first order for a season” (Personal interview with a merchandiser, 1997). The SKU classification is related to design evaluation, color demand forecast, and size variation determination. Bhat (1985) mentioned that: “A retail buyer has full control of this task, and the control is usually dependent on intuition” (p. 20). When intuition is not accurate, retail buyers lose sales, which can be fatal to their jobs and their companies. When retail buyers lose sales in a season, they usually face financial difficulty ordering merchandise for next season. To reduce this fatal-loss probability from an uncertain demand prediction, retail buyers have begun to implement Quick Response (QR) Systems, Electronic Data Interchange (EDI), Point of Sale (POS) systems, and Management Information Systems (MIS). Advanced information system software with EDI and POS databases could improve accuracy of short-term forecasting by reducing the time gap between demand at the information-search point and demand at the selling point. Information search and forecast demand are usually done six months before the selling point. By using QR, retail buyers could reduce the time gap to two months (Leung & Yeung, 1995). By reducing the time gap, retail buyers could more readily meet rapidly-changing consumer tastes, reduce stock-holding and high markdown costs, and increase profits. Even with improved systems, buyers must still forecast what products will be selected by consumers.

Most research about developing an MIS prototype to implement QR is related to: (a) effective order-reorder schedule (Bhat, R.R., 1985; Leung & Yeung, 1995; Nuttle, King, & Hunter, 1991; Poindexter, 1991); (b) inventory cost management (Riall, 1993); and (c) faster sourcing strategy (Anderson et al., 1997; Doherty et al., 1993; Hunter, King, & Nuttle, 1992). Few studies were related to developing a MIS to improve item assortment-planning for fashion goods. A reliable systematic approach and a reliable conceptual model for assortment-planning processes were rarely found in either the industry or the academic arena. Many challenges still exist for software development using EDI and POS data. For fashion goods, one challenge is the need to simulate SKU classification techniques, which implement fashion trend and product

segmentation for a computer-based, merchandising information system. SKU classification is rarely systematically studied, and the decision-making process of SKU classification is not organized in an objective format (Bhat, 1985). Before deciding the proportion of items, colors, and sizes in a merchandising plan, Easey (1995) suggested making a checklist of sales history, emerging trends, and competitors, and then balancing product lines. Few studies exist on how to evaluate the specific information about the clothing product mix to develop a final purchase quantity. From this research, an assortment-planning model as a foundation for developing a computer information system was suggested. The model was a conceptual model, which was the result of a systematic approach to organize the product assortment plan, to evaluate the product assortment plan, and finally, to make the first order decision.

This research provides several benefits for the retail and academic arenas: (a) clothing retail buyers can have an organized assortment planning model as a groundwork to build an effective assortment planning model for their stores, (b) clothing retail management executives can examine fatal sales loss from uncertain demand prediction by having a standardized assortment planning system, (c) academic researchers will have a starting point for assortment planning related research such as investigating effective activities and indication of important variables for a successful assortment planning, (d) retail teachers gain a coordinated guideboard for teaching assortment planning, and (e) computer software developers can have a foundation logic for formulating a clothing retail management information system by obtaining established and detailed functional activity diagrams from the assortment planning model developed by this research.

Conceptual Framework: Retail Buying Process

Retail Buyer's Role

Retail buyers have had an important role to link between manufacturers and consumers in the clothing industry complex. To predict and buy what consumers want from their stores for the next season, retail buyers can get information from store records and past experience, market representatives or agents, competitors, magazines, recommendations, trade directories, trade shows, films, and exhibitions. The information is the essential groundwork to be successful in their jobs. A retail buyer's job includes the following: (a) planning policies, (b) buying in, (c)

budgeting, (d) planning model stock, (e) contacting vendors, and (f) planning promotion (Bohdanowicz & Clamp, 1994). The most important part of a retail buyer's role in a retail company is satisfying company objectives by making accurate and timely decisions of merchandise planning and assortment planning, because decisions related to the acquisition of merchandise are critical to the profit potential of a retail company. Therefore, the clothing product retail buyer plays an important role in the success or failure of a retail store (Diamond & Pintel, 1976). Retail buyers forecast and select merchandise that the store's customers want or need (*i.e.*, the right styles, size range, color assortment, fabrics) all at acceptable prices from vendors (Fairhurst & Fiorito, 1990). Fiorito and Fairhurst (1989) found that the most difficult job elements of a women's clothing retail buyer are (a) analyzing information for color perception, (b) estimating size, and (c) controlling inventory. Frings (1994) suggested that the buying planning process, in terms of analyzing sales histories and developing a merchandising plan, had two aspects; an analytical aspect and a creative aspect. The creative side is the ability to understand the customer, spot trends, and use intuition to choose merchandise with terrific sell-through. The analytical side is the ability to evaluate merchandise and judge whether the selected products and the quantity of the products are suitable for their target customer. This ability develops over years of examining all types of merchandise for quality, styling, and price (Frings, 1994).

Fashion-Sensitive Clothing Products

Sproles (1979) defined clothing as a body covering, specifically referring to an actual garment constructed from fabric. Clothing is one of several distinct objects that express changes in an individual's thought and mind (Sproles, 1979). As people change their thought and mind in regard to environment changes (*i.e.*, society, economic, art), they consciously or unconsciously have expressed the changes through appearance modification. Selection and purchase of the right clothing is very important to many consumers.

Definition of Fashion-sensitive Products

Product variation and change is an obvious consideration in clothing retail management. Clothing industry people consider two types of changes regarding time: seasonal changes and fashion changes (Glock & Kunz, 1995). According to Glock and Kunz (1995):

Fashion change relates to changes on color, styling, fabrication, silhouette, and performance to reflect fashion trends. Seasonal change is a modification of products available on the market and used by consumers according to the time of the year. Factors influencing seasonal change include the weather, holidays, beginning and ending of the school year, and cultural and religious tradition (p. 65).

Regarding fashion changes, clothing products that exist for a long time without fashion change are called basic products, while clothing products that change rapidly in styling are called fashion-sensitive products. Regarding seasonal changes, products are categorized as seasonal goods and staple goods. The demand of seasonal products is influenced by seasonal uniqueness, while the demand of staple goods is continuous throughout the year (Glock & Kunz, 1995). To clarify the product classification, Kunz (1987) suggested a useful perceptual map that graphically categorized product characteristics based on weeks in selling period. The perceptual map includes two continuum lines: horizontal fashion/ basic continuum and vertical seasonal/ staple continuum. Each continuum has a year period of fifty-two weeks and intersects at the twenty weeks point. Fashion-sensitive seasonal products are products for which the range of consumer demand for change in styling is less than twenty weeks in both fashion/ basic continuum and seasonal/staple continuum. Women's clothing products are representative products of the fashion-sensitive seasonal products. Due to the characteristics of fashion change and seasonal change, clothing retail buyers may have more difficulties in forecasting consumer demand and developing an assortment plan than basic-staple product buyers (Ko & Kincade, 1998).

Fashion Product Life-Cycle

“Fashion is an expression that is widely accepted by a group of people over time” (Donnellan, 1996, p. 142). Sproles (1979) more specifically identified clothing fashion as uniqueness of a style that is temporarily adopted by a detectable proportion of a social group because the chosen unique object is perceived to be socially suitable for the time and situation. The fashion objects (*e.g.*, brand, style, color, fabric) are transmitted from creation to public introduction, measurable public acceptance, and eventual obsolescence (Sproles, 1979). The transmission process of fashion is often illustrated as a fashion-diffusion process or a fashion-product life-cycle. The concept of the product life-cycle is based on the concept that the products

have a measurable life-cycle, which can be plotted over a given period using the biological analogy of introduction, growth, maturity, and decline (Atkinson, 1995). The product life-cycle is also called diffusion curves of fashion (Sproles, 1979) and consumer acceptance pattern (Packard, 1983). A diffusion curve is constructed by counting the number of consumers who adopt the style at each point in time and drawing a graph of this acceptance. The diffusion curve for a specific fashion object shows several key variables: (a) the length of time of acceptance, (b) the rate of speed of acceptance, and (c) the level of acceptance of the object (Sproles, 1979).

For the length of time, a fashion trend might remain from several months to a full decade; whereas, most trends last several years (Sproles, 1979). The time range of a fashion trend is getting shorter than in the past due to easy access to trend information through advanced media and easy access to fashionable clothing products in stores. The rate of speed means the time it takes to adopt a trend. Two extreme life-cycles are examples of fashion adoption speed: fad and classics. Fad has a very short fashion life-cycle with a high adoption speed (Atkinson, 1995). A classic has a low adoption speed, but the adoption period is very long. The classic will maintain its popularity among certain consumers over time. The style changes in a classic are very subtle over a long time period (Donnellan, 1996).

The acceptance of fashion products can be drawn as a bell shape, which indicates that acceptance grows to a peak and declines to an end over time (Donnellan, 1996). The diffusion curve of a classic will be an elongated bell-shape curve, and the diffusion curve of a fad will be a thin and tall bell-shape curve (Atkinson, 1995). According to the theory of adoption and diffusion, the introduction of a trend may be spread by subconscious communication among consumers (Rogers, 1983). Workman and Johnson (1993) identified consumer types based on fashion adoption time: fashion innovators, fashion opinion leaders, innovative communicators, and fashion followers. Fashion innovators may introduce a fashion trend. The new style is first adopted among fashion opinion leaders or innovative communicators. After the trend is confirmed in society, fashion followers adopt the style. This kind of consumer segmentation regarding fashion involvement is generally accepted in the clothing industry (Donnellan, 1996). Packard (1983) illustrated an adjacency probability of adopters through a product life-cycle: (a) initiators 2.5%, (b) early adopters, 13.5%, (c) early majority, 34%, (d) late majority, 34%, and (e) laggards, 16%; however, each specific trend will have a different probability. The fashion sensitivity of a product can be determined with time, slope of life-cycle curve, and types of

adopters. The sales and profitability patterns and marketing implications of the model are described in Table 1.

Table 1. Fashion Product Life-Cycle

Fashion Diffusion Curve (Sproles, 1979)	Consumer Acceptance Pattern (Packard, 1983)	Fashion Product Life-Cycle (Atkinson, 1995)
1. Commercial introduction and high fashion promotion Adopted by fashion innovator	1. Style pioneering Adopted by initiators (2%) Highest price in fine specialty stores	1. Introduction
2. Rising retail inventories and local promotions Adopted by fashion opinion leaders and conformists	2. Style growth & popularity Adopted by early acceptors (13.5%) High price in better department stores	2. Growth
3. Mass merchandising Adopted by mass market consumer	3. Style maturity Adopted by early majority (34%) Moderate price in department and moderate-priced specialty stores	3. Maturity
4. Clearance and obsolescence Fashion isolated and laggards	4. Style decline Adopted by late majority (34%) Popular price in department and moderate-priced specialty stores	
	5. Style vanishing Laggards (16%) Close-out price in mass distributors, discounters, and factory outlets.	4. Decline

Positioning a market through segmentation by fashion involvement may be considered in merchandise planning when establishing store policies. The fashion involvement level of the target market will affect the fashion sensitivity of the assortments in the stores. Fashion sensitivity can be an important indicator used to predict consumer demand.

Fashion Selling Period

When a clothing retail buyer tries to select the right products, the fashion cycle of consumer acceptance leads the buying and selling cycle. However, predicting the right product cycle of an item is difficult. For example, the best-selling item of the last season could be the worst-selling item for the coming season, if the item has a fad life cycle. Retail buyers still depend on intuition on the prediction of demand for a fashion-sensitive product. The nature of fashion has qualitative aspects by itself; therefore, fashion forecasting still depends on qualitative analysis. If the qualitative methodology is objectively established, analyzed, and properly integrated with quantitative methods, the forecasting accuracy can increase and the sales loss due to forecasting error may decrease.

Retail Buying Process

The retail buyer's responsibility in buying decisions involves planning, analyzing, purchasing, and controlling merchandise investments (Fairhurst & Fiorito, 1990). Clodfelter (1993) introduced three stages of purchase planning and merchandise control process as follows: (a) merchandise planning, (b) assortment planning, and (c) inventory control. Frings (1994) illustrated four stages of a buying planning process: (a) planning sales goals based on target market analysis, (b) planning stock based on ability of investment, (c) product order schedule planning, and (d) assortment planning. Bohanowicz and Clamp (1994) suggested three stages: (a) planning and programming of store policy and time table, (b) budgeting with model stock plan, and (c) buying from vendors and promotion. Rabolt and Miler (1997) introduced three overall stages of a retail merchandising process: (a) merchandise planning, (b) assortment planning, and (c) buying. In summary of the above information, the buying process is generally divided into three stages: (a) merchandise planning to set up sales goals and an inventory control system, (b) assortment-planning to decide quantity and quality of specific items, and (c) actual buying and

rearrangement of the previous plan with vendors (see Table 2). In this research, the assortment-planning process was discussed intensively to reveal how to decide the first order quantity of each item. A review of the whole retail buying process is required before discussion of the assortment plan, because the assortment plan should follow the policy and inventory control rules in the merchandise plan and also should be realistic in the actual buying situation. For these reasons, the activities in the retail buying process are briefly introduced and explained in the following sections.

Merchandise Planning

Planning Sales Goal

Merchandise planning involves purchasing activities for the right merchandise, at the right time, at the right place, in the right quantities, and at the right price (Mazur, 1927). To make a realistic merchandise plan, a retail buyer must consider (a) target market demand, (b) local retail competition, (c) physical expansion or alterations needed in the store, (d) planned promotional efforts, (e) trend analyses, (f) seasonal consumer demand, and (g) economic conditions. Retail buyers need forecasting activities, because a gap exists between the time that manufacturers need to develop products and the time that retail buyers want to replenish clothing products in stores.

Frings (1994) suggested that the merchandise plan may require a fashion forecast for the following objectives: (a) studying market condition and consumer buying behavior, (b) evaluating up-to-date fashion trend information, and (c) noting street fashions of target consumers. In other words, before developing a forecast for assortment planning, marketers must first identify their target customers, understand why they buy, and gain an understanding of trends affecting these markets for both long-term and short-term retail management planning (Clodfelter, 1993).

Frings (1994) and Clodfelter (1993) agreed that the merchandising plan includes a financial plan allocating specific amounts of money to each division for the purchase of an appropriate assortment of clothing product that will meet the consumer demand within a specific season. Retail buyers determine the store policy, sales goals, stock level, product order schedule, product price range, product fashion sensitivity range, and fashion direction three to six months

Table 2. Retail Buying Planning Process

Clodfelter (1993)	Bojdanowicz & Clamp (1994)	Frings (1994)	Rabolt & Miller (1997)	New Clothing Buying Process
Merchandise planning: Target market analysis/ policy making	Planning & programming	Planning goals	Merchandise planning: Environment scan & planning sales goal	Planning sales goals: Target market positioning
Forecasting seasonal demand Planning inventory control	Budgeting	Planning stock Planning inventory control	Sales planning Inventory planning	Planning stock Planning inventory control
Assortment-planning: <ul style="list-style-type: none"> • General product line decision • Determining brands & price • Specific assortment plan decision • Sales forecasting for specific items • Order quantity decision 	Model stock planning	Assortment-planning: <ul style="list-style-type: none"> • Analysis past sales and trends • Specific order quantity 	Assortment-planning: <ul style="list-style-type: none"> • Unit planning • Dollar planning of model stock. 	Assortment planning: <ul style="list-style-type: none"> • Qualitative Aspect • Quantitative Aspect
Actual buying and rearrangement planning	Buying in without with	Shopping in market	Buying	Actual buying & rearrangement plans with vendors ⇒ First order quantity decision

Note: Bold box = Focus on this study.

before the selling season (Frings, 1994). The merchandise plan includes anticipated sales, stock, markdowns, and purchase plans for the coming six-month season.

An important forecast in retail merchandising is the sales forecast, which is a prediction of future sales for a specified period under a proposed marketing plan. The sales forecast can be used for several objectives for retail companies: sales forecasts for merchandise planning (*i.e.*, company-wide sales forecasts) and sales forecasts for assortment-planning (*i.e.*, specific-item sales forecasts). The sales forecast affects merchandise planning, which considers target-market analysis, store policy, and inventory-control plan (Clodfelter, 1993; Rabolt & Miller, 1997). Target-market demand, store policies, and consumer seasonal-consumption patterns do not change radically in a short time; therefore, long-term sales forecasting is usually required for merchandise planning. The sales forecasts for an assortment plan is required for order-quantity decisions of specific styles, colors and sizes, and these order decisions usually last for a short-time period.

When developing a sales forecast, a step-by-step process should be followed that analyzes both internal and external forces that will affect sales. The step-by-step sales forecast can be reviewed in two ways: top-down and bottom-up (Clodfelter, 1993; Gordon, Morris, & Dangerfield, 1997). In a top-down approach, the total budget is planned and then divided into individual item categories based on their historical fraction of sales. The bottom-up approach involves a separate forecasting model that is developed for each item budget then the budget of each item is added into a total budget for final forecasting results (Gordon, Morris, & Dangerfield, 1997). The top-down forecasting process follows four steps: (a) planning sales goal by reviewing past sales, economic conditions, and marketing strategies; (b) planning stock level for a store/ company and each order; (c) planning the assortment plan by analyzing sales potential for specific products; and (d) making a sales forecast report. In the bottom-up forecasting process, the total sales goal and stock level are determined by adding up sales potential for individual items. If item proportions in the assortment plan are positively correlated, the bottom-up approach is more accurate. If item proportions in assortment plan are negatively correlated, the top-down approach is more accurate regardless of the distribution of each item in the total (Gordon, Morris, & Dangerfield, 1997). Many large retail buyers use both the top-down and the bottom-up forecasting processes, then reach the final sales figure for the store company

and for individual items through a discussion among the buying team members (Clodfelter, 1993).

Goodman (1954) determined sales forecasting as a process of arranging known facts and realistic hypotheses into a pattern, which will provide a sound basis for estimating the expected demand and composition of a company's sales, to reduce the area of uncertainty of future operations. Goodman (1954) also suggested that sales forecasting could be thought of as a term to denote organized sales planning, because planning is also a process of anticipating future moves. The purpose of sales forecasting is to try to estimate the net effect on market demand from the following external influences: (a) the economic environment, (b) the political situation, (c) population change, (d) fiscal policies, (e) technology, (f) competition in market, (g) the fashion influence on products (Keay, 1972). In a survey of 175 companies done in 1993, 92% of the respondents indicated that forecasting was important for their company's success (Herbig, Milewicz, & Golden, 1993).

Planning Stock and Inventory Control

The next step in planning is to determine the amount of stock, in terms of dollar investment, necessary to meet the consumer demand and thereby support planned sales (Clodfelter, 1993; Frings, 1994) (see Table 2). Volume of stock is calculated relative to desired sales and inventory turn. After planning stock, the retail buyer determines the amount of merchandise on hand at the beginning of any given month and the stock turn (*i.e.*, number of times inventory is replaced). This information is needed to determine the necessary stock to purchase.

Assortment Planning

After developing a merchandise plan, retail buyers must make decisions about which items to display in their stores. A merchandise assortment is a collection of various quantities of styles, colors, sizes, and prices of related merchandise, usually grouped under one classification within a department (Clodfelter, 1993). The assortment is called different names: buying plan (Frings, 1994), product mix arrangement (Atkinson, 1995), and model stock plan (Bohdanowicz & Clamp, 1994; Poindexter, 1991). The words illustrate the factors of type, quantity, size, and price of merchandise that a retail buyer expects to purchase within a specific period of time. The purpose of assortment planning is to maintain a balanced assortment of merchandise that meets

the needs of as many customers as possible (Clodfelter, 1993). Assortment planning can also affect display plans of stores based on the floor or shelf space available for the merchandise. The final report of an assortment plan states the budget for each item followed by sales goals and a merchandise plan for a specific period.

Rabolt and Miler (1997) sorted these activities into two aspects of assortment planning: unit plans and dollar plans. A unit plan refers most often to qualitative decisions or types of merchandise bought. A dollar plan is the quantitative result of the assortment planning or volume of merchandise bought. By adopting Rabolt and Miler's perspective, the assortment plan can be differentiated with two phases: qualitative decision-making process within product-specific factors and quantitative decision-making within store sales goals and policies. The two phases may affect each other both consciously and unconsciously in a real-life situation. To clarify the retail buyer's logic in buying decision-making, the two phases, for this study, are separately considered in a new buying process model.

Actual Buying and Rearrangement Plans with Vendors

After the assortment planning steps, clothing retail buyers look around the market and meet vendors to view the merchandise available for the next season. At this point in the overall process, vendor selection criteria are an important consideration. In the decision-making process in the market, clothing retail buyers will evaluate vendor performance based on vendor selection criteria including quality of goods, good delivery, product fashion-ability, fair price, styling, reputation, selling history, and steady source of supply (Arbuthnot, Sisler, & Slama, 1993 a; Francis & Brown, 1985-86; Wagner, Ettenson, & Parrish, 1989). For clothing retail buyers, the vendors can be manufacturers or agents. Retail buyers look for new products from both key resources and new ones. Key resources are vendors who have maintained a reputation for dependability and whose merchandise sells-through because of appropriate styling, quality, and price. The clothing retail buyer regularly purchases a major portion of these manufacturers' lines. The retail buyer must also be on the lookout for new resources and new talent in buying (Frings, 1994).

After making a contract with vendors, retail buyers reevaluate the merchandise plan and the assortment plan, which is already developed through previous stages. The rearrangement should be considered within their previously fixed budget. In this research, the final buying

process was not considered; therefore, the decision-making for vendor selection criteria for the actual buying process was not further discussed. Decision-making discussed in this research concentrated on decisions made during the assortment-planning process.

By summarizing several buying process theories, a new buying process is drawn as the research framework (see Figure 1). The new clothing buying process includes five stages: (a) planning sales goal, (b) planning stock, (c) planning inventory schedule, (d) assortment planning, and (e) actual buying and rearrangement plans with vendors. In the new clothing buying process model, the assortment plan is separated into two stages to clarify the qualitative aspects and quantitative aspects of the assortment plan. In this research, the qualitative decision-making process is discussed as background information to understand an assortment-planning process. The review of the qualitative decision-making process examines why a retail buyer selects specific women's dresses as their products.

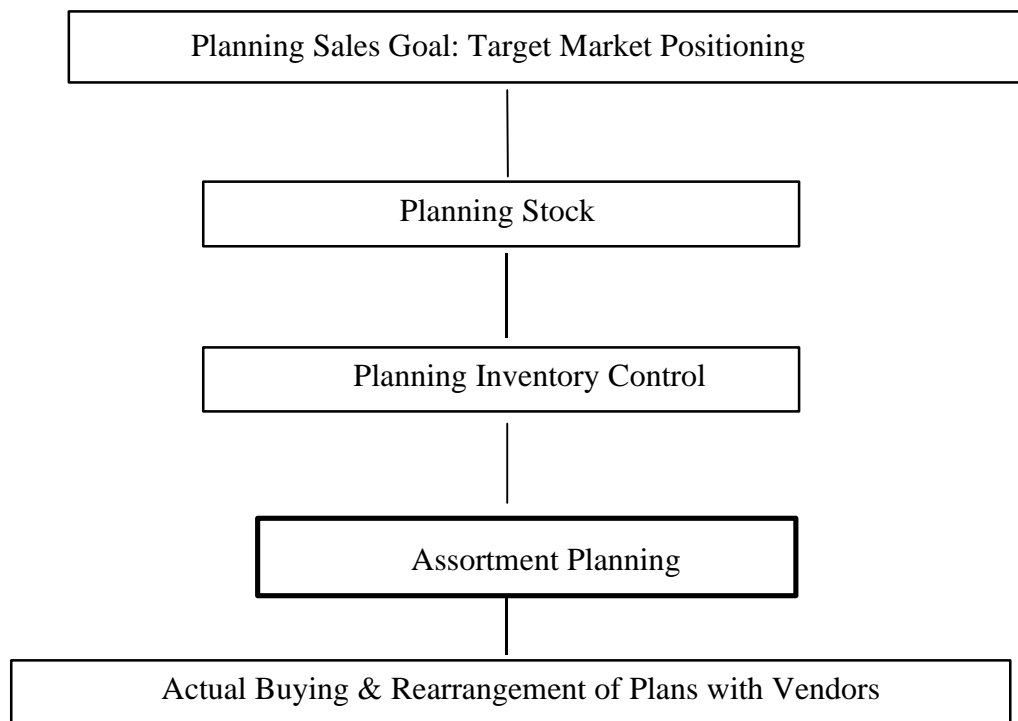


Figure 1. Retail Clothing Buying Process Model

Note: Bold Box = Focus of this study

Purpose of Study

The purpose of this study was to develop an assortment-planning model for women's clothing retail buyers by integrating a conceptual assortment planning and a practical-use assortment planning model.

Definitions

Assortment-planning (*i.e.*, Product mix arrangement or Stock Keeping Unit [SKU] classification) is a process of determining quantity and quality of goods that a retail company offers for sale at any time (Easey, 1995).

Breadth of product line is the number of product lines carried by a retail buyer or the number of brands carried within a product-classification (Clodfelter, 1993).

Clothing product classification factors are product characteristics that can differentiate product categories in an assortment plan, such as brand, price, color, size, and materials.

Clothing retail buying is a decision-making process where the retail buyer identifies, evaluates, and selects clothing products for resale to customers (Ettenson & Wagner, 1986).

Decision-making process for assortment plan is a problem-solving process to choose products to sell in a store or a company among alternative items.

Decision rules for making final choices are choice logic that are the guides that decision makers use to help them make a final decision about purchases (Kang, 1995).

Depth of product line is the number of choices offered to consumers within each brand or product classification (Clodfelter, 1993).

“Dress is a women's clothing item that is made in one piece, cut in two pieces and joined with the waistline seam, or made in two separate pieces with each piece finished separately” (Calasibetta, 1988, p. 170).

Fashion-sensitive products are products for which the range of consumer demand for change of style is less than twenty weeks (Kunz, 1987).

IDEF0 (ICAM DEFinition) is an engineering technique for performing and managing needs analysis, benefit analysis, requirements definitions, functional analysis, system design, maintenance, and baselines for continuous improvement (US Air Force, 1998).

Information source for qualitative decision-making is determined as a reference used to reduce the uncertainty associated with choice decisions in an assortment plan (Anthony & Jolly, 1991).

Information source for quantitative sales forecast is a reference used to predict the sales of the specific products for the next season (Anthony & Jolly, 1991).

Merchandise plan is a financial plan allocating specific amounts of money to each division for the purchase of an appropriate assortment of a clothing product that will meet consumer demand within specific season (Clodfelter, 1993; Fring, 1994).

Product life-cycle illustrates the expected behavior of a product over its life through introduction, growth, maturity, and decline (Clodfelter, 1993).

Product line is a broad category of products having similar characteristics (Clodfelter, 1993).

Short-term sales forecasts are the activities of estimating the demand of product lines marketed by a particular retail organization in any one season (Midgley & Wills, 1974).

Tree-structured sales forecasting for assortment plan is a hierarchical breakdown of quantity order of garment categories for a season, product segmentation by fashion sensitivity, and color and size variation for a product (Kang & Kincade, 1998).

Women's clothing retail buyer is a decision maker who buys women's clothing for resale to consumers in retail stores or companies (Kang, 1995).

CHAPTER II: LITERATURE REVIEW

Theories

Retail Buying Decision-making Process

Retail buying can be defined as a decision-making process where the retail buyer identifies, evaluates, and selects merchandise for resale to customers (Ettenson & Wagner, 1986). A major portion of a clothing retail buyer's job is satisfying company objectives by making accurate and timely decisions. Decisions related to the acquisition of merchandise are critical to the profit potential of a retail company; therefore, the retail buyer plays an important role in the success or failure of the retail store (Diamond & Pintel, 1976). Fiorito and Fairhurst (1989) found that the decision-making process is the most frequently used mental process in job content of a clothing retail buyer. The retail buyer's responsibility in these decisions involves planning, analyzing, purchasing, and controlling merchandise investments (Fairhurst & Fiorito, 1990).

Assortment Planning Process

Decision Making Process for Specific Product Buying

Over the years, researchers and specialists have produced many studies and theories regarding human choice behavior. John Dewey's (1910) conceptualizations of the decision-process behavior as problem solving have been an especially influential source. Problem solving is defined as thoughtful, consistent action undertaken to bring about need satisfaction. The problem-solving perspective encompasses all types of need-satisfying behavior and a wide range of motivating and influencing factors (Engel, Blackwell, & Miniard, 1993). Decision-making includes information acquisition and process activities as well as choice processes and development of goals and other criteria to be used in choosing among alternatives (Webster & Wind, 1972). In other words, decision strategies include search and evaluation actions and decision rules (Miller, 1993).

Previous research on retail buyer's decision-making has been based on organizational buying models. Organizational buying behavior is defined as the decision-making process by which formal organizations establish the need for purchased products and services and identify,

evaluate, and choose among alternative brands and supplies (Webster & Wind, 1972).

Organizational buyer behavior involves three aspects. The first aspect is the psychological world of the individuals involved in organizational buying decisions. The second aspect relates to the conditions in which joint buying decisions are rapidly made among these individuals. The final aspect is the process of joint decision-making with the inevitable conflict among the decision makers and its resolution by resorting to a variety of tactics. Related with the psychological world of the individuals, Sheth's decision-making model (1973) was mainly concerned with aspects of individual buyer behavior. Sheth (1973) introduced product-specific and company-specific factors as well as the outcome of previous decisions and situation factors and suggested that two important buying decisions are the selection of goods and the selection of suppliers. Sheth (1973) indicated that one could simplify the actual application of the model in a specific study in two ways. Depending on variables included, conditions in a study would hold constant differences among types of products to be purchased (*i.e.*, product-specific factors) or difference among types of purchasing organizations (*i.e.*, company-specific factors). The company-specific decision factors would not necessarily be considered if the objective of the study is to describe the process of buying behavior for a specific product or service.

Within product-specific decision-making research, the selection of merchandise in retail buying has been studied by several scholars (Ettenson & Wagner, 1986; Francis & Brown, 1985-86; Hirschman, 1981; Hirschman & Mazursky, 1982; Kline & Wagner, 1994; Mazursky & Hirschman, 1987). Some researchers (Ettenson & Wagner, 1986; Francis & Brown, 1985-86; Kline & Wagner, 1994) have mentioned that clothing retail buying is vastly different from industrial buying. This argument suggests that research use of the industrial buying model for a product-specific decision-making process such as an assortment plan is inappropriate. A clothing retail buyer plays an important role in the marketing exchange process by providing clothing products for ultimate consumer consumption. This position is different from the role of an industrial buyer who buys component parts and equipment to be used in manufacturing and who is usually not concerned with resale of the purchased product. Clothing retail buyers use a more individualized decision-making process (Kline & Wagner, 1994). The decision-making process for an assortment plan can be described more accurately by the individual decision-making process model (Kang, 1995). In this research, a decision-making process for an assortment plan can be determined as a problem-solving process to choose products among alternative items.

The assortment planning process of this research is identified as follows: (a) problem recognition, (b) information-search, (c) qualitative and quantitative product evaluation, and (d) forecasting product selection and short-term sales (see Figure 2).

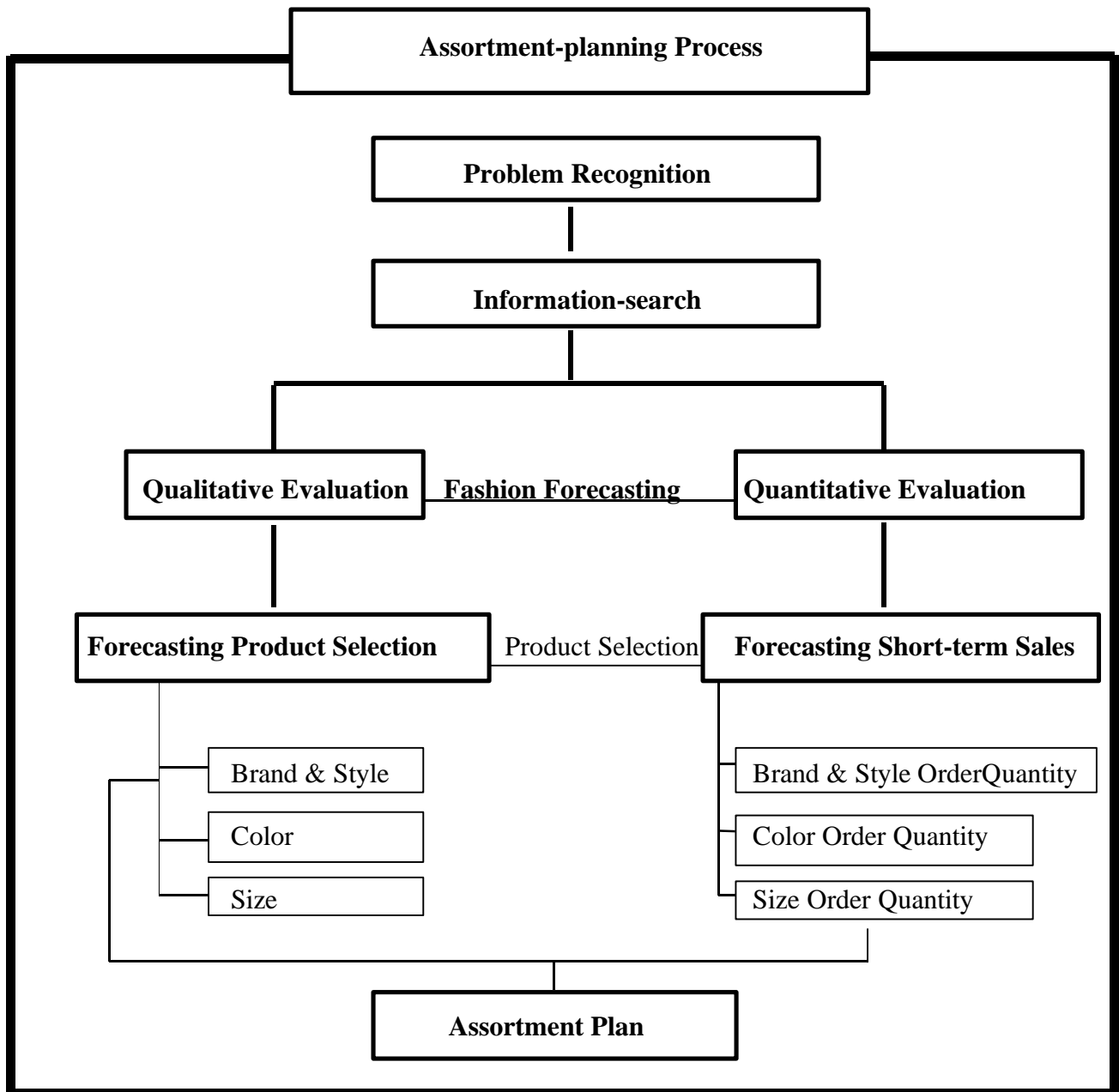


Figure 2. Assortment Planning Process Model

Problem Recognition

Problem recognition represents the first step of a decision-making process. For assortment planning, this step occurs when a retail buyer begins to move toward a purchase decision. Conceptually, problem recognition occurs when a retail buyer perceives a gap or discrepancy between the current state of the company or store and the desired state of the company or store (Wilkie, 1994). Recognition of two major problems can begin the assortment-planning process. They are a change in the desired state for a store and a change in the current store assortment. Need for changes in the desired state are new store circumstances, new product opportunities, and new product selections for customer satisfaction. The changes in the current store circumstance are deficiency of stock, dissatisfaction with a current product line, decrease or increase in finances. Any of these situations can trigger an assortment planning process. Need for new products is the most regular problem for clothing retail buyers. The information for problem recognition comes from the previous steps of the buying process: target market position, total stock plan, and inventory control plans.

Information-Search

Decisions involving purchase of new goods are inherently risky and challenging, even for experienced buyers. To reduce the uncertainty associated with such decisions, retail buyers may search for information from a variety of sources. Clodfelter (1993) and Packard, Winters, and Axelrod (1983) mentioned that various internal and external information sources are available to help forecasting consumer demand and selecting product line in an assortment plan. The internal sources may be store records, merchandise plan report, and sales people's opinions. The external sources may include: (a) customer panel, (b) consumer magazines and trade publications, (c) vendor opinions, (d) trade associations, (e) competitors, (f) fashion forecasts magazines, and (g) reporting bureaus (*i.e.*, demographic data). In study of information seeking pattern of clothing retail buyers, Shim and Kotsiopoulos (1991) identified five factors of information sources: (a) general media/printed promotion, (b) fashion trade, (c) personal sources, (d) outside sources, and (e) trade shows. In study of retail buyers information source utilization, Mazursky and Hirschman (1987) identified information sources that affect the retail buyer's selection of

merchandise: buyer's own knowledge, trade press, sales representatives, buyers from other stores, and selling records.

In a study of clothing retail buyers, Kline, Wagner, and Ettenson (1990) found that clothing retail buyers used buyer's own opinion, consumer requests, consumer magazines, sales records, retail buyers from other stores, sales representatives, articles in trade publications, and vendor ads. Among all sources, the most important information sources were the retail buyer's own opinion and customer requests. In study of information sources used by retail buyers, Kline and Wagner (1994) found results similar to earlier research regarding retail buyers' information sources. The retail buyers' responses reflected the individual nature of retail buying decisions in that the most frequently cited source was the retail buyer's own knowledge. Achabal, McIntyre, and Miller (1993) found that most specialty and department store retail organizations rely on the intuitively developed and highly subjective forecasts of their buyers. The dominance of own knowledge is also consistent with the results of several other researchers (Hirschman & Mazursky, 1982; Miller & Drake, 1987; Shim & Kotsipulos, 1991). If the most important information source is the buyer's own knowledge, questions can emerge including (a) how a retail buyer builds up own knowledge and (b) how own knowledge is translated into evaluation process and final product line selection. No research regarding these questions exists. With no established rules for applying own knowledge into clothing-product evaluation, retail buyers can face uncertainty in a decision.

Shim and Kotsipulos (1991) indicated that the information-search process is likely to vary with the type of buy, such as novel, modified, and straight rebuy, and suggested that buyers may be differentiated by the information sources they tend to use for product-specific decisions. When retail buyers were uncertain about an intrinsic, product characteristic, such as quality or aesthetics, they tended to place a greater amount of importance on another buyer/ peer as a source of additional information (Anthony & Jolly, 1991). Francis and Brown (1985) found sales representatives to be the most important information source for product-specific clothing buying decisions. Kang (1995) also found that peer (*i.e.*, sales representatives), followed by own experience, is the most important source for the clothing buying decision within a product-specific factor.

Kline and Wagner (1994) also found that records of past sales had moderate effects on retail buyers' decisions. Although the decision-making task involved new merchandise, with no

selling history, selling records for established merchandise may have documented fashion trends and provided direction for buying new items.

Clothing retail buyers select products for sales to individual consumers. Kline and Wagner (1994) found that the magazines read by the retail buyer's target consumers were an important information source. In contrast, reviews in the trade news had little effect on the retail buyers' decisions. Kline and Wagner's (1994) result showed that vendor-driven sources, including the sales representative and advertising in the trade news, had little effect on retail buyers' decisions. Unlike industrial buyers, retail buyers need information on customer demand rather than technical information about their products. Consumer magazines communicate trends directly to the customer; therefore, retail buyers may view them as a more powerful trend mediator than the trade news. Given their position in the marketing channel, retail buyers have better access to consumers than vendors for such information. In fact, retail buyers often provide information on consumer demand to their vendors (Kline & Wagner 1994).

Stark and Johnson-Carroll (1994) investigated clothing manufacturers' most important information sources on color selection: (a) tradition, (b) last season's sales, (c) age of consumer market, (d) street fashions, (e) clothing collection shows, (f) product function, (g) geographical area of market, (h) fashion magazines, and (I) trade publications (Stark & Johnson-Carroll, 1994). Frings (1994) indicated that color forecasters in clothing companies often rely on color selection provided by color and design services, trade associations, or fiber companies. The clothing retail buyer finds to be common across these sources indicate trends. Information sources for color demand forecast can be derived from color forecasting services such as: The Color Association of the United States, The Color Box, The Color Marketing Group, Color Play, and Pat Tunsky, Inc. Fiber companies also supply color forecasts for manufacturers and retailers (Frings, 1994).

In summary, retail buyers depend on more qualitative information sources (*e.g.*, own knowledge, peer opinion, consumer publications) than quantitative information sources (*e.g.*, past sales record) in a product-specific, decision-making process. Retail buyers may face difficulty in interpreting a qualitative decision, resulting from qualitative information sources, into a quantitative demand forecast for the first order. Further, no empirical research has investigated how the information sources are organized and interpreted by retail buyers.

Product Evaluation

Product evaluation is a process by which a choice alternative is evaluated and selected to meet retail buyers' needs. This evaluation follows the problem recognition and information search (Engel et al., 1993). Product evaluation in assortment planning is defined as having two phases: qualitative evaluation and quantitative evaluation of the product (Rabolt & Miller, 1997).

Fashion Forecasting Involvement in Product Evaluation

Lawless (1997) defined forecasting as a systematic method of looking for pattern, trend, and turning point. Rabolt and Miller (1997) determined that forecasting activity in retail management is predicting the styles and trends to purchase for consumer. Literature and text books speaking of forecasting activities in clothing retail merchandise offer two aspects: fashion forecasting (Frings, 1994; Perna, 1987; Sproles, 1979; Sproles, 1981) and sales forecasting (Clodfelter, 1993; Gray, 1995; Rabolt & Miler, 1997). Fashion forecasting is associated more often with changes in qualitative aspects of consumer demand (*e.g.*, design preference, life style). The results of fashion forecasting may be considered in the product evaluation stage of decision making for assortment plans because fashion-ability is one of evaluation criteria for product line selection (Key, 1972).

Qualitative Evaluation

An important aspect in evaluation is the desired solution to a problem which involves establishing the criteria, implicit or explicit, upon which the decision will be based (Bass, 1983). Evaluation criteria are the particular dimensions or attributes that are used in judging the choice alternatives (Engel et al, 1993). Francis and Brown (1985-86) investigated the relationships among selected product evaluation criteria from the Sheth model (1973) of industrial buyer behavior for retail buying behavior and compared clothing buyers to appliance buyers. Clothing retail buyers and appliance buyers differed significantly on the criteria used to evaluate the product. For instance, clothing retail buyers were more concerned about styling, fashion-ability, color, and distinctiveness of the product as compared to appliance buyers who were more concerned about brand and negotiation of terms of sale.

Fiorito (1990) described that product-specific criteria (*i.e.*, quality, color, position on the fashion cycle, styling, distinctiveness, brand name, price) were the most important predictors of clothing retail buyers' evaluation criteria. Kang (1995) identified product-specific evaluation criteria with aesthetic aspects, situational usage, performance, and extrinsic criteria. She found that retail buyers and their target consumers have similar variance of criteria importance and product-specific perceived-risk in evaluation in buying decision-making. Kang's research (1995) implies that a retail buyer's evaluation within product-specific criteria reflects the target consumer evaluation criteria. Arbuthnot, Sisler, and Slama (1993 b) studied the selection criteria in the purchase decisions of clothing buyers for small retailing companies. The results of their study indicated that the small retail buyer was involved with product function, personal vendor relations, and the ultimate consumer.

Quantitative Evaluation

The quantitative evaluation is more relevant to forecasting of sales for products. Quantitative evaluation step in assortment planning can be identified as short-term sales forecasting processes. Short-term forecasts identify specific levels of demand for styles and pinpoint the times when consumer demand for the styles can be expected. The retail buyers make decisions about the demand of product lines in any one selling season (Wills & Midgley, 1974). Many companies consider their short-term forecasts to be those covering the period of product development or fiscal year beyond the present one (Hurwood, Grissman, & Bailey, 1978). Retail stores make forecasts for three months into the future, focusing on the coming season.

At the early stage of the sales forecasting, most clothing retail buyers develop a total sales forecast in a merchandise plan and layout the amount of inventory required to generate that amount of sales. Prior to assortment planning, retail buyers generally determine the following components: (a) initial markup for period, (b) planned net sales, (c) planned beginning inventory for a period (Beginning of the Months [BOM]), (d) planned ending inventory (Ending of the Months), (e) planned reductions, and (f) planned purchases at retail (Clodfelter, 1993). These items from the merchandise plan must be translated into specific quantitative evaluation in the assortment plan to make an order decision for a specific item.

Closely associated with merchandise classification is unit control, which is an inventory control system that tracks the movement of specific units of merchandise. Unit control information is essential to assortment planning (Clodfelter, 1993).

Table 3. The Qualitative Product Evaluation Criteria for Assortment-planning

Alternative evaluation criteria within product specific factors (Kang, 1995)	Retail buyer's product-specific criteria (Arbuthnot & et. al., 1993b)	Evaluation criteria for assortment-planning (For current research)
Aesthetic criteria	Quality of product	Aesthetic criteria
- Color/ Pattern/ Styling	Construction of product	- Color/ Pattern/ Styling
- Fabric line/ Detail	Color/ Style/ Fabric	- Fabric Detail
- Design	Design/ Aesthetic qualities	- Total balance
Situational Usage		Situational Usage
- Versatility	Season-ability of product	- Versatility
- Matching with other products	Consumer demand	- Coordination effect
- Fashion-ability of products		- Fashion sensitivity
- Expected popularity		- Predicted demand
Performance criteria	Sizing specification	Performance criteria
- Size variation/ Comfort	Fit of product	- Size/ Easy care
- Easy care/ Durability		- Comfort Durability
		- Quality vs. Cost
Extrinsic criteria	Vendor reputation	
- Price (Value of price)	Completeness of past orders	
- Seller's reputation	Personal past experience with vendor/ Return policy of vendor	
- Social acceptance	Minimum requirement of vendor	
- Return policy	Fashion awareness of vendor	
	Selling history of product	
	Rapidity of delivery	

Note: Bold box = Focus on this study

Forecasting Product Selection and Sales

Forecasting Product Selection

Forecasting Style Selection

In selecting a product line, a clothing retail buyer is determining combinations of styles, which can satisfy target consumers (Glock & Kunz, 1995). Rosenburg (1983) identified a product line as a group of items that has (a) similarity in satisfying certain needs, (b) matching ability with other items, and (c) similar price ranges. A product line is a breakdown of clothing categories into product classification that are related in more specific, identifiable styles. Each product line can be broken down into a variety of specific styles appropriate for the given season (Atkinson, 1995). Selection of a product line involves qualitative aspects of an assortment plan. The term product selection in this research does not consider quantitative decisions of specific designs and each unit. The quantitative decisions may be made by demand forecasting processes for assortment plans and will be discussed in the next section.

Forecasting Color Selection

According to Stark and Johnson-Carroll (1994), “Choice of colors is a major decision for those in the sewn products industry. The selection of colors, while not scientific, certainly is not completely intuitive for designers and manufacturers” (p. 17). Within the product line, each group is usually formulated around a color plan consisting of as few as two colors or as many as 100 colors. Clothing retail buyers usually select some trend colors and combine them with their own color choices (*e.g.*, never-out-colors: black, white). Retail buyers also select colors that manufacturers provide for individual garments based on the retail buyers’ store circumstance. In a study of retail buyers’ color choices, researchers found that most clothing manufacturers perceived only six months as life-cycle of trend colors and use that amount of lead time to initiate colors (Stark & Johnson-Carroll, 1994).

Forecasting Size Selection

Packard (1983) suggested that size specifications, the actual dimension of garments, were not standardized across different brands. Each manufacturer may interpret the garment specification by its own standard. Consumers often perceive necessity to buy a larger or smaller size, depending on brand. The size range is also determined by a store’s merchandise classification and the target market (Glock, & Kunz, 1997). The following are the most

commonly used women's size ranges in clothing stores: (a) misses (6 to 16), (b) juniors (1 to 15), (c) petites, 5'4" under women (1 to 13), (d) women's larger, fuller figures of average heights (14 to 25), (e) tall sizes (8 to 20), and (f) maternity, expansion of garment (6 to 16) (Diamond & Diamond, 1997).

Rules for Product Selection

The final decision or product selection is a process that can be described as a typical choice problem. Choice problems consist of a set of alternatives that are described by values on several attributes (Klein & Bither, 1987). As already mentioned, a retail buyer's decision-making process within product-specific factors reflects or adopts consumer decision-making process (Kang, 1995; Kline & Wagner, 1994). However, Kang (1995) found that retail buyers and consumers use different decision rules to choose a product because of their different buying situation.

Decision rules are also termed choice logic and are the rules of thumbs that decision makers use to help them make decisions about purchases (Wilkie, 1994). The three basic types of decision rules are (a) compensatory rule, (b) lexicographic rule, and (c) conjunctive rule (Wilkie, 1994). The compensatory rule requires the most effort of all the decision rules, because the decision maker calculates, for the product, an importance weight and attribute rating for each attribute and then sums these over all the attributes to arrive at a total product satisfaction score. The lexicographic rule requires that decision-makers rank the attributes according to importance and then select the brand that is superior on the most important attribute. The conjunctive decision rule is quite commonly used by people as a means of eliminating a number of alternatives in a fast and simple manner. The decision-maker sets a minimum standard for each attribute. If a product fails to pass any standard, it is dropped from consideration (Wilkie, 1994).

Kang (1995) found that clothing retail buyers most frequently use the conjunctive rule, but consumers use the lexicographic rule. The consumers' decision rules were not the same rules as retail buyers' decision rules despite the use of same product-specific evaluation criteria. The clothing retail buyer's conjunctive rule is more matched with decision-making rules for organizational buying. The results of Kang's research (1995) can be explained with the judgment of adequacy concept in decision-making for organizational buying, as determined by Bass (1983). Bass (1983) suggested that buyers set standards to establish the judgment of adequacy

concept for an alternative evaluation in buying decision-making. He explained that the judgment of adequacy can be categorized as a minimax, maximin, or mixed strategy:

With the “minimax”, we will accept that decision which is likely to yield the least ill effect if the worst happens. The least amount of loss is risked for an acceptable gain. With the “maximin”, we strive for the greatest gain fixing on the amount of loss we are willing to accept. Probably most frequently employed is a mixed strategy of striving for a reasonable gain avoiding undue risks (Bass, 1983, p. 71).

Clothing retail buyers may set up a standard to choose a product line through previous buying-planning process when establishing merchandising plan regarding price, quality, and store image. Detailed empirical research regarding decision rules for clothing retail buyers is rarely found in the academic arena.

Forecasting Short-Term Sales

For forecasting, clothing merchandise is grouped into broad classifications, fashion or basic merchandise (Rabolt & Miler, 1997). The forecasting technique of the two merchandise groups is different. Fashion goods must be monitored more frequently than basic goods. Fashion merchandise is usually surveyed on a weekly basis; whereas, basic merchandise does not require such frequent attention. The sales forecasting process for an assortment plan is distributed by the product classification process; therefore, the sales forecasting process can be illustrated with a tree-structured model. Tree-structured sales forecasting for assortment plan can be a hierarchical breakdown of quantity order of garment categories for a season with product segmentation by fashion sensitivity, color, and size variation for a product (Kang & Kincade, 1998). Sales forecasting for fashion goods is built for a short-term period and must allow for flexibility.

Sales Forecasting Methods & Analysis

Forecasts are major components of the business decision-making process and forecasting technique range from simple to complex (Herbig et al., 1993). The methods of sales forecasts, used by planners, can be either objective or subjective in nature. Objective methods can be statistical or another well-specified process for forecasts. Subjective methods are based on informal, experimental and intuitive processes and often referred to as judgmental forecasting (Gordon et al., 1997). Goodman (1954) investigated sales forecasting methods by several case

studies and classified seven forecasting methods: (a) jury of executive opinion, (b) sales force composite, (c) correlation analysis, (d) trend and cycle analysis, (e) market forecast, (f) product-line analysis, and (h) end-use analysis. Keay (1972) classified sales forecasting methods in his book Marketing and sales forecasting, as follows: (a) obtaining a consensus (*e.g.*, consensus from consumer group, Delphi method); (b) statistical projection (*e.g.*, correlation analysis); (c) deterministic situations with no random elements (*e.g.*, multiple regression analysis); and (d) prediction under uncertainty (*e.g.*, frequency table and conditional probability). Hurwood, Grossman and Bailey (1978) categorized forecasting methods in the book, Sales forecasting: (a) judgmental methods, (b) sales-force estimation, (c) user's expectation, (d) traditional time-series analysis, (e) Box-Jenkins Analysis, (f) econometric or regression models, (g) input-output analysis, and (h) new-product forecasts. In summary, for SKU-level forecasts, consumer companies may use the following methods: (a) decomposition, (b) exponential smoothing, (c) regression analysis, and (d) jury of executive's opinion (see Table 4).

Decomposition is a sales forecast which split the total sales forecast for the individual forecasts of the each product line and SKU level by importance rating or profit. Regression analysis is an approach to forecasting that examines relationships between sales and external variables that affects sales, such as product quality, advertising, and markdown (Mentzer & Schroeter, 1994). Exponential smoothing and moving average is a weighted moving average of past sales (*e.g.*, monthly or quarterly data) with considering of seasonal factor and the irregular component (Hurwood et al., 1978). Jury of executive opinion is a sales forecast based upon a cross section of a small expert group or key executives (Goodman, 1954).

Herbig, Milewicz, and Golden (1993) found significant differences in the buying process between large and small companies but limited differences in the forecasting behavior between industrial-product companies and consumer-product companies. In opposition, Khan and Mentzer (1995) found that consumer-market companies and industrial-market companies use different sales forecasting techniques to adjust to different buying-selling situations. In their study of sales forecasting in consumer and industrial firms, consumer companies relied on regression analysis, jury of executive opinion, decomposition, straight-line projections, and life-cycle analysis. For SKU-level forecasts, consumer companies use more regression analysis, jury of executive opinion, and decomposition than used by industrial-market companies (Khan & Mentzer, 1995) (see Table 4). If clothing retail buyers only sell basic items year round, planning

assortments will be less complicated; however, with frequent changes in fashion trends, keeping inventories and balancing sales of fashion product assortments are more difficult than basic, staple products (Francis & Brown, 1985-86). In regarding the nature of fashion products, the forecasting methods used by clothing firms may be different from ones used by non-clothing companies.

The sales forecasting activities for non-clothing products are often discussed in books and articles (*e.g.*, Adams, 1995; Mentzer, 1993; Mindy, 1992); however, the sales forecasting techniques for fashion retail merchandise, which consider fashion sensitivity in the analysis, are rarely discussed in the academic area. The sales forecasting manager of the L'eggs Products, Inc. (Michel, 1991-92) suggested that changes made to the forecasting process are important for the company's profit. When improving the forecasting process more systematically, her company had the following benefits: (a) reduction in work and time for forecasting activities; (b) unambiguous sales direction due to effective communication; and (c) less friction among various functional areas. The L'eggs Products, Inc. (Michel, 1991-92) has established a forecasting process as follows: (a) determining company-wide decision and policy, (b) analyzing past sales results for a particular brand based on a regression model, (c) reviewing marketing plans, (d) anticipating sales levels of each promotional events, (e) forecasting styles level quantity for each product line, and (f) planning each unit quantity. In every review meeting of forecasts, all major functional individuals that contribute to the forecasting process are present.

Forecasting Style Order Quantity

Clothing sales forecasting is also significantly associated with changes in fashion trends due to the aesthetic, social, and symbolic aspects of clothing products (Kaiser et al., 1995). Sproles (1979) suggested eight methods of fashion specific forecasting as follows: (a) historical continuity of fashion change, (b) measurement of fashion diffusion, (c) consumer survey, (d) consumer panels, (e) test marketing of new styles, (f) monitoring major centers of fashion creativity, (g) trends in consumer expenditure, (h) diffusion curve analysis. Retail buyers may extract quantitative forecasts from qualitative data or may only use quantitative data for quantitative forecasts based on their logic or company logic. In summary, clothing retail buyers may or may not use some of following short-term forecasting methods for assortment-planning: (a) decomposition, (b) product life-cycle analysis, (c) exponential smoothing, (d) regression analysis, (e) jury of executives, and (f) Sprole's (1979) fashion forecasting methods.

Table 4. Sales Forecasting Methods

Gordon, Moris, & Dangerfield (1997)	Goodman (1954)	Key (1972)	Hurwood, Grossman, & Bailey (1978)	Consumer Company's Forecasting Methods Khan & Mentzer (1995)
Objective Forecasting	Sales force composite Correlation analysis Product line-analysis Trend and cycle analysis End-use analysis Market analysis	Statistical projection Prediction under uncertainty Deterministic situations with no random elements	Sales force estimation Traditional time-series analysis Exponential smoothing Box-Jenkins analysis Input-out analysis Econometric or regression models	*Decomposition. Straight-line projection Life-cycle analysis **Exponential smoothing *Regression analysis
Subjective Forecasting	Jury of executive opinion	Obtaining consensus	Judgmental methods User's expectation	*Jury of executives opinion

* Methods used for SKU-level forecasts by consumer companies.

** The most recommended methods for SKU-level forecasts for consumer companies by Khan and Mentzer (1995).

Forecasting Color Order Quantity

After selection of a color line, retail buyers have to decide quantities or importance for each color. For quantitative forecasting of color demand for the product, retail buyers may use last season’s sale and a color counting process (*i.e.*, counting a certain color frequency among color information sources). Empirical research regarding quantitative color forecasting techniques or methods is not available.

Forecasting Size Order Quantity

Clodfelter (1993) stated that size decisions for a product classification are based almost entirely on past records, because size requirements for customers remain fairly consistent from one period to another, and the size distribution of products sold during the past season is usually an indication of future demand. Information sources for size demand forecast may be demographic size distribution information, experts’ opinion of size distribution related with each style, and past sales records. Empirical evidence on size forecasting is not available.

Table 5. Forecasting Methods for Clothing Product Assortment-Planning

Consumer Company’s Forecasting Methods (Khan & Mentzer, 1995).	Fashion Forecasting Methods (Sproles, 1979)	Forecasting Methods for Assortment Plan (Current Study)
Decomposition	Quantitative Forecasts:	Decomposition
Straight-line projection	Measurement of fashion diffusion	Product Life-cycle Analysis
Life-cycle analysis		Exponential smoothing
Exponential smoothing		Regression analysis
Regression analysis		
Jury of executives’ opinion.	Qualitative Forecasts:	Jury of executives’ opinion.
	Historical continuity of fashion change	Historical continuity of fashion change
	Consumer survey	Consumer survey or panels
	Consumer panels	Test marketing of new styles
	Test marketing of new styles	Monitoring major centers of fashion creativity
	Monitoring major centers of fashion creativity	Trends in consumer expenditure
	Trends in consumer expenditure	

Characteristics of Women's Clothing Retail Store

By the early 20th century, retail buyers established department stores and specialty stores in big cities to sell ready-to-wear to consumers. From early retailing to the 1950s, clothing retailers worked with manufacturers to produce ready-to-wear products to satisfy the their customers' needs and suggested fashion trends for manufacturers (Jarnow & Dickerson, 1997). New and different types of retailing are continuously evolving to adjust for changes in circumstantial conditions, and each type has initiated unique and often new operational methods (Jarnow & Dickerson, 1997).

Clothing products are sold in various channels such as specialty stores, family-wear stores, department stores, discount stores, mail order, TV shopping, and Internet shopping. Although many, once widely different, types of retailing now overlap, many of their distinctive operational characteristics still exist. Based on their distinctive characteristics, the Standard Industrial Classification (SIC) system for all retailing activities designates certain categories for clothing (Jarnow, J & Dickerson, K.G., 1997). For example, the SIC 56 indicates retail stores which are primarily engaged in selling new clothing and related items for personal wear and adornment. The SIC 53 is the major group including retail stores that sell a number of lines of merchandise, such as dry goods, clothing accessories, furniture and home-furnishings, small wares, hardware, and food (Infotrac, 1997). According to Market share reporter (1998), the dollar amount for the women's clothing sales by outlet in 1995 was \$ 114.6 billion. Lazich (1998) reported that the leading distribution channel of women's clothing channel was department stores (SIC 5311: 30.2%) followed by women's clothing stores (SIC 5621: 24.3%).

SIC 5621 Women's Clothing Stores are establishments primary engaged in the retail sale of a general line of women's ready-to-wear clothing. This industry also contains establishments basically engaged in the specialized retail sale of women's coats, suits, and dresses (Infotrac, 1997). This category is generally named as specialty stores of women's clothing (Clodefelter, 1993; Donnellan, 1997). In the past ten years, this type of store increased market share from 15% of about \$108 billion of the women's clothing market (Naisbitt, 1989) to 24.3% of \$114.6 billion of the women's clothing market (Lazich, 1998). According to General Business File ASAP, 459 stores are classified into this category. The revenues of eighty leading stores ranged from \$7881

million to \$50 million sales per year. The employees of this category count 34.4 thousand in 1990 (EIU Special Report, 1992).

SIC 5311 Department Stores are retail stores carrying a general line of clothing, such as suits, coats, dresses, and furnishings. Department stores must carry men's/ women's clothing and either major household appliances or other home furnishings. These products and other merchandise lines are normally arranged in separate sections or departments with the accounting on a departmentalized basis. The functions of separate sections are integrated under a single management system. The stores usually provide their own charge accounts, deliver merchandise, and maintain open stocks. These stores have 50 or more employees. Establishments, which sell a similar range of merchandise with less than 50 employees, are classified in industry 5399. Establishments which do not carry all of these general lines of merchandise are classified according to their primary activity (Infotrac, 1997). General Business File ASAP reported that 362 stores are classified in this category. The revenues of 120 leading stores ranged from \$104,809 million to \$200 million sales per year. The employees of this category numbered 3,181.2 thousand in 1990 (EIU Special Report, 1992).

Clothing Product Classification

Most retail buyers classify the merchandise in their store into broad product categories to organize and understand detailed-sales situations. Each of these broad product categories could be further divided into subclassifications (Clodefelter, 1993). For merchandising and control purposes, each classification (*i.e.*, product category) and subclassification is usually assigned an identification number. The National Retail Federation has developed a Standard Classification of Merchandise (SCM) coding system that classifies merchandise using a four-digit code.

Women's Clothing Classification

Women's clothing is classified as SCM 1000, which is subdivided into subclassifications such as: (a) 1100 for cloth and all weather coats; (b) 1200 for leather and fur outerwear; (c) 1300 for women's dresses and suits; (d) 1400 for formals; (e) 1500 for bridal, maternity, and uniform; and (f) 1600 for sportswear tops. The subclassifications can be further subdivided. For example, women's dresses can be subdivided as daytime dresses and evening dresses. The SCM has not been universally accepted, but the concept is progressively discussed by retail buyers. A standard coding system is required to develop an EDI system.

Women's Dress Market

WWD (May 8, 1996) expected that for that coming seasons, (a) dresses would share 61.5% of tailored of women's clothing market, (b) women's clothing stores would control about 27% of the women's dress market, and (c) department store would share about 26% of women's dress market. Women's clothing stores account for about 11% of their sales from dress items, and department stores account for about 12% of women's clothing sales (WWD, May 8, 1986). The sales of dresses increased for several years because of the women's managerial work force, the need of office wear, and women's income increased. The thirty-five to forty-four age group is composed of major consumers of tailored-clothing and account for 30 % of the market (WWD, May 8, 1986). March to June is the best selling months for dresses and accounts for about 40% of annual sales, and the next best selling time is Labor Day sales promotions in September, when 57% of dresses are bought at promotional prices.

Depth and Breadth Arrangement of Women's Dresses

The number of choices within each brand or product category is called the depth of assortments. Breadth relates to the number of product lines carried within a product classification (Clodfelter, 1993). A narrow and deep assortment plan helps retail buyers to focus on a bestseller product category with a wide selection of colors and sizes in their stores. The narrow and deep assortment plan may often be established for a style assortment, and customers may not be offered a wide selection of product styles in any store. To understand the depth and breadth of an assortment plan, a simple figure illustrates the idea (see Figure 3). On the other hand, stores, such as department stores, may offer wide stock breadth and very little depth - a broad and shallow assortment plan. For example, a women's clothing store may offer several styles of women's dresses, but all the dresses are blue, white, or black with a small size variation.

	Width of Dress in Assortment Plan					
<u>Style Range</u> <u>by trend</u>	A: New	B: Growth	C: Maturity	D: Decline	E: Classic	F: Fad
Chosen Style for Brand A		X	X		X	
Chosen Style for Brand B	X	X				X
Depth of Each Style	(Quantity per style)					
	Fabrics					
	Colors Range (Quantity per color)					
	Size Range (Quantity per size)					
	Total quantity					
	Depth of sale/ buy					

Figure 3. An Example of Assortment Plan for Women's Dresses (Adapted from Atkinson's range planning, 1995)

CHAPTER III: RESEARCH FRAMEWORK

Purpose of Study

The purpose of this study was to develop an assortment-planning model for women's clothing retail buyers by integrating a conceptual assortment planning and a practical-use assortment planning model.

Objectives

1. To identify the procedure of assortment planning.
2. To identify information-search activities in the assortment-planning process.
3. To identify qualitative evaluation activities in the assortment-planning process.
4. To identify quantitative evaluation activities in the assortment-planning process.
5. To identify product selection forecasting activities in the assortment-planning process.
6. To identify sales forecasting activities in the assortment-planning process.

Research Methodology Framework

This research built three types of assortment-planning models: (a) a conceptual model based on secondary data analysis, (b) a practical-use model based on interviews using a questionnaire and a set of activity cards, and (c) a suggested model based on configuration of the two previous models. Integrated DEFinition (IDEF) Functional modeling method was used to analyze data and to illustrate the three types of assortment-planning models. This chapter contains the following: sample selection process, data collection process, and data analysis.

This study adopted a research methodology framework used by Regan (1997) in her research, Concurrent engineering framework for apparel manufacture. The research developed by Regan (1997) was an interpretational qualitative case study to develop concurrent engineering apparel framework. Regan (1997) used a two step qualitative research process. First, a literature review was developed into an *as is* environment model. This first model was refined into a *to be* environment model. The second model was further refined and evaluated with additional industry interviews.

As discussed in Chapter 1 and 2 of this proposal, no research existed that suggests a working model of assortment planning; therefore, this study had the limitation of determining the initial *as is* environment for assortment-planning based only on conceptual background research. This research illustrated the *as is* environment with the following questions: (a) what was a conceptual assortment-planning model, (b) what was a practical-use assortment-planning model for clothing retail buyers, and (c) what could be the finally suggested assortment-planning model. A potential *to be* environment was not determined in this research.

Despite the difference in research purposes, the data analysis technique used by Regan (1997) and Regan, Kincade, and Sheldon (1998) still provided a good direction for this research framework, because their research tested validity and reliability with established validation processes for qualitative research methods and qualitative data-analysis techniques. Regan (1997) used IDEF0 function modeling method to analyze data and illustrate results. To build an IDEF0 model, the research followed the IDEF0 rules and semantics; therefore, the sub-variables of this research, which were used to categorize data, were determined by IDEF0 semantics. Before an explanation of the variables of this research, the IDEF0 conceptual framework is briefly introduced in following section.

IDEF0 Conceptual Framework

Many process-mapping methods from traditional tools such as flow diagrams to complex simulation software models were found in literature (Feibus, 1997; Jayaraman, 1990; Kettinger, Teng, & Guba, 1997; Mason, 1997; Rasmus, 1988; Rupert, 1995; Sellers, 1997; Stoughton, 1996). One reliable method for process capture was the ICAM DEFinition language (*i.e.*, IDEF) developed by the Air Force Program (Jayarman, 1990; Kettinger et al, 1997; Mason, 1997). ICAM stands for the Integrated Computer Aided Manufacturing (Mason, 1997). The IDEF contains several modeling methods such as IDEF0, IDEF1, IDEF2, IDEF2, and IDEF3. This research used the IDEF0, a functional-activity processes-capture method. The US Air Force (IDEF World Wide Web, 1998) defined IDEF0 as “an engineering technique for performing and managing needs analysis, benefit analysis, requirements definitions, functional analysis, system design, maintenance, and baselines for continuous improvement” (p. 1). The IDEF0 was established to analyze only manufacturing processes. Kettinger, Teng, and Guha (1997) suggested that IDEF0 could be used to define and to analyze redesign and reengineering of

business planning process, because IDEF0 models contained necessary process capture variables: task inputs and outputs, function and methods, controls, and their interrelationships (see Figure 4). The IDEF0 is composed of syntax and semantics. The syntax of IDEF0 includes boxes and arrows. A box illustrates a verb or verb-phrase description of a functional activity. Arrows convey data or objects related to functions to be performed (IDEF World Wide Web, 1998). Task inputs are data that are needed in an activity step of process and are written to the left of a functional-activity box. Constraints are any difficulties or limitations on a functional activity. Task outputs are the results created by a functional activity in a diagram and indicated by arrows from the right of the box. Mechanisms are the method or technique to accomplish a functional activity and are written on the bottom of a functional activity. Connection means the interrelationship with other diagrams (Regan, 1997).

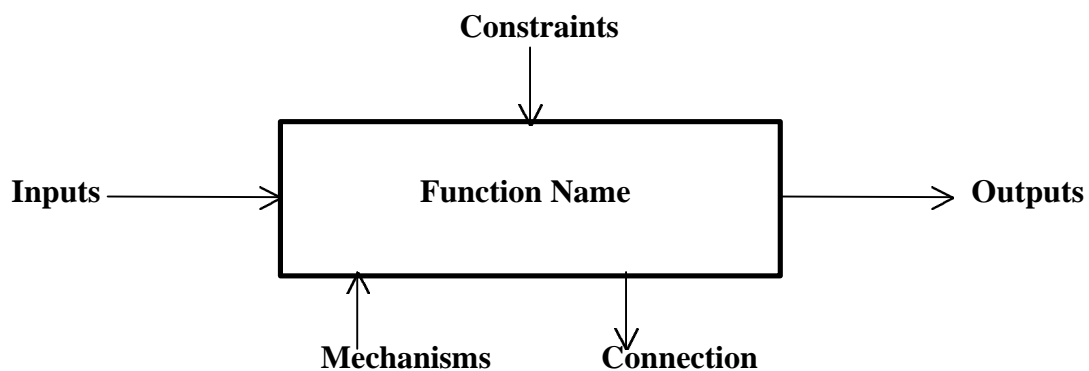


Figure 4. Conceptual Framework of an IDEF0 Diagram Unit (IDEF World Wide Web, 1998).

An IDEF model is composed of a hierarchical series of diagrams that display operational levels of detail-describing functions and their interrelationships with other diagrams in a context of an IDEF model. The three types of diagrams are as follows: graphic, text, and glossary. The graphic diagram defines functions and functional relationships with box and arrow syntax and semantics. The text in an IDEF diagram and glossaries in small, attached text-boxes provide additional information in support of graphic diagrams (IDEF World Wide Web, 1998). The hierarchical series is illustrated by A-0 and A0 diagramming techniques (Marca & McGowan, 1988). An A-0 diagram contains the most abstract activities and is placed on top of an IDEF0

model. The A-0 diagram is broken down into many operational or A0 diagrams. Each diagram is a conceptual framework of an IDEF diagram unit, which is represented by a functional activity. Each A0 diagram is hierarchically broken down to lower levels, and the operational levels are illustrated by numbers after alphabet letter such as: A1, A11, A112 (see Figure 5).

Variables

To reveal the models of conceptual assortment-planning, practical-use assortment-planning, and suggested assortment-planning, this research investigated each step of the assortment-planning process model (see Figure 2): (a) problem recognition, (b) information-search activities, (c) qualitative-evaluation activities (d) quantitative evaluation activities, (e) product selection forecasting activities, and (f) sales forecasting activities. The research question of this research was operationally categorized with IDEF variables: (a) inputs of each activity, (b) functions of each activity, (c) mechanisms of each activity, (d) constraints of each activity, (e) outputs of each activity, and (f) interrelationship with other activities. These variables were used to build the contextualization table needed for data analysis (see Appendix A).

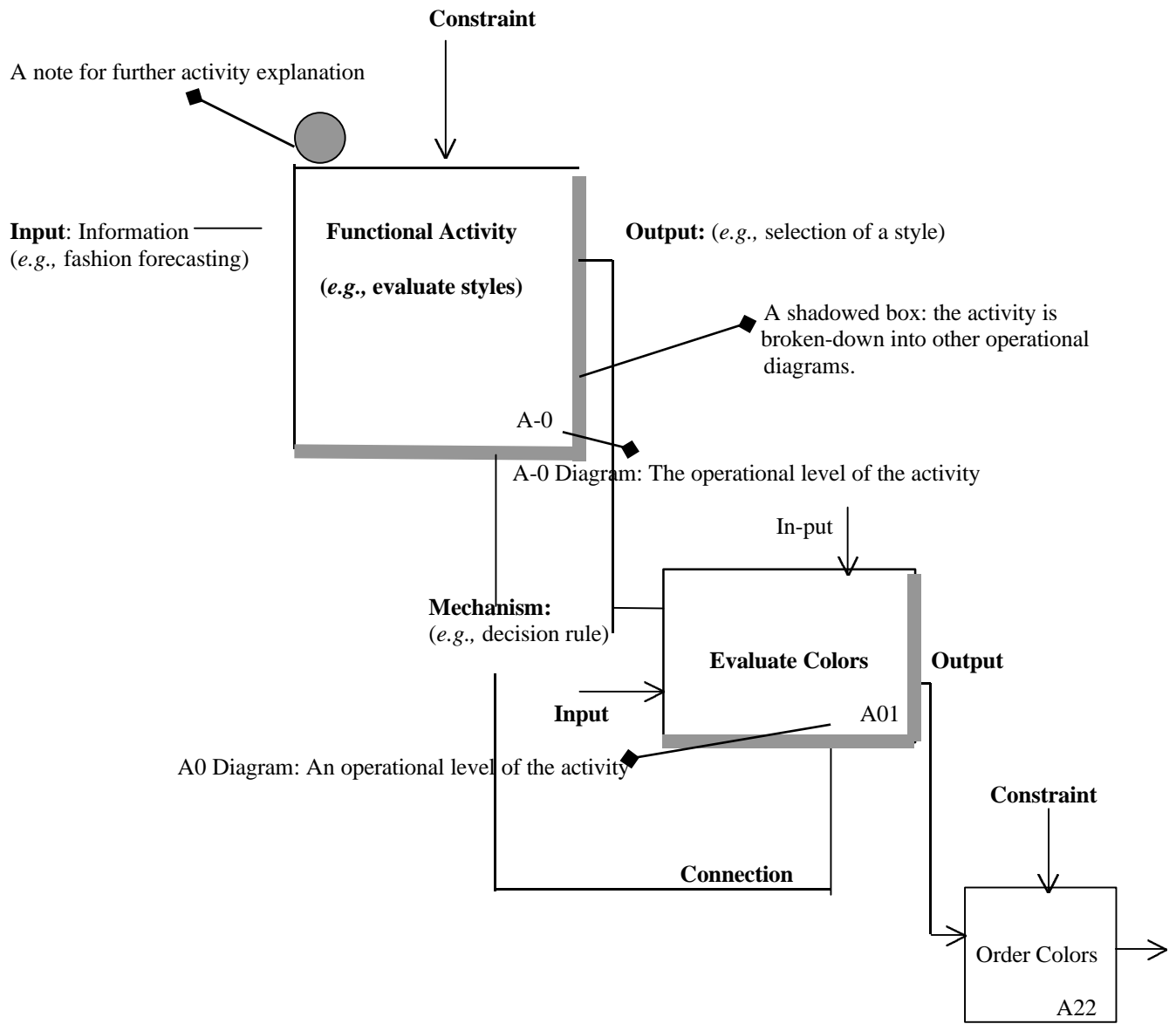


Figure 5. Operational Framework of IDEF0 Diagram (Adopted from Regan & Kincade, 1998).

CHAPTER IV: DEVELOPMENT OF CONCEPTUAL MODEL

Introduction

The purpose of secondary data analysis was to develop a conceptual assortment-planning model based on a literature review. Most articles included only pieces or stages of the assortment-planning activities of the clothing industry; therefore, this study categorized and organized the pieces of assortment-planning activities illustrated in literature and suggested a model of the assortment-planning process for clothing retail companies. Another important purpose of the conceptual model was to guide interviews to a correct direction based on the model or flow-chart developed by secondary data analysis. Secondary data are data that are previously collected for similar purposes from the past (Malhortra, 1993). In this study, the secondary data included text books, journal articles, and trade publications.

Data Conversion

Data conversion was the process of changing the original data format to suitable format to accomplish the research purpose and to be matched to data analysis methods (Zikmund, 1994). To convert data into IDEF0 syntax and semantics, the authoring process was required. The authoring process for secondary data analysis for this research was as follows: (a) transcribe data in articles and books to a text without any conversion; (b) categorize data with research variables; (c) de-contextualize data; (d) code and count data; and (e) re-contextualize data with IDEF0 modeling method (Regan, 1997; Tesch, 1990; Vass, 1995).

Transcribing data. The assortment-planning explanation written in articles and books was reviewed. To set a limitation of input data, the assortment-planning model was identified as a set of activities that explain the determination of quantity and variety of goods that a retail company offers for sale at any time (Easey, 1995). The assortment-planning transcription included the following variables: problem recognition, information-search, qualitative evaluation, quantitative evaluation, product selection forecasting, and sales forecasting. The document developed in QSR NUD*IST® contained all information found in secondary sources related to the listed variables. For this review, the transcription notes were presented as the Review of Literature.

Decontextualization. This researcher carefully read the context of the text and categorized the text into segments by research variables (Tesch, 1990). In decontextualization, passages of text were tagged with codes to indicate the variables represented by the passage. A contextualization table (see Appendix A) was used to direct categorization, to index the categories of the segmented text, and to increase the research-construct validity.

Recontextualization. After coding data, text and words were assembled by coded categories to prepare interpretation of data. The assembling process of coded data is called recontextualization or content analysis (Silverman, 1993; Tesch, 1990). The data was verified by cross-checks and content analysis. The cross-checks mean comparison of data from one source to other sources (Zikmund, 1994). Content analysis involves categorizing themes used in qualitative data (*e.g.*, text) and then counting the number of words (Silverman, 1993). To decide a theme from several different words with the same meaning, a majority rule was used.

After categorizing, identifying, and explaining the functional activities, template functional-activity cards (see Figure 6), representing an IDEF0 diagram (see Figure 7) and written functional activities, was drawn to see the order of activities. The card was placed in a table and arranged into IDEF0 flow-chart format based on the data analysis. This card was used also for an interview. The card was numbered by the format in the table. The numbers on the activity cards was determined as the A-0 or A0 diagram number of IDEF0 assortment-planning model. After recontextualization, the determination and explanation of each variable was established. A secondary person, who knew the meaning of terms in assortment planning, assisted with contextualization for determination and explanation of each variable. This assistance reduced the bias in choosing words from categorized text and in establishing steps of assortment planning (Silverman, 1993).

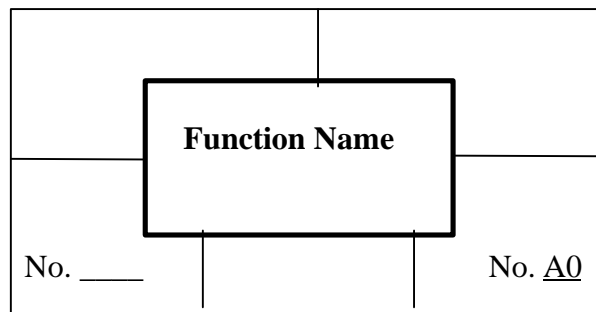


Figure 6. Activity Card Template.

IDEF0 modeling. The recontextualized document was applied into an IDEF0 model. The procedure of conceptual assortment-planning was represented by A0 diagrams and functional-activity numbers at the bottom of box. To create a conceptual assortment-planning IDEF0 model, the process modeling software, VISIO® was used.

Validity

The validity of the data was reviewed in two ways. The process of reviewing secondary literature and decontextualizing the information from literature into component parts provided some assurance of content validity. Experts also evaluated validity through the review of kits. The expertise was identified by the following standards: (a) teaching experience of clothing retail buying, (b) working experience in clothing retail company, (c) publishing experience of clothing retail buying relevant topics, or (d) completed at least three graduate courses regarding clothing and textile business. If a person fulfilled at least two standards, this research identified the person as an expert of clothing retail buying. Three experts in terms of clothing retail buying reviewed a kit of diagrams. The kits of a conceptual assortment-planning model were devised as three parts: (a) problem recognition and information search; (b) qualitative decision making, and (c) quantitative decision making. The diagram kit was a set of IDEF0 diagrams representing a group of activities. After three experts reviewed the kit of diagrams, the conceptual assortment-planning model was revised. An instrument including questions regarding the conceptual model and activity cards for the questions was prepared for the interview with retailers.