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*Araştırma Makalesi / Research Article*

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## **0-12 Yaş Grubu İçin Giysi Koleksiyonu Hazırlama ve Ürün Maliyetlendirme Aşamalarının İncelenmesi**

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### **Öz**

Giysi koleksiyon hazırlama süreci fikir aşamasından satış aşamasına kadar pek çok süreçten oluşmaktadır. Ürün tasarımına ve maliyetlerine etki eden çeşitli faktörler bulunmaktadır. Hazırlanan koleksiyonlar bebek ve çocuk gruplarına yönelik ise tasarım, estetik, kalite, satılabilirlik ve maliyet faktörlerinin yanında sağlık ve güvenlik standartlarına uygun ürün kavramı da önem kazanmaktadır. Bu çalışmada 0-12 yaş grubuna yönelik koleksiyon hazırlama prensipleri ve aşamaları, ürün maliyet hesabı çalışmaları ve koleksiyon maliyetine etki eden faktörler incelenmiştir. Hedef pazar olarak Türkiye'nin tekstil ihracatında büyük öneme sahip olan Avrupa pazarı seçilmiştir. İzmir'de bulunan ve ihracat yapan bir hazır giyim ve konfeksiyon firmasının Zara erkek çocuk ve erkek bebek departmanları için hazırladığı sonbahar-kış 2016 koleksiyonları incelenmiş ve elde edilen sonuçlar değerlendirilmiştir.

**Anahtar kelimeler:** Koleksiyon, çocuk giyim, maliyet, geleneksel maliyet yaklaşımı, hedef maliyet yaklaşımı.

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## **A Research about the Preparation and Costing Processes of 0-12 Age Garment Collection**

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### **Abstract**

Garment collection preparation consists of several processes from design idea to selling to last consumer and it is a costly process when compared with mass production. There are various factors that affect the product design and product cost. If the designed products are for babies and kids groups, suppliers need to care about health and safety conditions besides the design, aesthetics, quality, cost and marketability. At this research, the principles, the production steps and the cost factors of 0-12 age baby boys and boys garment collection processes were examined. Because of its big importance for Turkish textile and apparel industry, Europe was determined as target market at this study. Traditional costing and target costing methods from contemporary costing systems were used for cost calculation. It has been observed that the costs of the collections increase according to the fabric type, auxiliary materials, accessories, side processes and labour.

**Keywords:** Apparel manufacturing, Collection, Kids garment, Cost calculation.

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### **1. Introduction**

Nowadays textile sector's production terms and product profiles have been changed regarding to customer demand revisions. Since the life time of clothing fashion gets shorter and fashion concept varies by product, suppliers serve with short term deliveries and wide product ranges. Being aesthetic, having visual attractiveness, originality and difference are demanded features in addition to usability and utility of the garment. So suppliers need to focus on designing and collection works. Unquestionably, fashion phenomenon leads the garment collection's design process. But "commercial gain" target

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mustn't be underestimated neither. In an increasing competitive conditions of textile sector, suppliers need to design and offer new collections that fit with up-to-date trends to increase their marketspace. High quality, suitable price policy, short delivery terms, etc. are the other indispensable services to be achieved in the competitive market. In order to stay competitive in a field as challenging as the apparel sector, it is imperative that target consumer groups be determined and designs prepared in accordance with their taste and needs.

Fashion is one of the most effective elements of textile and clothing market in developed countries. Therefore exporter companies at developing countries needs to recognize the importance of the design factor. Since the product has an accurate relationship between the sales and the price of the style reflected by the product, the more the product reflects the latest fashion and style, it has higher chance of being sold with higher prices [1]. Understanding how consumers interpret clothing and how groups make judgements about fashion products is critical for fashion retailers as they can maximise satisfaction by providing features that appeal to consumer needs. Consumers with high fashion interest tend to consider fashion as a lifestyle, holding appearances in high regard and possessing advanced levels of fashion confidence, often exhibiting an orientation towards fashion leadership [2].

Suppliers focus on product design and development activities to meet customer demands and keep their marketspace. Companies achieves two goals at the same time with the customer-focused new product design process. Firstly they can design the good by consideration of product characteristics and operational qualifications. Secondly a successful cost management will be ensured, so company will ensure to sell the product at the price that the customer would be willing to pay. In this process, cost management will be achieved with target costing system [3].

Regarding to the rapid change of fashionable products and customer demands, there are more than two seasons at textile industry lately. Nowadays there are two or three different micro seasons under two basic seasons. The increase in the decisive role of fashion in consumption also affects the production processes. As the number of batches in production increases, the batch sizes become smaller, which makes it necessary to use flexible production systems. Fashion changes rapidly regarding to customer preferences and demands, so manufacturers needs to develop fast production and deliveries methods. As a result of this change, companies offer fast-changing products called "Fast Fashion" at affordable prices to the customers [4]. Every segment of the textile industry plans and produces products well ahead of the retail selling season and the industry has to operate within tight seasonal schedules and lead times. The total "design to production" cycle – from designing fabrics to products arriving in the shops – is lengthy given the shortness of product lives and the potential for rapid changes in style [5]. Garment collections are designed according to the current fashion trends by considering product lines and characters of brands. Customer's needs and requests, fashion trends, age, gender and season mustn't be disregard during collection preparations. A well made collection is the conclusion of series preparation work. Successful collection management can be achieved by getting know about customer groups and related market, following latest trends, interpretation of customer needs and requests, preparing a fast, well controlled and systematic collection. In the light of these information company should ensure the customer satisfaction at preparation and distribution of the collection. This process is a faster, more controlled and consecutive cycle at "fast fashion" concept [4].

Quick response proposes to make the chain more competitive through the speeding up of time to market, the continuous transmission of information from the customers and, beyond that, along all the links in the chain and the construction of value with the improvement of the quality of service to the customer, on the one hand, and the overall decrease of entrepreneurial risk along the chain, on the other. The "design time" should generally be understood to be the time that lapses between the beginning of fabric design and the realization of the sample collection of the tailoring company. The shorter this time is, the more fabrics and models can reflect the expectations and needs of the final customer [6]. Collections are formed as a result of careful research and good planning. All the materials in the collection and all the styles that are designed for collection must fit well with each other. Collection must show the character of the brand it belongs to [7].

The main element of the garment collection is cloth designing. The imagination, foresight and ability of the designer are important in the clothing design. If a work reflects a thought from a certain goal and it exhibits an original result with creativity, it can be said that this work has high design quality [8]. The collection of product information is a key part of interactivity, and the absence of fashion information is an element that has been recorded as an issue significantly concerning consumers. Due

to the “cyclical nature of fashion” and the ongoing changes of trends, the consumer’s “knowledge about fashion apparel products quickly becomes outdated”. Thus, regular fashion information and updates are becoming increasingly relevant and useful for consumers [2]. Textile designers have to be careful at designing of new styles, fabrics and artworks. These should fit with the latest fashion trends and also characteristics and product line of the customer brand. Designers should be creative and unique; their works should separate their company from competitors [8]. Original designs have an important role in the apparel industry.

Collection types are stated in three groups and they are usually listed as follows:

- Commercial Collection: The commercial collection is being prepared for a brand and aims to earn the appreciation of the individuals as well as to make money for the owner / distributor / licensee of the brand [9].
- Fashion Collection (Haute Couture Collection): These collections consist of fashion designers’ work that reflect their own thoughts and feelings. Designers exhibit the collection under their own names.
- Collections based on customer needs and requests: These collections are prepared regarding to customer demands and needs. The likes of the designers are at the second plan.

Garment collections belong to commercial collection group. The collection preparation steps vary regarding to product group of collection and these steps can be seen from the below list:

- Determining the target market
- Theme research
- Style design
- Colour, fabric, artwork and accessory research and development
- Prototype production
- Preparation of series and re-production of the collection
- Presentation of the collection
- Cost calculation of collection
- Selection of collection
- Production plan

High costs are the biggest complication at textile and apparel industries. This situation is same for our country too; high costs of raw materials, labor and energy cause difficulties in the world market competition [10]. One of the most effective ways to get ahead in the competitive environment is to reduce costs. Companies should care about costing process and determine the right costing method. Each company has different features, so the companies should select the appropriate costing method for their structures. They aim to protect the existing market shares firstly and then they work on to increase the market shares and keep the high profit values with the correct cost calculation methods.

Cost calculation can be done in the following steps in apparel manufacturing:

- Pre-Costing: It is done during product developing. It is an estimated costing method based on the time and cost information of similar styles that were previously produced. Technical style drawing which shows style details, fabric and accessory information are the guide.
- Detailed Costing: It is done after technical details of the style, fabric properties, and accessory information and then the prototype is produced. The unit product cost is calculated by adding percentages of production surplus, amounts of overheads and profit rates to the total cost.
- Accrued Costing: Unit material usage, wastage ratios, time studies and unit durations during production are determined. Increases and decreases at the total cost, unit input prices and efficiency are controlled, their reasons are investigated and precautions to be taken are discussed by the related departments [11].

The cost calculation factors of a garment are fabric costs, accessory and auxiliary material costs, labour costs, general expenses (overheads), profit ratio and transportation costs.

## **2. Materials ve Method**

### **2.1. Materials**

In this study, we worked with an apparel company which was established in 2004 in Izmir. The company is the manufacturer of well-known famous international buyers. The main production groups of the

company are women, men and children garments from the knitted fabrics. According to the company policy, the environmental and the social factors have big importance in all the production processes. It means the components of the products should not be harmful for the health and also the production conditions should not be contrary to the human rights. The company's health and safety standards are; clear to wear, safe to wear, green to wear (ecological products), tested to wear (garments that are produced with care for employees' rights and safety). After all standards are met, products can be labelled as "right to wear" (based on sustainability, consumer safety, ethical and ecological production). In this research; design, preparation of collection and cost calculation steps of the company were examined. The collection was prepared for an international buyer group's "boys" and "baby boys" departments for the "Fall-Winter 2016" season.

**Fabrics, auxiliary materials and auxiliary processes used in the collection:** The technical details of the fabrics used in the collection are shown in Table 1 and Table 2:

**Table 1.** The fabrics used for boys collection

Fabric	Composition	Weight (g/m <sup>2</sup> )	Process
30/30/10 3-Thread Fleece	100% Cotton	300	Indigo Dyed
30/30/10 3-Thread Fleece	50% Cotton - 50% Polyester	300	Yarn Dyed
30/30/10 3-Thread Fleece	50% Cotton - 50% Polyester	300	Plain Dyed
30/30/20 3-Thread Fleece	100% Cotton	260	Pre-Finished
30/1 Slubbed Jersey	100% Cotton	160	Indigo Dyed
30/1 Single Jersey	100% Cotton	150	Plain Dyed
30/1 Single Jersey	98% Cotton - 2% Polyester	150	With Colored Nope
30/1 1*1 Rib	100% Cotton	180	Plain Dyed
30/1 2*2 Rib	100% Cotton	350	Plain Dyed
30/1 2*2 Rib	100% Cotton	350	Indigo Dyed
60/1 Voile	100% Cotton	80	Plain Dyed-Indigo Dyed

**Table 2.** The fabrics used for baby boys collection

Fabric	Composition	Weight (g/m <sup>2</sup> )	Process
30/30/20 3-Thread Fleece	100% Cotton	260	Pre-Finished
30/30/20 3-Thread Fleece	100% Cotton	280	Template Printing
30/30 2-Thread Fleece	100% Cotton	200	Yarn Dyed
16/1 Slubbed Jersey	100% Cotton	190	Plain Dyed
20/1 Slubbed Jersey	100% Cotton	180	Plain Dyed
30/1 Slubbed Jersey	100% Cotton	160	Plain Dyed

The auxiliary materials used in the collection increased the attractiveness of the collection. All these materials have been tested for buyer's safety and health standards. Types of auxiliary materials and accessories are shown as follows:

- Button: 4 holes, Coconut shell, Size 14 and Size 18.
- Button: 4 holes, Polyester with wooden appearance, Size 16.
- Fastener: Metal, Size 14.
- Flat cord strip: 100% Cotton herringbone tape, 0.7cm and 1 cm width.
- Round cord strip: 100% Cotton, 0,6 cm width.
- Zipper: Type 3 brass oxide coated.
- Adhesive metal stud: Brass oxide coated, Size 14.
- Label: Leather, laser engraving.

The auxiliary processes used for this collection as follows:

- Water-based alllover printing,
- Digital alllover printing,
- Water-based piece printing,
- Photo printing,
- Cracking printing,
- Pigment printing with "Dip-dye" (a kind of batic effect) appearance,
- "Moonwash" washing (indigo dyed products are treated with chemicals at special machines to get different effects),
- Cord embroidery technique
- Quilting embroidery technique.

## 2.2. Method

**Theme, color, fabric, artwork and accessory research for collection:** The collection consisting of "boys models" was prepared on the theme of a "Casual Bones". The collection for "baby boys models" was prepared on the theme of a "Soft Forest".

Both "boys" and "baby boys" collections were prepared with single jersey, fleece and rib fabric types that are suitable for fall-winter season. Generally cotton and cotton-polyester blended fabrics with different weights and compositions were used. Basic style patterns were used and casually cut-out relaxed styles were made. Small details such as using of accessories, style and pattern details, creative artworks and different printing techniques, various product washing operations were used to be able to get more attractive appearances.

The general features of Casual Bones theme are as follows:

- Blue and grey colours,
- Bone and skull artworks,
- Slogan prints,
- Used appearances,
- Batic effects,
- Basic style patterns,
- Casually cut out styles.

The general features of Soft Forest theme are as follows:

- Green and grey colours,
- Animal artworks,
- Slogan prints,
- Used appearances,
- Basic style patterns,
- Casually cut out styles.

**The important standars for production processes:** The company pays attention to comply with general health and safety standards of the buyer. These standards are valid for all the materials (fabrics and accessories) and all the production processes like knitting, weaving, sewing, dyeing, printing, washing, finishing. The buyer works with a multinational testing firm. This firm provides inspection, verification, testing and certification services. All suppliers have to work regarding to these standards. The standards to be observed in the buyer child and infant groups are defined as follows:

Clear to wear (CTW) – Tests for health and safety product standards:

- The use of substances such as Formaldehyde, Arylamine, Phenol, Cadmium, Lead, Chromium, Nickel, Phthalate, etc. are harmful for health when they are above the certain levels. Suppliers should pay attention to be in acceptable limits for these substances in fabric, accessories, print or embroideries.
- pH range should be between 4,0 - 7,5 values.
- Especially required colour fastness tests for kids and babies garments are; sweating, dry and wet rubbing, water fastness tests. In addition to these tests, saliva fastness test is requested for babies' garments.

- Analysis of fabric compositions is also made according to standards. In particular, it is desirable that products that have direct contact with the skin should not contain any synthetic fibers.

Safe to wear (STW) – Product safety standard tests:

- Fabrics which do not contain Acrylic, Modacrylic, Nylon, Polyester, Wool, Olefine fibers or blends of these fibers and weight less than 85g/m<sup>2</sup> must pass the non-flammability test. 16 CFR II, Subchapter D, Part 1610, ASTM D1230 test method is used for flammability test.
- Products with integral small parts and/or accessories (buttons, snap fasteners, zippers) have to pass the tensile strength tests.
- Accessories on garments have to be without sharp corners.
- There are accidental risks at use of cords, strips etc. on kids' and babies' garment. "Visual inspects" are done to reduce these risks. Also essential precautions are taken with fixing seams.

**Preparation of designs and size tables:** The design department of the company makes researches in the direction of the themes which are determined by the buyer. The design team members use their own aesthetic and creativity skills for customer satisfaction. In addition to the aesthetics and originality of the styles, all designs should be sellable, producible and profitable (12).

The kids department's production body/age groups of the buyer's are 4-5-6-7-8-10-12-14 ages. For baby groups, this size range is 6-9-12-18-24 months and 2/3 - 3/4 ages. In design studies, a single size was determined for each group and design models were prepared at this size. The sample size was 6 age for boys group and 9-12 months in baby boy group.

In this research, the company didn't prepare a special measurement chart for each design. They worked with the patterns regarding to the measurements of the models which were generally worked. Similar previous designs or productions have been used as references and essential corrections and additions have been made.

### 3. Results

In this study, eleven styles were designed and samples of them were prepared. Five of these styles belong to baby boys and six of them belong to boy departments. All these styles were prepared by the company's design team. For all collection, company followed the STW and CTW standards that mentioned above.

Five styles of "baby boy" department Autumn-Winter 2016 collection are; BD50691(a), BD50713(b), BD50714(c), BD50722(d), and BD50381(e). All styles are named according to the company's own system. The photographs of baby boys' prototype samples are shown in Figure 1.



**Figure 1.** Styles BD50691 - BD50713 - BD50714 - BD50722 - BD50381 – collection samples

Six styles of "boy" department Autumn-Winter 2016 collection are Boy5299(f), Boy5322(g), Boy5332(h), Boy5335(i), Boy5337(j) ve Boy5350(k). The photographs of boys' prototype samples are shown in Figure 2.

Autumn-Winter 2016 garment collections of boys and baby boys departments were presented at the customer visit. The members of design and marketing departments presented collections in the buyers headquarters office. The following styles were selected by the customer at the meeting:

- Style BD50722 – Baby Boys Department
- Style Boy5322 – Boys Department
- Style Boy5332 – Boys Department

The cost calculation and delivery term studies were done for selected styles. After the price and delivery term agreement, the production processes were started.



**Figure 2.** Styles BD50691 - BD50713 - BD50714 - BD50722 - BD50381 – collection samples

The company’s general aim is to get orders for 10% of the prepared collections. This rate was 27% for the Fall-Winter 2016 baby boys and boys collections and it is higher than the target. It is possible to say that in early periods of the seasons, customer needs lots of different styles and designs. The company was achieved to use this niche time properly and prepared the collection on time and get the orders.

The cost calculation methods of the company are "traditional costing" and "target costing". The company uses the most appropriate cost calculation method in accordance to its own company structure for different orders. The target prices that are set by the customer are also effects the costings. If the foreseen production costs are higher than the maximum acceptable production costs, cost reduction precautions are considered. In order to get order for the selected collection styles, it is necessary to offer acceptable prices to the customer. At the same time it shouldn’t be disregard that prices should be workable and profitable for producer. The details of cost calculation for selected collection styles (BD50722 - Boy5322 – Boy5332) are shown in Table 3, Table 4 and Table 5.

**Table 3.** The cost calculation sheet of BD50722


COSTING SHEET				
Customer	Baby Boys	Date	23.10.2015	
Style Number	BD50722			
Fabric Weight	150-160 g/m <sup>2</sup>			
Fabric Detail	30/1 Full Shabbed Jersey %100 Co			
TL VALUES	TOTAL COST	QUANTITY	UNIT COST	NOTE
Cutting/Sewing/Packaging	3,35 TL			
Print (water based)	0,65 TL			front body - motive
Metal snap button	0,10 TL	2	0,05 TL	
General Accessory	0,90 TL			
<b>TOTAL TL</b>	<b>5,00 TL</b>			
EURO rate of exchange	3,15 TL			
<b>SUBTOTAL (EUR)</b>	<b>1,59 €</b>			
EUR VALUES	TOTAL COST	QUANTITY (kg)	COST (kg)	NOTE
Body Fabric	0,44 €	0,075	5,80 €	
Testing Cost	0,03 €			
<b>SUMTOTAL FABRIC (EUR)</b>	<b>0,47 €</b>			
<b>EUR TOTAL COST</b>	<b>2,05 €</b>			
WASTAGE	1,05			
	<b>2,15 €</b>			
PROFIT	1,05			
	<b>2,26 €</b>			
OVERCOME	0,25 €			
	<b>2,51 €</b>			
FOB PRICE	<b>2,51 €</b>			
CIF PRICE	<b>2,63 €</b>			
AGREED PRICE (FOB)	<b>2,50 €</b>			





**Table 4.** The cost calculation sheet of Boy5322

Costing Sheet				
Customer	Boys		Date	20.10.2015
Style Number	Boy5322			
Fabric Weight	150 g/m <sup>2</sup>			
Fabric Detail	30/1 Jersey %100 Co			
TL VALUES	TOTAL COST	QUANTITY	UNIT COST	NOTE
Cutting/Sewing/Packaging	2,85 TL			
Print (front+back body)	1,40 TL			water based
General Accessory	0,85 TL			
TOTAL TL	5,10 TL			
EURO rate of exchange	3,25 TL			
<b>SUBTOTAL (EUR)</b>	<b>1,57 €</b>			
EUR VALUES	TOTAL COST	QUANTITY (kg)	COST (kg)	NOTE
Body Fabric	0,81 €	0,155	5,20 €	
Pocket - %100 Co slubbed - indigo dyed	0,06 €	0,005	12,10 €	
Moonwash (pocket)	0,01 €	0,005	2,40 €	
Testing cost	0,03 €			
<b>SUMTOTAL FABRIC (E)</b>	<b>0,91 €</b>			
<b>EUR TOTAL COST</b>	<b>2,48 €</b>			
WASTAGE	1,06			
	<b>2,63 €</b>			
PROFIT	1,07			
	<b>2,81 €</b>			
OVERCOME	0,20 €			
	<b>3,01 €</b>			
FOB PRICE	<b>3,01 €</b>			
CIF PRICE	<b>3,13 €</b>			
AGREED PRICE (FOB)	<b>3,00 €</b>			



**Table 5.** The cost calculation sheet of Boy5332

COSTING SHEET				
Customer	Boys		Date	20.10.2015
Style Number	Boy5332			
Fabric Weight	150 g/m <sup>2</sup>			
Fabric Detail	30/1 jersey with coloured rope %98 Co - %2 PES			
TL VALUES	TOTAL COST	QUANTITY (mt)	UNIT COST	NOTE
Cutting/Sewing/Packaging	3,00 TL			
Print (water based)	0,40 TL			
Cord embroidery process	0,25 TL			
Cord acc.	0,27 TL	0,65	0,42 TL	
General Accessory	0,85 TL			
TOTAL TL	4,77 TL			
EURO rate of exchange	3,25 TL			
<b>SUBTOTAL (EUR)</b>	<b>1,47 €</b>			
EUR VALUES	TOTAL COST	QUANTITY (kg)	COST (kg)	NOTE
Body Fabric	0,95 €	0,142	6,70 €	
Ribana (1*1 rib %100 Co)	0,05 €	0,008	6,00 €	
Testing costs	0,03 €			
<b>SUMTOTAL FABRIC (EUR)</b>	<b>1,03 €</b>			
<b>EUR TOTAL COST</b>	<b>2,50 €</b>			
WASTAGE	1,05			
	<b>2,62 €</b>			
PROFIT	1,07			
	<b>2,81 €</b>			
OVERCOME	0,20 €			
	<b>3,01 €</b>			
FOB PRICE	<b>3,01 €</b>			
CIF PRICE	<b>3,15 €</b>			
AGREED PRICE (FOB)	<b>3,00 €</b>			



After costing studies, company shared the unit prices of selected collection styles with the customer. The offered prices were accepted by the customer. The order quantities for the selected styles are as follows:

- BD50722: 25.000 pieces
- Boy5322: 33.000 pieces
- Boy5332: 30.000 pieces



#### 4. Conclusion

Being in a long-term business relationship with the well-known international buyers is a status for the manufacturers. In addition, having a high number of orders in successive seasons guarantees the of production continuity for the supplier companies. Regarding to this factor, the company has been working hard to get orders from the buyer with great dedication, despite of the severe competition conditions, high quality expectations and low profit margins. Design, marketing, planning, production and finance departments works in good cooperation in order to provide high quality, fast and effective service at design, collection, cost accounting, production, quality control and delivery activities. The customer receives successful service with short term and wide product range.

The company focuses on collection design work and aim to offer aesthetic, attractive and unique products. Products in the collection should be trendy, remarkable, unique and innovative as well as they should carry the feasibility and salability features during the production stages.

Within the scope of this study, the process of preparing the clothing collection for 0-12 year old boys and baby boys were examined from the idea stage to the sales stage and the factors affecting the product design and costs were emphasized. It has been observed that the company's design department works according to customer buyer's needs and requests. They prepare collections that are appropriate for current trends, originality, manufacturable, proper with health and safety standards.

Costing studies were done for the selected styles from the collections presented to the customer. The company used the traditional costing and the target costing approaches together in its pricing studies.

When the costing tables were examined, it was observed that labor and fabric costs accounted for about 60% of the product cost. For this reason, the manufacturer makes negotiations with the fabric suppliers and the sewing subcontractors and struggles to get the lowest price. Stock purchases can be made for frequently used basic accessories and fabrics. This stock purchases help to reduce the costs of basic costs and it cause a decrease unit prices. As a result of this, the company gains competitive advantage to get more orders.

It is possible to say that collection preparation is not only an artistic process but also it needs an engineering knowledge. The companies should present closely priced alternatives with similar appearances to the customers for orders of different sizes. Of course, this will increase the chances of manufacturers to develop the most profitable products.

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