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A Comparison of the Materials Costs for Men's Shirts of Various Sizes and their Effects on the Final Price of a Shirt in the Market

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ABSTRACT

The study compares the material cost of producing plus size men's shirts compared to standard size men's shirts. The approach used in this study involves using an Excel spreadsheet to analyze the prices and compare the costs to find any major price discrepancies between plus size and standard size. The study discovered that from S to 5XL; the amount of fabric consumed increased steadily. As a result, each size now includes one button every time the size increases for each shirt. Additionally, each size received an average of 0.2 to 0.4 more yards of sewing thread than the smaller size. Therefore, the increase in price from standard to plus size men's shirts was verified due to the certain percentage of increase in the materials of producing the shirts.

Keywords: Garment costing; Plus size; Standard size; Apparel Technology

INTRODUCTION

Garment costing

Garment costing is used for a variety of purposes, including cost classification and sub-division, material control, labor and overhead cost control, and business policies (Karthik et al, 2020). Garment costing also enables management to take the proper action to address seasonal changes in sales and costs, and ensure optimal profitability (Rathinamoorthy & Surjit, 2018). Plus-size clothing refers to a specific segment of clothing that is designed and manufactured in larger sizes that are larger than the standard common sizes. The most important factor in the clothing usage cycle is customer satisfaction. The plus size apparel industry, as we know it, dates to the 1920s, when Lane Bryant, which had previously only sold maternity garments, began offering sizes 14 to 72 (Kumar Shiva et al, 2021).

There are fewer options and higher prices for plus size clothing compared to standard size clothing, which contributes to a social injustice and discriminatory retail environment. Although the cost differences between plus size and standard size apparel are frequently justified by the claim that extra fabric and more complex design and manufacturing are necessary, not everyone agrees that these justifications do so (Greenleaf et al, 2020).

Objectives

In this study, an Excel spreadsheet was used to calculate the cost of plus size men's shirt and standard sizes. Careful consideration must be given to specifics like seams, fabric, structure, sewing thread while analyzing one sample shirt. According to Takebira, 2016, when calculating garment costing, the expenses of labor, raw materials, and any other hidden costs must all be considered when determining the final price. For this study, only cost of materials (fabrics, sewing thread, accessories) were considered in looking for price comparison between plus and standard sizes men's shirt. Two main objectives of this study were to analyze garment construction such as seam density, sewing length and stitches of different sizing on men's shirt and to analyze differences in cost which include materials, accessories and sewing thread for plus size and standard size.

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LITERATURE REVIEW

Introduction

Budgeting and establishing benchmarks for gauging effectiveness can both benefit from garment pricing It maximizes the utilization of scarce resources and works as a management oversight tool. It helps with pricing determination and cost audits. It gives a precise cost analysis by process and operation as well as the cost per unit of several manufactured goods. It identifies waste sources and acts as a benchmark for manufacturing product pricing. It assesses the financial viability of each manufactured good and keeps effective control over raw materials at various points. carries out cost-saving strategies. It helps management with the planning and execution of incentive bonus programmed as well as with budgetary control (Karthik et al., 2020).

Costing element for apparel

When estimating a cost, it's important to think about how much everything will set, including the costs associated with raw materials, labor cost and any additional costs. These factors are extremely dynamic and keep fluctuating frequently, making them extremely important when the production merchandiser is doing the costing of garments (Rathinamoorthy & Surjit, 2018).

The cost of a garment is largely determined by the fabric used. 60% to 70% of the cost of even simple garments go toward the fabric. The cost of manufacturing a garment can often be estimated by examining the quality and quantity of fabric used in its construction. Fabric prices vary widely depending on the desired fabric quality and quantity. Fabrics can be classified based on their construction method (woven or knitted), dyeing method, fiber content (cotton, wool, polyester, silk, blended fabric, etc.), gram per square meter (gsm) weight, and yarn construction (ring spun, open ended, carded/combed, etc.)

Buttons can be made from a variety of materials, including nylon, plastic, acrylic, wood, shell, and metal. Every type of button has a minimum order quantity determined by the button manufacturer. Buttons are acquired in bulk with the specified line. The apparel sector is witnessing rising levels of competitiveness on a global scale, which has led to a general shift toward more cost-effective production processes. Any increase in costs, no matter how slight, has the potential to have a substantial effect. A significant amount of money is required to purchase sewing thread, which is one of the auxiliary materials used in the textile sector almost constantly. The goal of this investigation was to ascertain the quantity of sewing thread that would be required to sew together woven textiles of varying thicknesses. As a result of this, research was carried out on woven textiles that had a sewing area that was 7 10cm in length. The research examined the effects of three distinct stitch densities (3, 4, and 5 stitch/cm) as well as two distinct stitch types (lockstitch and three-thread overedge stitch). This study makes use of the most common sewing thread, stitch type, and fabric type (100% cotton woven textiles, lock stitch, and three-thread overedge stitch, respectively). According to the findings of the statistical analysis performed on the data gathered for this investigation, the thickness of the fabric and the number of stitches used are both connected with the amount of sewing thread that is utilized. A regression equation was then developed with the values that were used. Based on these numbers, a piece of software was developed to calculate the amount of thread that was used as well as the number of bobbins that were necessary for a particular length of stitching and a given quantity of orders while using either a lockstitch or a three-thread overedge stitch.

The factory overhead can be calculated in a number of ways, but typically includes the following three components: a. Indirect labor: This covers every person in the factory who does not directly perform a production operation such as managers, supervisors, engineers, store personnel, clerks, maintenance staff, porters, canteen staff, security and cleaners b. Expenses: Rent, rates, utilities, insurance, depreciation, maintenance, air conditioning, and the numerous energy sources needed by a textile manufacturing are included in this aspect (Choudhary, 2015). c. Logistic and transportation: Logistics costs are a significant and relevant component of business costs, frequently exceeding 10% of company turnover. This article investigates the differences and interdependencies in the self-reported logistics costs of manufacturing and trading firms. Total logistics costs are divided into six components: transportation, warehousing, inventory carrying, logistics administration, transport packaging, and indirect logistics costs. The analyzed panel data includes 241 companies, eight identified in two surveys conducted in 2005 and 2008. Logistics costs were explored through multiple methods including descriptive analysis, generalized linear mixed models (GLMM), and principal component analysis. The beta distribution best described the distributions of logistics costs measured as a percentage of turnover (Engblom et al., 2012).

Sizing system for men's clothing

Around the middle of the 1800s, there was a notable spike in customer interest in ready-to-wear (RTW) apparel for men. The need for men's tailoring, standard sizing, and patterns for men's suits expanded substantially because of the substantial development in the number of individuals working in financial institutions, public administration, and insurance agencies. Tailors noticed a growth in the demand for men's clothing that was specifically suited to their bodies, which led to the collection of men's body measurements for the purpose of designing patterns and developing 11 sizing tables for men's clothes. This practice was pioneered by European tailors, who also produced some of the earliest size tables that would be utilized for decades to come (Ashdown, 2007). A standard sizing system is a table of numbers that offers the value of each of the body dimensions used to classify the bodies encountered in the population for each size group in a system (Ashdown, 2007). The purpose of size standard creation in the fashion industry is to categorize consumers based on their body dimensions and assign them to groups with similar forms so that accurate garment measurements may be created (Ashdown, 2007). Consumers' discontent with sizing and fit is a common reason for returns of garment products to a store, hence it's crucial that accurate size development and standards be established. Another common source of customer unhappiness is clothing that is mislabeled as to size. When consumers can't determine whether or not a garment is the right size based on the label, consumers may become dissatisfied with the manufacturer's or retailer's overall quality of service. Finally, vanity sizing, in which the size of the garment does not exactly represent the size tag in order to make the consumer feel like the wearer has a "smaller" size than actual, is another contributor to consumer discontent with apparel (Hoegg, Scott, Morales, & Dahl, 2014).

METHODOLOGY

Pre-data collection

Men's shirts with size M (standard size) were obtained from the market. This sample has a long sleeve and is made with Poly/Cotton fabric. The shirt was detached into individual body parts such as sleeved, front, and back body, pockets and collars and information on stitch density, seam, fabrics and sewing threads consumptions were all collected. These were part of the pre-data collection before calculating the actual fabric and thread consumption using formula and inserted into Excel spreadsheets.

Calculation of materials (fabrics, sewing thread and button)

Formulas were used to calculate amount of fabrics needed for different panels for each size. Combination of formulas and measurements from Table 1, consumption of fabrics needed for sizes can be calculated.

Table 1: Men's shirt sizing cart for all sizes

Size	Neck(inches)	Chest(inches)	Waist(inches)	Sleeve(inches)
XS	13 ½-14	33-35	27-29	31 ½-32
S	14 ½-15	36-38	30-32	32 ½-33
M	15 ½-16	39-41	33-35	33 ½-34
L	16 ½-17	42-45	36-39	34 ½-35
XL	17 ½-18	46-49	40-43	35 ½-36
XXL	18 ½-19	50-53	44-47	36 ½-37

3XL	19 ½-20	54-57	48-51	37 ½-38
4XL	20 ½-21	58-61	52-55	38 ½-39
5XL	21 ½-22	62-65	56-59	39 ½-40

Fabric Requirement for back panel (yards):

{(Center back length + Allowance) X (1/2 Chest + Allowance)}
…………………………………………………………
44 X 36

Fabric Requirement for front panel (yards):

{(Body length + Allowance) X (1/4 Chest + Allowance) X 2}
…………………………………………………………
44 X 36

Fabric Requirement for Yoke (yards):

{(Yoke length + Allowance) X (Yoke width + Allowance)}
…………………………………………………….…
44 X 36

Fabric Requirement for Sleeve (yards):

[{Sleeve length – (1/2 Drop shoulder + ½”)} X (Arm hole depth + Allowance) X 2
…………………………………………………………
44 X 36

Fabric Requirement for Cuff (yards):

(Cuff length + Allowance) X (Cuff width + Allowance) X 2
……………………………………………….………
44 X 36

Fabric Requirement for Pocket (yards):

(Pocket length + Allowance) + (Pocket width + Allowance)
………………………………………………..……….
44 X 36

Fabric Requirement for Collar (yards):

(Collar length + Allowance) X (collar width + Allowance) X 4
…………………………………………………………
44 X 36

Total fabric consumption for one shirt =

Back panel + front panel + Yoke + Sleeve + Cuff + Pocket + Collar

Other charges

The price of a shirt can be detailed by considering other charges such as below.

Rejection and wastage charges −2%–5%

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Inspection charges −1%–2%

Buying house commission −1%–1.5%

Transportation charges −RM1–2/piece

Profit margin −10%–15%

By adding these charges according to industry requirement, the final price of a shirt can be determined more accurately. However, in this study, the final price was only based on materials involved which include fabrics, sewing thread and buttons. Further work can be explored on these other charges involved in the production of a shirt.

FINDINGS

Required amount of fabrics, button and sewing thread

For this study, one shirt of size M was chosen to be analyzed. The first step was to measure the stitch length of size M men's shirts, and then unravel each stitch individually. From this activity, the amount of sewing thread length can be calculated based on stiches per inch values. The amount of thread required for each inch of seam was likewise growing as the number of stitches per inch increased. Table 2 shows the amount of sewing threads to sew the shirt for size M based on the number of stitches.

Table 2: Amount of sewing thread based on stitches on M men’s shirt.

Panels	**Size M (yds)**
Body	**0.53**
Shoulder	**0.34**
Pocket	**0.16**
Arm hole	**0.28**
Collar	**0.35**
Sleeve	**0.41**
Hem	**0.39**
Yoke	**0.34**
Total (yds)	**2.80**

Table 3: Fabric consumption calculated for different sizes.

Panels	S	M	L	XL	XXL	3XL	4XL	5XL
Back	0.37	0.42	0.46	0.51	0.58	0.63	0.69	0.74
Front	0.39	0.44	0.49	0.54	0.60	0.66	0.71	0.77
Yoke	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.11
Sleeve	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.20
Cuff	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05
Pocket	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.08
Collar	0.09	0.09	0.11	0.12	0.17	0.17	0.20	0.21

Total (yards)	1.09	1.19	1.33	1.45	1.67	1.8	1.98	2.12
% increment	0	8.4	10.5	9.7	7.2	12.2	6.6	8.5

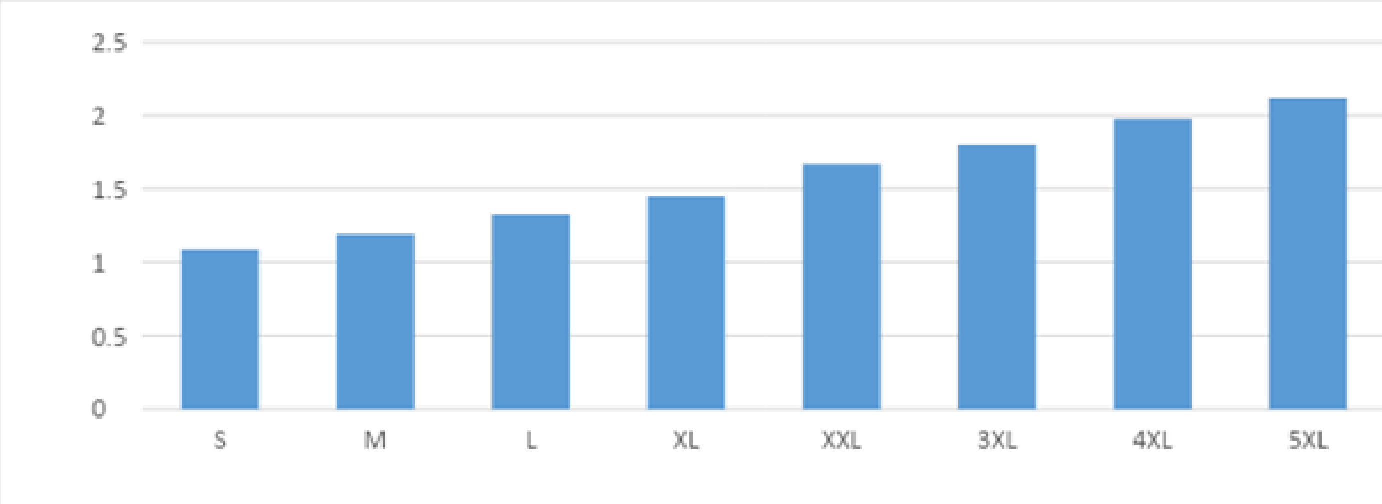

Figure 1: The increment of fabrics needed for each additional size.

Based on the increment of fabrics needed for different sizes, assumption was made that same percentage in the usage of sewing thread for each size of men's shirt. Calculation was made based on the earlier amount of sewing thread for a M size shirt (round up to the nearest value).

Table 4: Amount of sewing thread needed for different size with the basis of M size and increment according to the fabric consumptions.

Size	S	M	L	XL	XXL	3XL	4XL	5XL
Increment %	0	8.4	10.5	9.7	7.2	12.2	6.6	8.5
Sewing thread (yards)	2.56	2.80	3.09	3.38	3.62	4.06	4.33	4.69

Table 5: Amount of button according to sizes

Size	S	M	L	XL	XXL	3XL	4XL	5XL
No of button (pieces)	12	13	14	15	16	17	18	19

To calculate the price of one shirt, cost of button, sewing thread and fabric were placed with current wholesale market value.

Button/piece = RM0.13

Sewing thread/yard =RM0.0032(4000yds=RM12.8)

Fabric/yard = RM9.58 (Poly/Cotton fabric)

Table 6: Cost of a shirt according to sizes

Size	S	M	L	XL	XXL	3XL	4XL	5XL
RM (buttons)	1.56	1.69	1.82	1.95	2.08	2.21	2.34	2.47
RM (sewing threads)	0.0081	0.0087	0.0099	0.011	0.0012	0.0013	0.0014	0.0015

RM (fabrics)	10.44	11.40	12.74	13.89	15.99	17.24	18.96	20.30
RM (one shirt)	12.00	13.09	14.56	15.85	18.07	19.45	21.30	22.77

DISCUSSION

Materials cost for one shirt

Table 6 totals up the cost of materials which include buttons, sewing threads and fabrics needed for men's shirts from standard size (S to XL) and plus size (XXL to 5XL). The difference between size S and 5XL in terms of total price was RM10.77. The difference between size S and XL was RM3.85. Due to that, most of the shirts with standard size (S to XL) were sold at the same price and with higher price for plus size (XXL to 5XL). This price here does not include any other factors such as transportation costs, packaging, mark-up cost, marketing, and any other necessary factors that plays an important role in justifying the price of a shirt in the marketplace (Choudhary, 2015).

Increment of fabric with size

The formula to calculate the amount of fabrics needed to produce one shirt according to different sizes was calculated and shown in Table 3 and the increment of fabric was shown clearly in Figure 1. The amount of fabrics needed for size S men's shirts was double when producing 5XL men's shirts. The measurement agreed with a statement by Greenleaf et al, 2020 stating that extra fabric and more complex design and manufacturing are required for plus size apparel.

CONCLUSION& RECOMMENDATIONS

As a conclusion, the objective of this study was to compare the material costs associated with plus size garments to standard size garments. The primary aim is to examine the construction of garments, specifically focusing on factors such as seam density, stitching length, and stitches in relation to various sizes of men's shirts. The determination of the necessary amount of fabric for the construction of a garment is a crucial aspect of the overall process. This can be achieved by meticulously measuring each individual component of the garment. This methodology can be employed to ascertain the financial implications associated with the procurement of men's shirts, encompassing the entire spectrum of available sizes.

Through computation utilizing an Excel spreadsheet, the goal of analyzing the cost of production including materials, accessories, and sewing thread for plus size and standard pricing, was effectively accomplished.

The findings of the study show that the cost for producing a garment increase depending on its size. The number of buttons utilized for size S garments is 12, while the number of buttons utilized for the size M garments is 13. It can be observed here that the larger the size, the higher the requirement for the use of buttons. The same principle applies to the amount of fabric consumption and sewing thread. After making all calculations, it became clear that a standard size men's shirt cost less than a plus size men's shirt. This affects the final price between standard and plus size men's shirts.

In the future, other style of apparel such as ladies blouses, pants, men's trousers' with a standard size and plus size in the market can be investigated in terms of their materials cost. The calculation can also include other costing elements such as labelling, packaging, transportation, overhead and other important values.

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