Designing Fabric with Innovative Fancy Yarns to Achieve Aesthetic Values in Men's Clothing Fabrics

Prof. Osama Ezz El-Din Ali
Professor of Textile Design Spinning and Weaving Dept. Faculty of Applied Arts Helwan University
Prof. Mohamed Abd-El Gawad
Professor of Textile Structures Spinning and Weaving Dept. Faculty of Applied Arts-Helwan University
Dr. Ayman El Saied Ibrahim
Prof. Assistant of Spinning and Weaving Dept - Faculty of Applied Arts -Helwan University
Assist. Lect. Marwa Mostafa Mostafa Mohamed qotb
Assistant Lecturer at Spinning and Weaving Dept.
qotbmarwa@gmail.com

Abstract

The aim of the research is to designing fabric with innovative fancy yarns to achieve aesthetic values in men's clothing fabrics.
In designing fancy doubled yarns, or indeed fancy yarns of any discussion are two different approaches. In the first, the 'design' element is likely to be concentrated upon achieving visual and tactile subjective attraction in high fashion attire. This usually entails combining a variety of plain and fancy yarns to create an exciting visual effect by blending color, texture, and structure to achieve the desired appearance. In the second, which is more commonly seen in the mass market sector. (Wright, 2002) (Lord, 2003)

Key words:

Design - Fancy Yarn - Aesthetic values – Stiffness – Tensile strength

1. Introduction

Every textile product is designed: that is, it is made specifically to some kind of plan. (Wilson, 2001) Fabrics are made from yarns and fibers. Fabrics may be made by a variety of processes including weaving, knitting, knotting and twisting yarns together and by bonding fibers together. Yarns are made from fibers, and fibers may be natural such as cotton and wool, or man-made such as acrylic and polyester. Fabrics may be industrial textiles with detailed technical and performance specifications or for apparel, furnishings or household textiles where aesthetics may be as or even more important than performance. Fabrics may be colored by dyeing, printing, using colored yarns in their construction and may have a finish applied to enhance appearance (brushing) or performance (flame proofing). (K.Townsend, 2011)
Fabric aesthetic properties include the optimized handle of fabric, good appearance in the garment and good appearance in wear. Fabric properties like thickness, compressibility, bending properties, extensibility, dimensional stability and surface properties are associated with fabric aesthetics. Generally, the aesthetic characteristics of fabrics can be measured by a mixture of subjective evaluation and objective tests. (HU, 2008)

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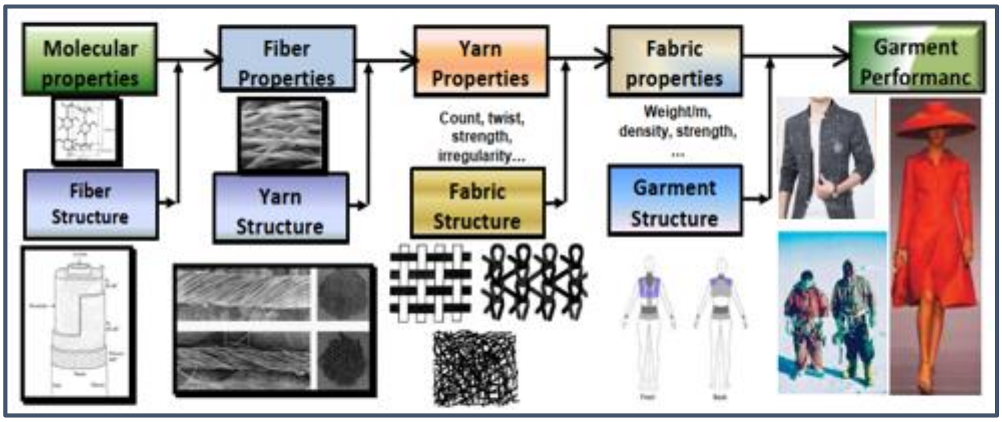


FIGURE [1]RELATIONSHIPS OF FIBER, YARN, FABRIC AND GARMENT TO THE PERFORMANCE OF CLOTHING (SAYED IBRAHIM, 2017)

1.1 The principles and Elements of Textile Design

Textiles are frequently made to be decorative and are used to embellish and decorate both people and objects. The designers responsible for such textiles have to balance many factors color and appearance are two of the most significant factors, with handle, performance and price coming lower down in terms of importance. (Wilson, 2001) Artists and designers manipulate these elements as shown in figure [2], mix them in with principles of design, and compose a piece of art. Not every work of art contains every one of these elements, but at least two are always present. (Esaak, 2019)

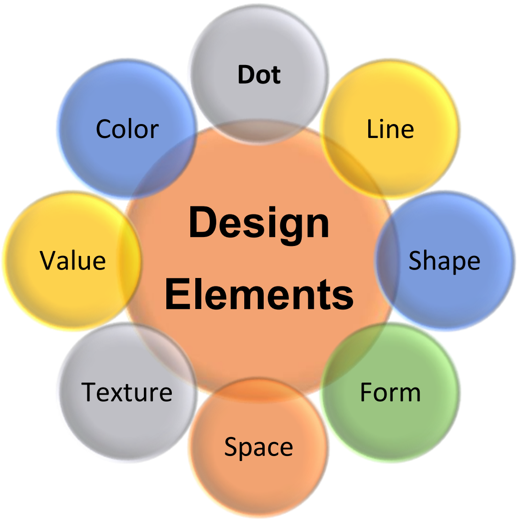


FIGURE [2]ELEMENTS OF TEXTILE DESIGN

2. Fancy Yarns (NOVELTY YARNS)

Fancy yarns are a type of yarn that is primarily developed for its aesthetic look rather than its performance. "A yarn that differs from the conventional construction of single and folded yarns by way of purposefully generated flaws in its construction," according to the Textile Institute (Textile Terms and Definitions). The presence of periodic effects like knops, loops, curls, and slubs, or an increase in the input of one or more of its components, causes these irregularities." (Goswami, 2018) Denim, knitted apparel, formal wear, and home textiles are all examples of applications for fancy yarns. (Shaikh Tasnim Nisarahmed, June 2012)

2.1 The structure and formation of fancy yarns

A fancy doubled yarn's basic structure consists of 'core' threads, an 'effect substance,' and a 'binder,' which binds the entire structure together. (Gong, 2011)

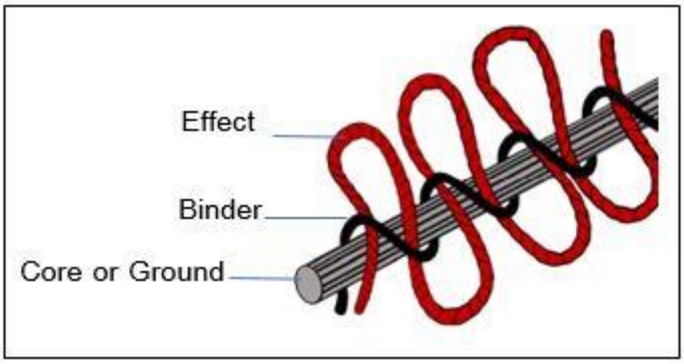
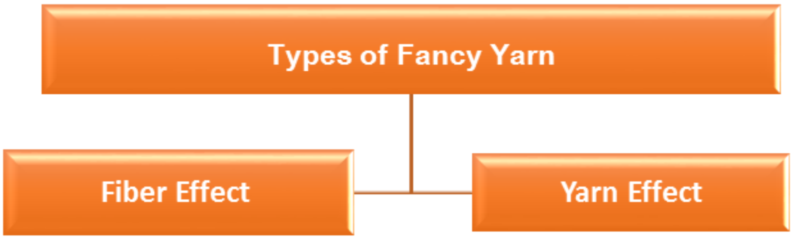


FIGURE (1- 1) BASIC COMPONENTS OF FANCY YARN (SAID, 2011)

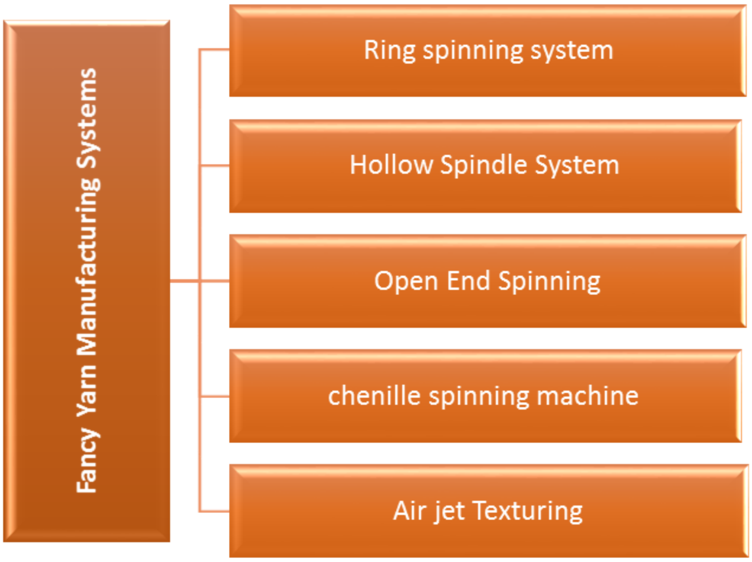
2.2 TYPES OF NOVELTY YARNS

Fiber effects and yarn effects are the two primary kinds of fancy yarn effects. Fiber effects are introduced prior to the development of yarn; yarn effects are introduced after the individual yarns have already been formed by joining two or more yarns. (Goswami, 2018)



2.3 Production methods for fancy yarns

Fancy yarns with yarn effects have included One or more ground yarns, one or more effect yarns, and, in most cases, a binder yarn have been used with yarn effects. These fancy yarns are produced in two or more stages, not including the production of the individual yarns that are combined to produce the final fancy yarn. (Gong, 2011)



2.3.1 Hollow Spindle System

The hollow spindle machine can produce a wide variety of fancy effects. In addition to the feeding devices' independent control, the delivery roller can be controlled to produce even more effects. More recent hollow spindle machines are outfitted with computer control systems, allowing the machine to be programmed to produce a variety of effects. (Goswami, 2018)
The hollow spindle is intended for use as a false twisting assembly. The fiber strand is led out and back around the spindle with a wrap of roughly one-quarter of the spindle core after entering the vertical spindle. As a result, the strand is provided with a twist between the drafting arrangement and the hollow spindle's head as the spindle turns. These twist turns are cancelled out again in the spindle head, according to the false twist principle. This twist prevents the strand from unravelling along its length before the filament staple fibers wrap with filament. (BABU, 2021) All feeds are routed through the hollow spindle's twisting. The hollow spindle is attached to and rotated by a bobbin containing the binder yarn. The binder is drawn into the hollow spindle from the top. The spinning of the hollow spindle wraps and binds the binder around all of the components that pass through it. (Gong, 2011) (Goswami, 2018)

2.4 The properties of the fancy yarn

The properties that might be of interest specifically to commercial users of fancy yarns

- Tensile Strength
- Wear resistance (that is, resistance to wear during use, as well as the effects of that wear on yarn strength, color, or other physical properties; and the differential changes in particular yarn components as a result of wear)
- Flexibility
- Comfort (especially, if final product is to be used as apparel fabric or upholstery).
- Stretch properties
- Suitability for a specific manufacturing or dyeing method. (Wright, 2002)

3. Experimental Work

The main purpose of the research is to designing fabric with innovative fancy yarns to achieve aesthetic values in men's clothing fabrics.

Performance through these different parameters

1. Novelty yarn structure with different effects.
2. Different material for (core and effect) structure.
3. Fabric Weave structure.

3.1 Samples specifications of Novelty yarn structure.

Fancy yarns in this research are created in **BR1/BR2 Novafil Twisting Machine /fancy yarn Twister, it provided with** computer control systems which allow the programmed control of the machine for producing fancy effects, program for Slub and knop yarn. (NOVAFIL, 2001)

3.2 Samples specifications of different material for (core and effect)

Yarn structures of the innovative cotton Slub yarn are made up of a core material [cotton yarn 60/2 Ne], an effect material [cotton yarn 60/2 Ne], and a binder [polyester 70/1 denier] that holds the yarn together, with additional effect by twisting different color for core and effect yarn are folded together.

TABLE [1]SPECIFICATIONS OF DIFFERENT MATERIAL FOR (CORE AND EFFECT)

Yarn structure	Core	Effect	Binder
1	Cotton 60/2 N_e	Cotton 60/2 N_e	Polyester 70/1 D
2	Polyester 150/1 D	Polyester 150/1 D	Polyester 70/1 D
3	Cotton 60/2 N_e	Polyester 150/1 D	Polyester 70/1 D

3.3 Samples specifications of woven fabric

3.3.1 Warp yarns

Warp yarns for all samples were used cotton yarns with count 50/2 English, density 36 yarns/cm.

3.3.2 Weft yarns

Weft yarns for al samples were used (fancy yarn 36/3 E and cotton yarn 30/1E), wefts arrangement — (1 Fancy yarn:1cotton yarn) density 20 weft/cm.

TABLE[2]THE SPECIFICATIONS OF FABRICS SAMPLES

Sample no.	Weft effect	Weft material	Structure	Pick density /cm
1	*Structure A Slub Yarn*	*Cotton*	*Twill 1/3*	*20*
2		*Polyester*	*Twill 1/3*	*20*
3		*Blending*	*Twill 1/3*	*20*
4		*Cotton*	*Crepe*	*20*
5		*Polyester*	*Crepe*	*20*
6		*Blending*	*Crepe*	*20*
7		*Cotton*	Matt *2/2*	*20*
8		*Polyester*	Matt *2/2*	*20*
9		*Blending*	Matt *2/2*	*20*
10	*Structure B Knop Yarn*	*Cotton*	*Twill 1/3*	*20*
11		*Polyester*	*Twill 1/3*	*20*
12		*Blending*	*Twill 1/3*	*20*
13		*Cotton*	*Crepe*	*20*
14		*Polyester*	*Crepe*	*20*
15		*Blending*	*Crepe*	*20*
16		*Cotton*	Matt *2/2*	*20*
17		*Polyester*	Matt *2/2*	*20*
18		*Blending*	Matt *2/2*	*20*

2.1.1 Structure of woven fabrics

2.1.1.1 Twill woven fabrics Structure

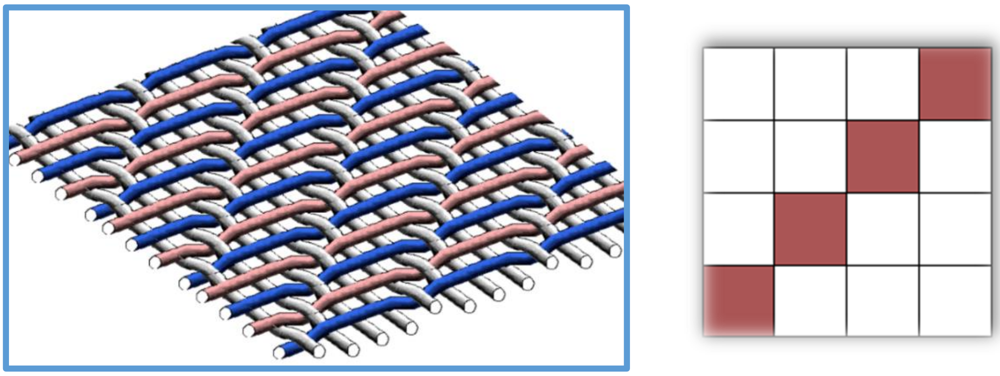


FIGURE [3]SIMULATION AND STRUCTURE OF TWILL WEAVE

2.1.1.2 Crepe woven fabrics Structure

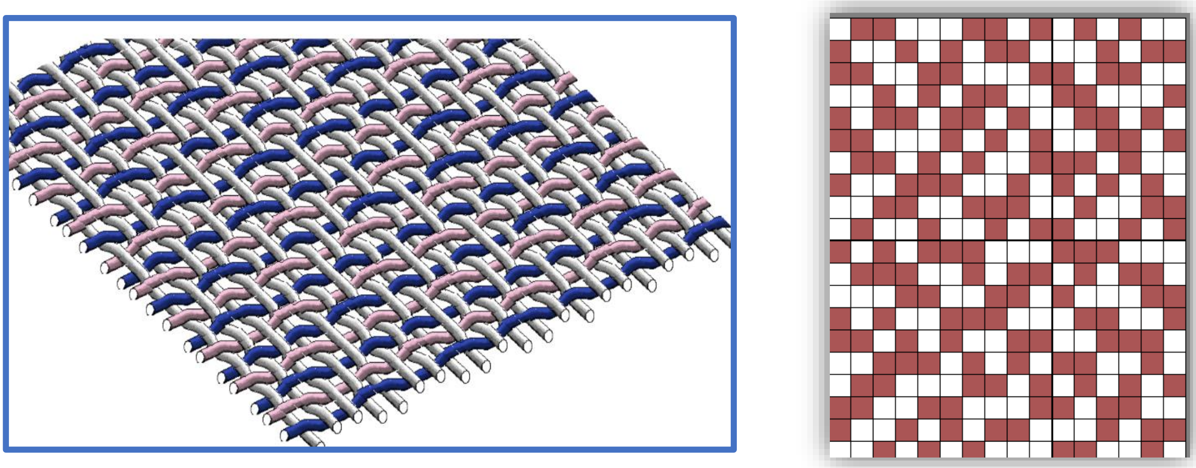


FIGURE [4]SIMULATION AND STRUCTURE OF CREPE WEAVE

2.1.1.3 Basket or (Matt) woven fabrics Structure

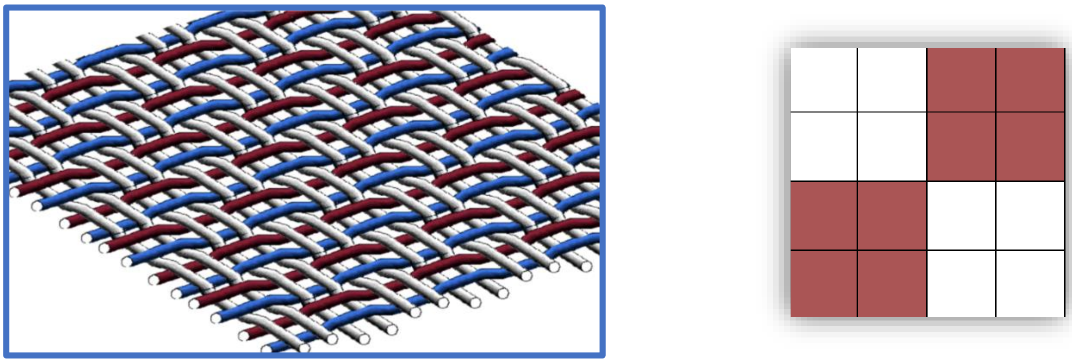


FIGURE [5]SIMULATION AND STRUCTURE OF BASKET WEAVE 2/2

2.1.2 Pictures of Selected Produced Samples and 3D Simulation

FIGURE [6] SAMPLE [1] USING TWILL STRUCTURE WITH COTTON WEFT SLUB

FIGURE [7] SAMPLE [2] USING TWILL STRUCTURE WITH POLYESTER WEFT SLUB

FIGURE [8] SAMPLE [3] USING TWILL STRUCTURE WITH BLENDED WEFT SLUB

FIGURE [9]SAMPLE [4] USING CREPE STRUCTURE WITH COTTON WEFT SLUB

FIGURE [10]SAMPLE [5] USING CREPE STRUCTURE WITH POLYESTER WEFT SLUB

FIGURE [11]SAMPLE [6] USING CREPE STRUCTURE WITH BLENDED WEFT SLUB

FIGURE [12] SAMPLE [7] USING BASKET STRUCTURE WITH COTTON WEFT SLUB

FIGURE [13]SAMPLE [8] USING BASKET STRUCTURE WITH POLYESTER WEFT SLUB

FIGURE [14] SAMPLE [9] USING BASKET STRUCTURE WITH BLENDED WEFT SLUB

FIGURE [15] SAMPLE [10] USING TWILL STRUCTURE WITH COTTON WEFT KNOP

FIGURE [16] SAMPLE [11] USING TWILL STRUCTURE WITH POLYESTER WEFT KNOP

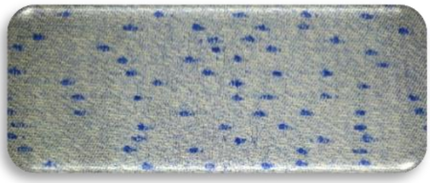


FIGURE [17] SAMPLE [12] USING TWILL STRUCTURE WITH BLENDED WEFT KNOP

FIGURE [18] SAMPLE [13] USING CREPE STRUCTURE WITH COTTON WEFT KNOP

FIGURE [19] SAMPLE [14] USING CREPE STRUCTURE WITH POLYESTER WEFT KNOP

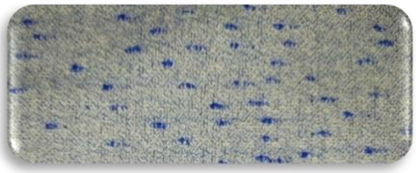


FIGURE [20] SAMPLE [15] USING CREPE STRUCTURE WITH BLENDED WEFT KNOP

FIGURE [21] SAMPLE [16] USING MATT STRUCTURE WITH COTTON WEFT KNOP

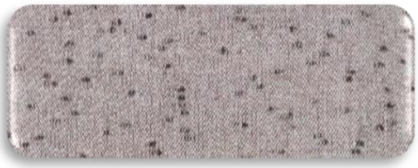


FIGURE [22] SAMPLE [17] USING MATT STRUCTURE WITH POLYESTER WEFT KNOP

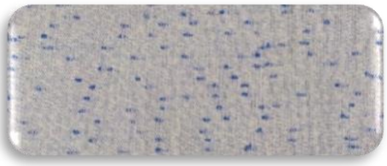


FIGURE [23] SAMPLE [18] USING MATT STRUCTURE WITH BLENDED WEFT KNOP

FIGURE [24]3D SIMULATION USING SAMPLE 1 WEFT SLUB YARN

FIGURE [25] 3D SIMULATION USING SAMPLE 12 WEFT KNOP YARN

2.1.3 Pictures of Selected Produced Samples and 3D Simulation

3 Results and Discussion

The following data presents the results of tests applied to the produced samples.

TABLE [3]TESTS RESULTS OF PRODUCED FABRIC SAMPLES

Fabric No.	Fabric Weft Material	Structure Weave	Stiffness in Warp Direction (mg/cm)	Stiffness in Weft Direction (mg/cm)	Tensile Strength in Warp Direction (N)	Tensile Strength in Weft Direction (N)
First Innovative Slub Yarn						
1	Cotton	Twill 1/3	38	69	335	274
2	Polyester	Twill 1/3	45	89	362	412
3	Blending	Twill 1/3	39	77	338	442
4	Cotton	Crepe	59	71	341	279
5	Polyester	Crepe	65	74	375	424
6	Blending	Crepe	61	73	372	305
7	Cotton	Matt 2/2	58	66	381	280
8	Polyester	Matt 2/2	56	79	388	399
9	Blending	Matt2/2	56	71	386	295
second Innovative Knop Yarn						
10	Cotton	Twill 1/3	36	69	342	278
11	Polyester	Twill 1/3	37	77	360	362
12	Blending	Twill 1/3	37	73	345	286
13	Cotton	Crepe	60	64	310	270
14	Polyester	Crepe	66	85	358	426
15	Blending	Crepe	57	73	348	296
16	Cotton	Matt 2/2	55	64	369	311
17	Polyester	Matt 2/2	61	81	386	376
18	Blending	Matt 2/2	54	72	371	335

3.1 Stiffness in Warp Direction

Table [4] and figure [26] show the results of Stiffness in Warp Direction for different materials and different structure in produced samples under test.

TABLE [4] RESULTS OF STIFFNESS IN WARP DIRECTION (MG/CM)

Fancy yarn weft Material	First Innovative Slub yarn			second Innovative knop yarn		
	Twill	**Crepe**	**Matt**	**Twill**	**Crepe**	**Matt**
Cotton	38	59	58	36	60	55
Polyester	45	65	56	37	66	61
Blended	39	61	56	37	57	54

Results presented in Table [2] and Figure [26] show that samples which produced from polyester material have scored the highest rates of stiffness in warp direction when compared with other samples. The relation between stiffness value and handling is an inverse relationship which means sample from cotton fiber achieving good handle followed by blended and polyester. Effect of weave structure on stiffness in warp direction were predicted by investigating two factors such as crimp Factor and Floating length Factor. The value of crimp is higher in crepe than matt and twill. The value of float is more in twill than crepe and matt. However, the effect of weave structure in crepe weave is higher than matt and twill. Fancy yarn effect was not specific on stiffness in warp direction. (Jahan, October 2017)
ANOVA results in Table [5],[6] show that there is insignificant relationship between Stiffness in Warp Direction and material, fancy weft depending on ANOVA results. And from table [7],[8] found there is significant relationship between Stiffness in Warp Direction and weave structure

TABLE [5]ANOVA STATISTICAL ANALYSIS OF THE FANCY WEFT EFFECT AND STIFFNESS IN WARP DIRECTION

ANOVA					
Fabric Stiffness in Warp Direction	(Fancy weft effect)				
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.889	1	10.889	0.094	0.763
Within Groups	1854.222	16	115.889		
Total	1865.111	17			

TABLE [6]ANOVA STATISTICAL ANALYSIS OF THE WEFT EFFECT MATERIAL AND STIFFNESS IN WARP DIRECTION

ANOVA					
Fabric Stiffness in Warp Direction	(Weft material)				
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	69.778	2	34.889	0.291	0.751
Within Groups	1795.333	15	119.689		
Total	1865.111	17			

TABLE [7]ANOVA STATISTICAL ANALYSIS OF WEAVE STRUCTURE AND STIFFNESS IN WARP DIRECTION

ANOVA					
Fabric Stiffness in Warp Direction		(Weave structure)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1719.111	2	859.556	88.311	<.001
Within Groups	146	15	9.733		
Total	1865.111	17			

TABLE [8]ANOVA MULTIPLE COMPARISONS WERE MADE BETWEEN THE EFFECT OF WEAVE STRUCTURE AND STIFFNESS IN THE WARP DIRECTION.

Multiple Comparisons			
Dependent Variable:			
(I) weave structure		Mean Difference (I-J)	Sig.
Twill	Crepe	22.66667*	<.001
	Matt	18.00000*	<.001
Crepe	Twill	22.66667*	<.001
	Matt	4.66667*	0.02
Matt	Twill	18.00000*	<.001
	Crepe	4.66667*	0.02
***. The mean difference is significant at the 0.05 level.**			

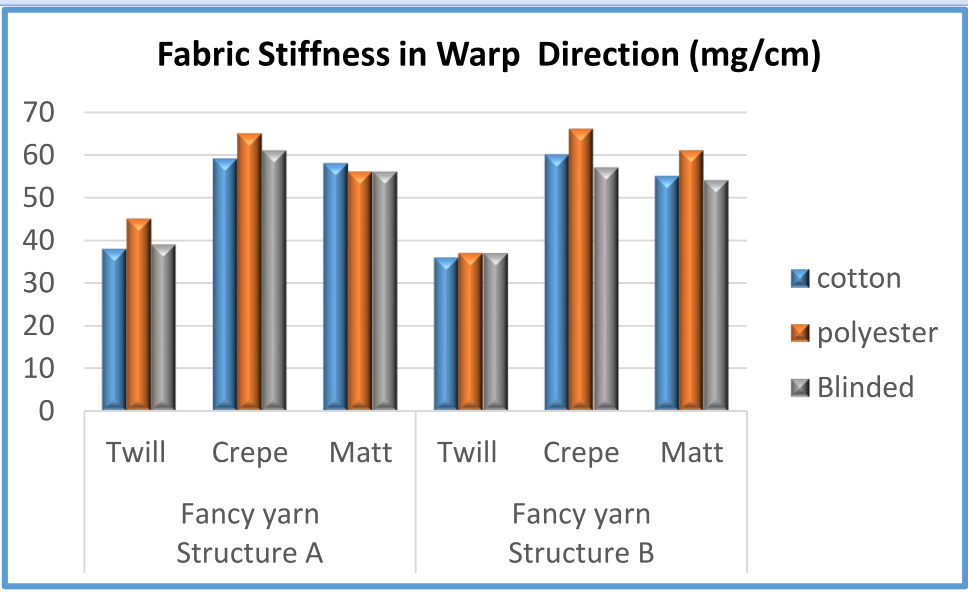


Figure [26] Effect of different Fancy yarn material, effect and weave structure on Fabric Stiffness in Warp Direction

3.2 Stiffness in Weft Direction

Table [9] and figure [27] show the results of Stiffness in Weft Direction for different materials and different structure in produced samples under test.

TABLE [9]RESULTS OF STIFFNESS IN WEFT DIRECTION (MG/CM)

Fancy yarn weft Material	First Innovative Slub yarn			second Innovative knop yarn		
	Twill	**Crepe**	**Matt**	**Twill**	**Crepe**	**Matt**
Cotton	69	71	66	69	64	64
Polyester	89	74	79	77	85	81
Blended	77	73	71	73	73	72

From pervious results in table [9] and Figure [27] show that samples which produced from polyester material as a weft have recorded the highest rates of stiffness in weft direction followed by blended and cotton, In other words we can say polyester fabric with weft yarn more stiff than blended and cotton fiber. Due to their extremely crystalline polymer system, which prevents the polyester polymers from yielding readily when the filament of staple fiber is bent or flexed. (E.P.G Gohl, 1983) Effect of weave structure on stiffness in weft direction stiffness is reduced with the increase of interlacement points. Fabric with more interlacement point such as crepe and Matt weave structure is stiffer than twill 1/3. ANOVA results in Table [10],[11] show that there is insignificant relationship between Stiffness in Weft Direction and fancy weft, weave structure depending on ANOVA results. And from table [12],[13] found there is significant relationship between Stiffness in Weft Direction and material.

TABLE [10]ANOVA STATISTICAL ANALYSIS OF THE FANCY WEFT EFFECT AND STIFFNESS IN WEFT DIRECTION

ANOVA					
Fabric Stiffness in Weft Direction		(Fancy weft effect)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.722	1	6.722	0.140	0.713
Within Groups	768.889	16	48.056		
Total	775.611	17			

TABLE [11]ANOVA STATISTICAL ANALYSIS OF WEAVE STRUCTURE AND STIFFNESS IN WEFT DIRECTION

ANOVA					
Fabric Stiffness in Weft Direction		(Weave structure)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.111	2	19.056	0.388	0.685
Within Groups	737.5	15	49.167		
Total	775.611	17			

TABLE [12]ANOVA STATISTICAL ANALYSIS OF THE WEFT MATERIAL AND STIFFNESS IN WEFT DIRECTION

ANOVA					
Fabric Stiffness in Weft Direction	(Weft material)				
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	563.111	2	281.556	19.875	<.001
Within Groups	212.5	15	14.167		
Total	775.611	17			

TABLE [13]ANOVA MULTIPLE COMPARISONS WERE MADE BETWEEN WEFT MATERIAL AND STIFFNESS WEFT DIRECTION.

Multiple Comparisons			
Dependent Variable:			
(I) weft material		Mean Difference (I-J)	Sig.
cotton	polyester	13.66667*	0.000
	blended	6.00000*	0.015
polyester	cotton	13.66667*	0.000
	blended	7.66667*	0.003
blended	cotton	6.00000*	0.015
	polyester	7.66667*	0.003
***. The mean difference is significant at the 0.05 level.**			

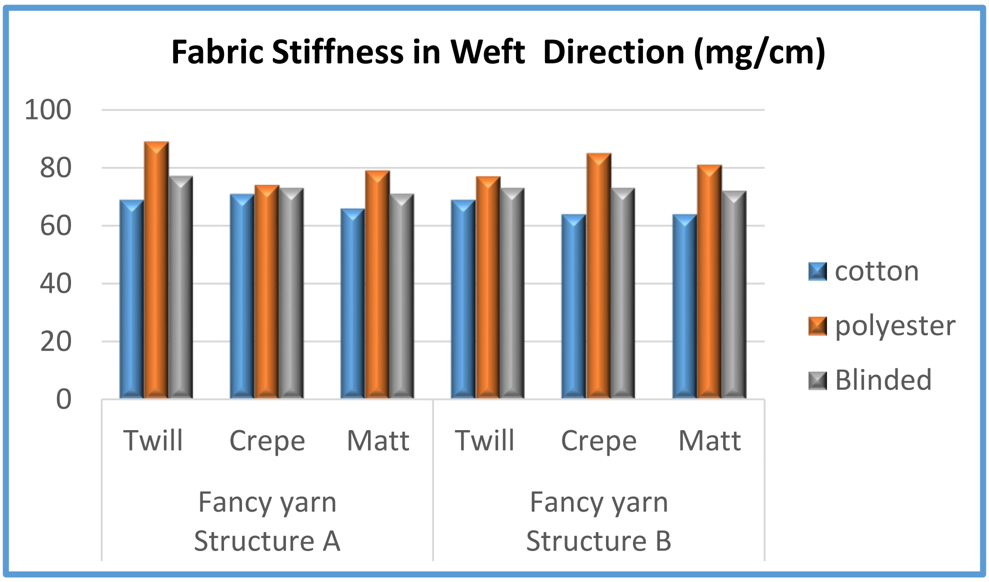


FIGURE [27] EFFECT OF DIFFERENT FANCY YARN MATERIAL, EFFECT AND WEAVE STRUCTURE ON FABRIC STIFFNESS IN WEFT DIRECTION

3.3 Tensile Strength in Warp Direction

Table [14] shows the results of tensile strength test in warp direction which was carried out on the produced samples.

TABLE [14]RESULTS OF TENSILE STRENGTH IN WARP DIRECTION (N)

Fancy yarn weft Material	First Innovative Slub yarn			second Innovative knop yarn		
	Twill	**Crepe**	**Matt**	**Twill**	**Crepe**	**Matt**
Cotton	335	341	381	342	310	369
Polyester	362	375	388	360	358	386
Blended	338	372	386	345	348	371

It is clear from the tables [14] and from figure [28] that the fabrics produced from Polyester weft yarn recorded the highest rates of tensile strength in warp direction. This because the Polyester fibers have high compressibility more than the other fibers so it can absorb the tension of the warp ends leading to increase the fabric tensile strength in warp direction. (Gawad, 2007) ANOVA results in Table [15,16] show that there is insignificant relationship between tensile strength in warp direction and fancy weft, weft material depending on ANOVA results. And from table [17,18] found there is significant relationship between Stiffness in Weft Direction and weave structure.

TABLE [15]ANOVA STATISTICAL ANALYSIS OF THE FANCY WEFT EFFECT AND TENSILE STRENGTH IN WARP DIRECTION

ANOVA					
Tensile strength in warp direction		(Fancy weft effect)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	440.056	1	440.056	0.955	0.343
Within Groups	7369.556	16	460.597		
Total	7809.611	17			

TABLE [16]ANOVA STATISTICAL ANALYSIS OF THE WEFT MATERIAL AND TENSILE STRENGTH IN WARP DIRECTION

ANOVA					
Tensile strength in warp direction		(Weft material)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1904.778	2	952.389	2.419	0.123
Within Groups	5904.833	15	393.656		
Total	7809.611	17			

TABLE [17]ANOVA STATISTICAL ANALYSIS OF WEAVE STRUCTURE AND TENSILE STRENGTH IN WARP DIRECTION

ANOVA					
Tensile strength in warp direction		(Weave structure)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3967.444	2	1983.722	7.745	0.005
Within Groups	3842.167	15	256.144		
Total	7809.611	17			

Table [18] ANOVA Multiple comparisons were made between the effect of weave structure and tensile strength in the warp direction.

Multiple Comparisons			
Dependent Variable:			
(I) weave structure		Mean Difference (I-J)	Sig.
Twill	Crepe	3.66667	0.697
	Matt	33.16667*	0.003
Crepe	Twill	3.66667	0.697
	Matt	29.50000*	0.006
Matt	Twill	33.16667*	0.003
	Crepe	29.50000*	0.006
***. The mean difference is significant at the 0.05 level.**			

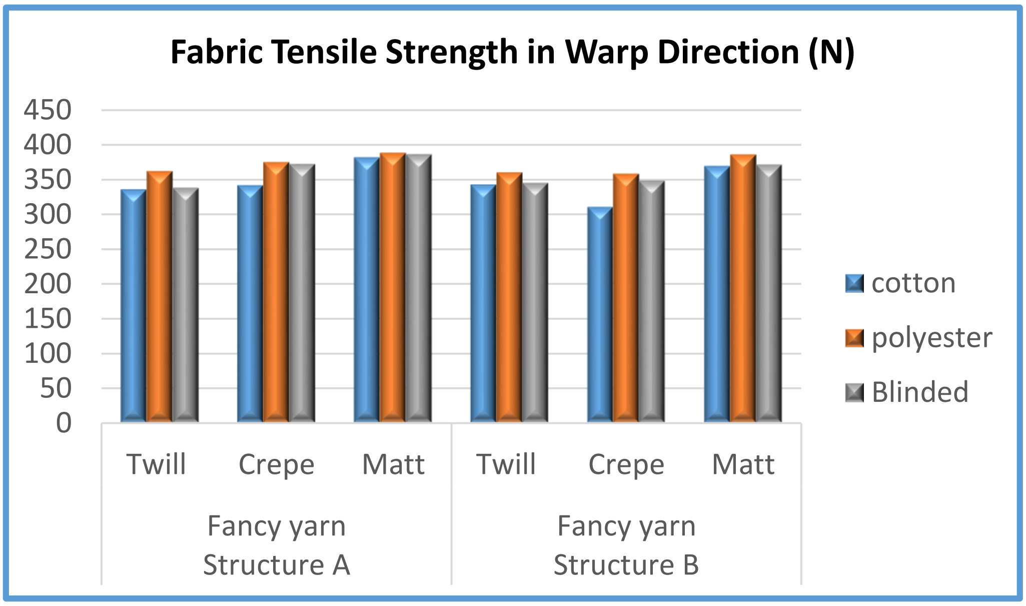


Figure [28] The effect of different fancy yarn materials, effects, and weave structures on fabric tensile strength in the warp direction

3.4 Tensile Strength in Weft Direction

Table [19] shows the results of tensile strength test in weft direction which was carried out on the produced samples.

Table [19] Results of Tensile Strength in weft Direction (N)

Fancy yarn weft Material	First Innovative Slub yarn			second Innovative knop yarn		
	Twill	**Crepe**	**Matt**	**Twill**	**Crepe**	**Matt**
Cotton	274	279	280	278	270	311
Polyester	442	424	399	362	426	376
Blended	412	305	295	286	296	335

From tables [19] and from figure [29] it is obvious that the fabrics produced from Polyester material as a weft recorded the highest rates of tensile strength in weft direction followed by blended and Cotton respectively. This is because the Polyester fibers have a high tenacity compared to other materials, this is mainly due to their extremely crystalline polymer system. This allows the formation of the very effective van der Waals' forces as well as the very weak hydrogen bonds, resulting in the very good tenacity with polyester polymers. (E.P.G Gohl, 1983) There is an inverse proportional relationship between float length and tensile strength in weft direction; this may be attributed to, the decrease in the float length increases the number of the intersections in the fabrics and increases the weft crimp as a result the resistance of the fabric to tensile strength in weft direction increases. The increase in the intersections increase the friction between yarns and increase the fabric coherence leading to increase the fabric tensile strength in weft direction.

ANOVA results in Table [20],[21] show that there is insignificant relationship between tensile strength in weft direction and fancy weft, weave structure. From table [22,23] anova statistical analysis was found there is significant relationship between fancy weft material and fabric tensile strength in weft direction.

TABLE [20]ANOVA STATISTICAL ANALYSIS OF THE FANCY WEFT EFFECT AND TENSILE STRENGTH IN WEFT DIRECTION

ANOVA					
Tensile strength in weft direction		(Fancy weft effect)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1605.556	1	1605.556	0.409	0.532
Within Groups	62812.222	16	3925.764		
Total	64417.778	17			

TABLE [21]ANOVA STATISTICAL ANALYSIS OF WEAVE STRUCTURE AND TENSILE STRENGTH IN WEFT DIRECTION

ANOVA					
Tensile strength in weft direction		(Weave structure)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	349.778	2	174.889	0.041	0.96
Within Groups	64068	15	4271.2		
Total	64417.778	17			

TABLE [22]ANOVA STATISTICAL ANALYSIS OF THE WEFT MATERIAL AND TENSILE STRENGTH IN WEFT DIRECTION

ANOVA					
Tensile strength in weft direction		(Weft material)			
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42485.444	2	21242.722	14.528	<.001
Within Groups	21932.333	15	1462.156		
Total	64417.778	17			

TABLE [23]ANOVA MULTIPLE COMPARISONS WERE MADE BETWEEN WEFT MATERIAL AND TENSILE STRENGTH IN THE WARP DIRECTION.

Multiple Comparisons			
Dependent Variable:			
LSD			
(I) weft material		Mean Difference (I-J)	Sig.
cotton	polyester	117.83333*	0.000
	blended	44.50000	0.062
polyester	cotton	117.83333*	0.000
	blended	73.33333*	0.005
blended	cotton	44.50000	0.062
	polyester	73.33333*	0.005
***. The mean difference is significant at the 0.05 level.**			

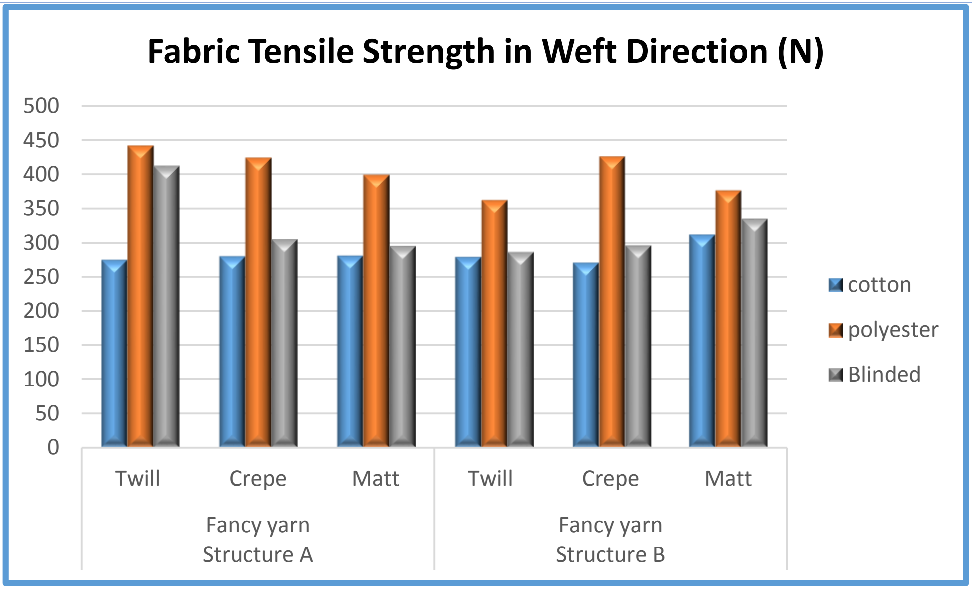


FIGURE [29]THE EFFECT OF DIFFERENT FANCY YARN MATERIALS, EFFECTS, AND WEAVE STRUCTURES ON FABRIC TENSILE STRENGTH IN THE WEFT DIRECTION

Conclusion

This research aims to study designing fabric with innovative fancy yarns to achieve aesthetic values in men's clothing fabrics.

When compared to other samples, the previous figures, tables, and relationships its found the Fabric samples produced from polyester material have scored the highest rates of stiffness in warp and weft direction. The relationship between stiffness value and handling is inverse, which means that cotton fiber samples have the best handle, followed by blended and polyester samples.

As the number of interlacement points increases, the effect of weave structure on stiffness in the warp and weft directions decreases. Because there are more interlacement points in crepe and Matt weave structures, they are stiffer than twill 1/3.

It is clear that fabrics made with polyester as a weft recorded the highest rates of tensile strength in the weft direction, followed by blended and cotton fabrics, respectively. This is because polyester fibers have a higher tenacity than other materials, owing to their extremely crystalline polymer system. This allows for the formation of very strong van der Waals forces as well as very weak hydrogen bonds, resulting in very good tenacity with polyester polymers.

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