

Technical Innovation in Fashion: "Multiple Design Possibilities with one Knit plan"



By:
Mr. Mohan
Kumar VK
& Dr. Nidhi
L Sharda

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Abstract

In today's apparel market, under the psychological influence of recession consumers desire to pay less for the apparels at the same time they also desire to personalize the style, fit and color of the clothes they buy. Most of today's consumers require high-quality customized products at low prices with faster delivery. [1] With this sort of consumer interest in mind, the concept of mass customization emerged in the late 1980's. Pine (1993) defines mass customization as “the mass production of individually customized goods and services” Given the changing characteristics of today's consumer interests and industrial competition, mass production systems cannot satisfy both manufacturers and consumers; however, a mass customization system may achieve both manufacturer and consumer satisfaction, providing a low-cost customized product [2]

Mass customization is a hybrid of mass production and customization. This mass customization system adopts the concept of serving a large market with low cost products created through mass production, and the application of new technology facilitates manufacturer responses to consumer drives for custom garments. To utilize mass customization, manufacturing processes must be flexible, and to be flexible, every step in the manufacturing process must have the ability to react quickly to changes in product design and to changes in consumer interests and needs. [3]

One of the most important innovative project of Issey Miyake, which is an excellent example of mass customization, has been the “APOC” collection (the acronym refers to “A Piece of Cloth,” a concept Miyake conceived early in his career), developed together with textile engineer Dai Fujiwara in 1999. APOC garments come off the loom as single flat tubes of fabric with varied patterns. Consumers simply cut them to size to create customised garments to individual fit. Not only does this reduce wastage, it allows consumers to become a part of the design process. With A-Poc, two apparently irreconcilable concepts customised clothing and mass-produced clothing are united for the first time ever. [4]

Such customised knitwear garments for sure requires certain amount of stretch ability. This stretch in the garments can be achieved by blending different types of elastomeric yarns with the fabric. [4] An Elastomer is a natural or synthetic polymer that, at room temperature, can be stretched and expanded to twice its original length. After removal of the tensile load it will immediately return to its original length. Spandex also known as elastene is classified as an elastomeric fibre. Spandex has many characteristics that have ingratiated it into the fashion industry. [5]

The most famous brand name associated with spandex is Lycra, a trademark of Invista (formerly part of DuPont). Fabrics with the use of Lycra have the ability to stretch five to six times their length and recover back to their original length. The composition of Lycra is a manmade eglantine fibre which is actually segmented polyurethane. Being composed of soft or flexible segments which are bounded together with a hard or rigid

segment, it is this molecular structure which gives the fibre its ability to stretch and return to its original shape.

The stretch phenomenon in garments has expanded dramatically for the past few decades. It was swim wear and stockings in the 70s and bicycle shorts and aerobic wear in the 80s. Body hugging garments in the late 80s and 90s have made stretch fabrics indispensable. [6]

Today's consumers are more sophisticated, educated, fashion conscious and affluent. They want their clothing to look good, feel good and perform with minimal upkeep. Lack of time and psychological pressure of recession surely demands for mass customised ready to wear garments. With this view an attempt is made in order to customise design process without much altering technical infrastructure. For this, a knitting plan is designed for skirt as an experimental initiative, which will be a viable solution for ever changing style, and will take care of varied anthropometric measurements for mass production was designed.

This design development requires insertion of elastomeric fibres unconventionally with varied percentage into different areas of the fabric, keeping in mind general anthropometric measurements of female torso. This technical intervention in designing of fabric will enable better fit and enhanced maneuvering ability to the garment thus improving the aesthetics and functionality without using additional garment construction details like darts seams, gourds, gathers, flair etc.

Objectives studied for this study are:

- To study the market space for custom made mass produced garments
- To study the compression factor of fabric in respect to lycra content
- To formulate knitting plan with varied percentage of Lycra for customised style and seamless finish garment.

Methodology:

Market survey was done in order to examine the existing customised mass produced garments retailed and to examine the response of the consumers for the need of customised ready to wear apparels. For this 100 females of 18 to 28 years from Bangalore were interviewed.

Market survey also revealed that Single Jersey fabric was found to be common for most of the customised ready to wear apparels, and therefore it was identified for the experimentation for the testing amount of compression in the fabric with the insertion of Lycra.

For this one meter each of Single Jersey fabrics with different percentage of Lycra content was knitted with 30's count, 170 GSM in 24 gauge machine.

All other machine parameters were kept constant. Composition of the fabric was as follows:

1. With no lycra
2. With 3% lycra
3. With 5% lycra

4. With 10% lycra
5. With 12% lycra

Analysis for each fabric was done for percentage of compression achieved by the fabric with respect to percentage of elastomeric fibre (Lycra) insertion.

By analyzing the requirement of varied horizontal measurement of the garment, knitting plan of Single Jersey fabric with varied percentage of Lycra was formulated for skirt.

Results & Findings:

Market survey revealed that most of the women of metro cities under the influence of recession are looking for low cost apparel which is unique. The concept of mass customization for low cost garment attracts them. The reasons felt were:

- Such garments will give them flexibility in terms of styles, fit as per the fashion requirement
- It will be dearth cheaper to ready to wear garments manufactured in conventional ways.
- In comparison to made to measure garments such garments will take less time for manufacturing.
- It allows consumers to become a part of the design process.
- Will find pleasure of uniqueness.

S. no	Items	Conventional method	Proposed
1	Fabric consumption	1.8 mt.	1.5
2	Fabric rate	Rs.50	Rs.50
3	Fabric cost	Rs.90	Rs.75
4	CMT	Rs.40	X
5	Finishing	Rs.10	X
6	Packing	Rs.07	X
7	Over head @7%	Rs.11	X
8	Mark up @ 15%	Rs.23	X
	Total	Rs. 191	Rs 75

Study of % Lycra vs. Compression:

It was found that in the case of 170 GSM Single Jersey fabrics with no Lycra open width achieved was 70 inches. As Lycra % was increased compression is achieved in the fabric though increase of compression is not proportionate to the increase of Lycra content (Figure2).

With 3% Lycra compression is 15%, when lycra % was increased to 5 percent compression in the fabric was 20 % approximately 52 inches. Similarly when % Lycra was increased to 10% compression achieved was 30% and fabric width achieved was 42” as shown in Figure no. 2 and graphically represented in Figure no 3

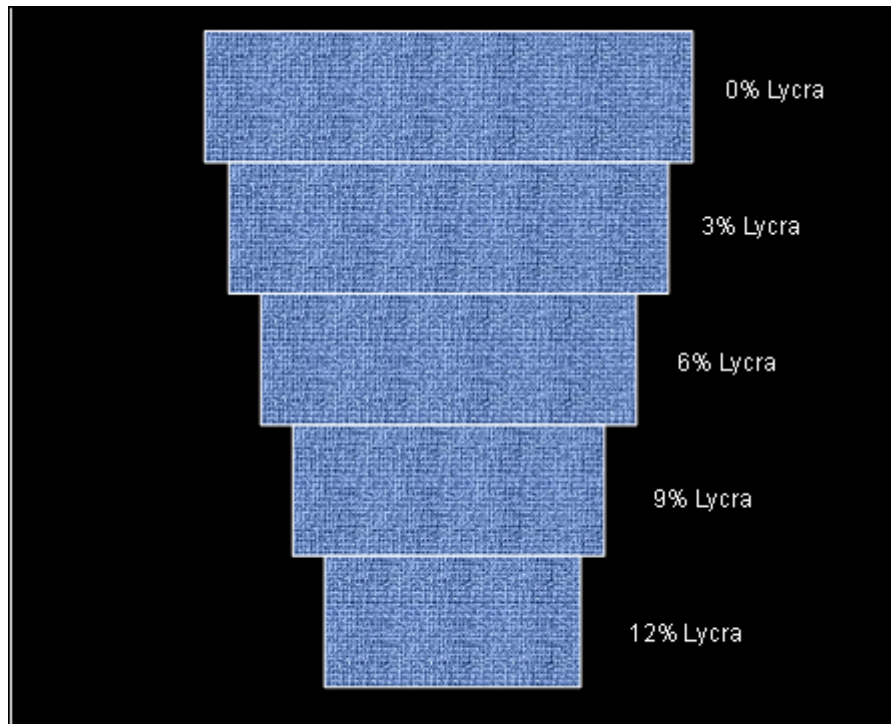


Figure1: Compression of fabric with insertion of Lycra

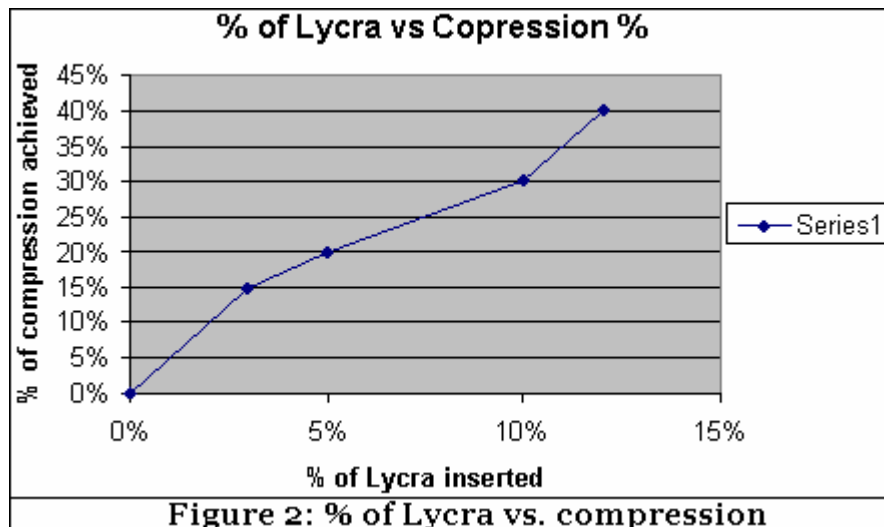
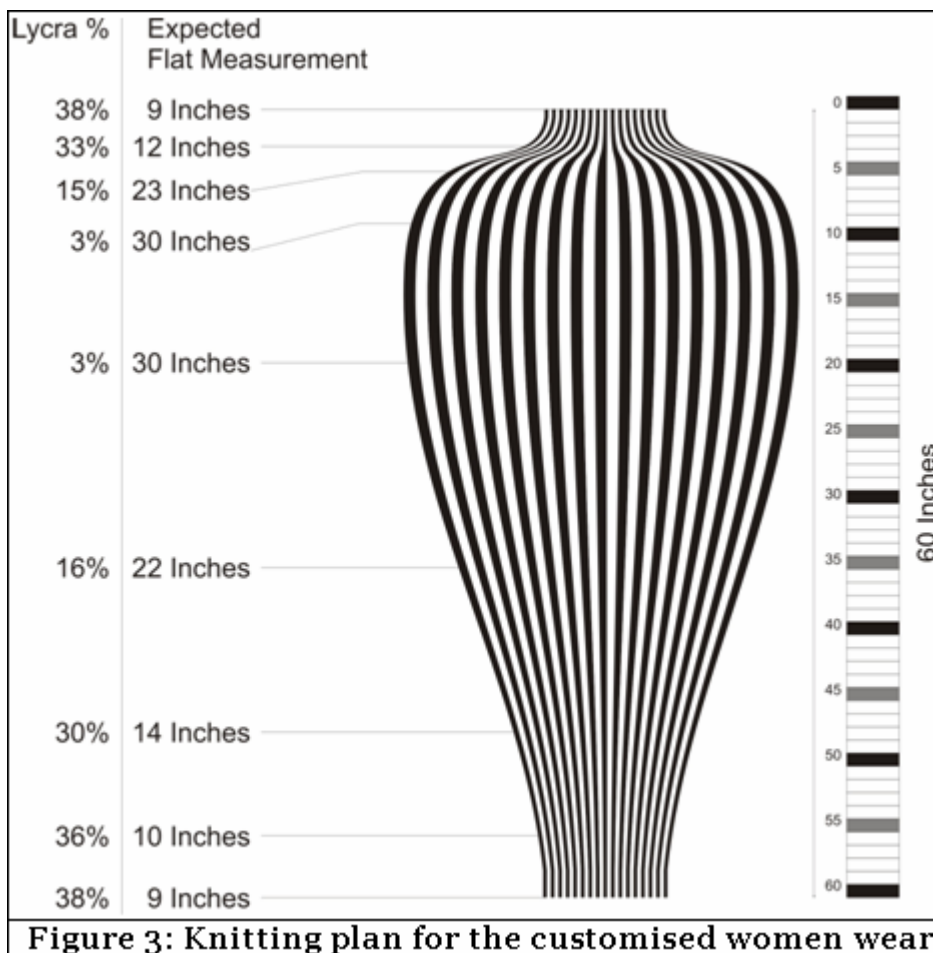


Figure 2: % of Lycra vs. compression

Development of Fabric with Varied % of Lycra Content as per Female Anatomy:

Horizontal body measurements shown in the figure no 3 were taken into consideration for developing knitting plan for skirt. Missy size ranges were taken for the development of the fabric with varied degree of Lycra content



Knit Plan Outcome:

- Possibility of various silhouette and its length & size..
- Such garments will give customer flexibility in terms of styles, fit as per the fashion requirement
- It will be dearth cheaper to ready to wear garments manufactured in conventional ways.
- In comparison to made to measure garments such garments will take less time for manufacturing.
- Will give psychological satisfaction of design intervention to themselves as to decide the final silhouette, length and size.
- Will find pleasure of uniqueness.



Figure 4: Some concepts

Conclusion:

Incorporating this plan for the production of mass customised garment a single fabric can be varied in styles in terms of silhouette viz; A line, tulip, and with side cowl. Length of the garment can also be adjusted as per the design and size requirement of a client. By using this design intervention consumers will have access to a variety of relatively low cost, varied style, customized apparel. This technical intervention in designing of fabric for women's wear will enable better fit and enhanced maneuvering ability to the garment thus improving the functionality without using additional garment construction details like darts seams or any other.

It is a commercially viable design intervention as it does not involve additional requirement in terms of raw material, processing time or infrastructure. Moreover unlike conventional garment construction technology where there is lot of wastage of material for pattern development, it involves no wastage, hence it has lot of market potential in fashion industry. As explained by Pine that using these technologies in the practice of mass customization will shorten product-life and development cycles as well as allowing manufacturers to respond more quickly and flexibly to changing consumptive drives.

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