

INCFAT '21

International Conference on Fashion Apparel and Textile (INCFAT'21)

*Proceedings of
online
International Conference on Fashion Apparel and Textile
(INCFAT'21)*

Theme: Textiles for Fashion Apparel: Changing Paradigms

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Amity Directorate of Applied Arts/Fine Arts/Performing Arts/ Visual Arts
Amity University Uttar Pradesh
Noida-201313 (U.P) India

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Message from Vice Chancellor



Prof. (Dr.) Balvinder Shukla
Professor – Entrepreneurship, Leadership, and IT
Vice Chancellor, Amity University, Uttar Pradesh
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I am pleased to learn that **Amity School of Fashion Technology** under Amity Directorate of Applied Arts/Fine Arts/Performing Arts/Visual Arts, Amity University, Uttar Pradesh is organising the 5th “**International Conference on Fashion, Apparel & Textile 2021 (INCFAT’21)**” in virtual mode on the theme ‘Textiles for Fashion Apparel: Changing Paradigms’ on 16th and 17th Nov 2021.

This conference is an initiative to deliberate on Fashion, Apparel and Textile Industry expectations from professional education and to bring together academicians, researchers, and experts for facilitating, interacting, and exchanging ideas for the same.

There has been a considerable change in industry dynamics due to the pandemic. Textiles and Apparel contribute substantially to the Indian economy with 5% contribution to the Indian GDP. Global apparel consumption shrunk in 2020 and thereby affecting textile exports. India’s Textile & Apparel exports reached US\$ 33.5 billion in 2019-20. Due to the impact of Covid-19, India’s Textile & Apparel exports fell around 15% to reach US\$ 28.4 billion in 2020-21. However, it is expected to grow certainly for the fashion e-commerce market.

I am confident that the informative sessions during the conference will be interactive, and the participant will benefit immensely from the expertise and experience of eminent speakers from the U.S.A, Indonesia, and Bangladesh.

I take this opportunity to extend my best wishes to all the guests, speakers, participants, and students for a very enriching experience during the Conference.

My Heartiest congratulations to the INCFAT’21 organising team and best wishes for the grand success of the Conference!

Prof. (Dr.) Balvinder Shukla

Message by Conference Chairperson (INCFAT `21)



Prof. (Dr.) Pradeep Joshi

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&

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Conference Chair

It gives me immense pleasure to welcome all delegates, industry members and esteemed speakers to online “International Conference on Fashion, Apparel & Textile 2021 (INCFAT `21)” (theme : “Textiles for Fashion Apparel: Changing Paradigms”) being organized by Amity School of Fashion Technology under Amity Directorate of Applied Arts/Fine Arts/Performing Arts/Visual Arts, Amity University, UP. Sub Theme for technical session of “International Conference on Fashion, Apparel & Textile 2021” are Sustainable Fashion & Textile, Marketing and Merchandizing for Fashion and Textile, Advancements in Apparel Manufacturing, Innovations in Textile & Apparel

INCFAT `21 proposes to deliberate on recent developments and trends in Fashion, Textile & Apparel industry with focus on Online Education in Fashion, Textile & Design: Opportunities & Challenges, Skill development and Entrepreneurship for Apparel Industry, Sustainable Fashion & Textile, E-Commerce in Fashion Business, Marketing and Merchandizing in Fashion and Textile, Advancement in Apparel Manufacturing, IT Applications in the Fashion Industry, Smart Textiles, Technical Textiles, Innovations in Textile Materials & Fashion, Competitiveness in the post COVID period.

Textile and apparel contribute 5% to India’s Gross Domestic Product (GDP) and constitutes 15% of the country’s export earnings. India with advantage in raw material (cotton, silk, cellulosic fibre) and easy availability of skilled labour, strong base of varied traditional design- colour- embroidery, combination provide key advantage to Indian textile & apparel Industry. Skill development is the thrust area of current Government for economic development of the country. Textile & Apparel sector has great potential for contributing towards

“make in India” achieving success as this sector has immense possibilities for starting entrepreneurial ventures even with low capital requirement for creative products.

Textile and Fashion Industry has witnessed tremendous challenges in the recent past due to Covid`19. Fashion Industry has substantial number of target customers whose buying pattern has got affected due to sudden changes in the work conditions due to pandemic. Further to it; type of the clothing requirement has also changed with more focus on casual cloths while purchase of formal, wedding and party wear etc. got suffered heavily during pandemic due to adverse economic conditions. E-commerce for apparel has got further strengthened and companies need to re-invent their business model to remain competitive in near future. To sustain amidst the fierce global competition in this sector, focus should be on new textile materials, pioneering & cutting edge technologies, skill development, innovative marketing and ecological and sustainable practices in fashion design.

The pandemic has impacted demand as well as supply in Textile and Apparel Sector. US & EU which are the key destination market for Indian apparel exports were having huge impact of this pandemic which has resulted in cancellation of many orders resulting in disruption in the garment manufacturing units in India. Further to it, since apparel industry is labor intensive and has significant number of migrant labor which also adversely affected functioning of the apparel manufacturing units. Global supply chain for Fashion & Apparel will still take time to stabilize and so will fashion and textile industry & hence all segment of industry are to strategically plan accordingly.

INCFAT`21 aims to bring together researchers, academicians & industry experts in the field of fashion and textile for facilitating deliberation in form of paper and poster presentation.

I take this opportunity to thank all invited Researchers, Delegates, Industry Leaders, Academicians & faculty colleagues who are associated with INCFAT `21 and making this reality.

I wish INCFAT `21 a great success.

Prof. (Dr.) Pradeep Joshi

Brief Profile of Invited Speakers

- **Mr. Anil Peshawari, Vice President, Noida Apparel Export Cluster**

He has graduated from Shri Ram College of commerce, New Delhi. After graduation, he passed his Chartered accountancy exam. After doing his CA practice, he started the garment export business in 1998 in the name of Meenu Creation. Today Meenu creation is a 400 crore plus turn over company. Its Main market is Europe and America. The company specializes in young fast fashion. Meenu creation is one of biggest supplier to Inditex group from India.

- **Mr. Avdhesh Sharma, Group CEO, Asmara International Ltd, Hong Kong**

Mr. Avdhesh Sharma, is the group CEO of Asmara International Limited, a leading global fashion company with offices in 14 countries like India, China, Dubai, Bangladesh, Indonesia, Pakistan, Srilanka, Turkey, Vietnam, Barcelona, Hongkong, Melbourne and New York. . He is an accomplished professional with proven management track record & 28 years of extensive experience in apparel Industry, with last 20 years focussed on apparel sourcing.

Prior to this , he served as Country Manager for Asmara’s Indonesia sourcing operation for three years. He earned his Masters in Management (MM) in 2001, from Asian Institute of management, Philippines.

- **Ms. Bela Shanghvi, MD, Navanidhi Design Solutions Pvt. Ltd.**

Belaa Shanghvi’s extensive career graph spans over 40 years working in revival of handloom, handcrafted and khadi techniques. in India and abroad. Over the years, her collections have been displayed across 23 countries via exhibitions, stores and various international museums including The Los Angeles County Museum of Modern Art and Kunst Museum, Basal. She has also addressed various industry conferences that including the UNESCO, Color Congress and Indigo; among other conference on Patola -Ikat, brocade and natural dyes. etc. Belaa’s passion is to bring handloom on the forefront and empower weavers and craftsmen to improve their per piece earning & their lifestyle.

Belaa is truly an artist rooted in Vedic traditions and Sanatan traditions approached from today’s angle. She love to revive traditional antiquated embroidery techniques, which are expressed via her textile murals that support 450 craftsmen who are grouped together on project need base. Her design studio Purnakala by Belaa Sanghvi (complete art) has a vision to revive antiquated handloom sarees. The word takes many forms in Sanskrit – knowledge, powers, arts, or levels of consciousness.

- **Mr. K.H. Radharaman, Textile Designer & CEO, House of Angadi**

He is founder, CEO and Principal Designer of The House of Angadi, Creative Director of the design Label Advaya, and international luxury ready -to-wear label, Alamelu. A self-taught designer, Radharaman hails from a family of master-weavers who have been in the business of textiles for over 600 years. Counting several royal families as their patrons over the centuries. Today he runs three labels through various stores. The House of Angadi (sold via the Angadi Galleria and the lovingly restored Angadi Heritage in Bangalore) is 20 years old. In 2010, he launched Advaya, a specialty line of heirloom-quality saris (actor Deepika Padukone wore two kanjeevarams from Advaya for the wedding ceremonies in Lake Como, Italy, three years ago). And the newly launched Alamelu that takes textile to a global ready-to-wear audience. Even before he dressed up the platinum-club movie star, Radharaman’s Angadi enjoyed cult status.

- **Ms. Kamal Kapoor, Owner of Achievers Consulting, Ex-President Pearl**

She is the owner of achievers consulting which provides recruitment help, portfolio teaching, training, consultancy and soft skills for management schools and business houses. Prior to that, she has worked as director with various apparel industries like Modelama Exports Pvt. Ltd., Pearl global ltd, ORGAAN India pvt. ltd. She graduated from Miranda House, Delhi University. She has excellent leadership qualities and communication skills along with other specialization like product development, marketing and supply chain management Global Modelamma Exports, Mona Designs.

- **Mr. Kazi Iftaquer Hossain, President, Bangladesh Garment Buying House Association**

Kazi Iftaquer Hossain', born and brought up in Bangladesh experienced in the garments Trade for 37 years in home and abroad. Working in international companies 'M/S Shah Safari' / 'Pepe Jeans' and proline as a garments brand retailers and trading house. He has got an experience with brand like Slazenger / Kangol. His extensive work expertise covered total value chain of sourcing to shipment of merchandise. Working closely with brands and interprets to local manufacturer. His working with eco-friendly product for the save of planet. He is involved with the organization as a President of 'Bangladesh Garments Buying House Association' which is a one of the largest association in Bangladesh for readymade garments.

- **Dr. Kusum Chopra, Ex-Chairperson NIFT, Delhi**

Dr. Chopra was formerly Professor and Chairperson of the Department of Fashion Design at NIFT. A Ph.D. from I.I.T. Delhi, Prof. Chopra has rich experience of more than thirty years of teaching, research and professional experience. She has held the positions of Chairperson – Fashion Design at NIFT and coordinated the setting up of NIFT Centers at Mumbai, Chennai & Kolkata. During the course of her career she has handled various consultancy projects related to product development, research, costumes, display and publication. She is on the advisory board of many reputed fashion educational institutes.

- **Ms. Madhu Jain, Craft Revivalist and Textile conservationist**

The work of craft revivalist and textile conservationist Madhu Jain, designer extraordinaire, is synonymous with *swadeshi*. Since launching her label in 1987 she has worked extensively with natural fibres, for which body of work she has carved a niche for herself as the country's most respected textile revivalist, whose museum-quality textile creations and revival of rare, extinct motifs and textiles are embedded in strong Indian roots. Her forte lies in creating new textiles in distinctive combinations of two different weaving traditions. In keeping with her passion for eco-friendly bio-degradable textiles, she was instrumental in introducing bamboo as an alternative textile in India, which she showcased in 2004 at the 7th World Bamboo Congress. She also used her textile in fashioning a giant installation for the opening ceremony of the Commonwealth Games 2010 in the "Fabric of India" segment. After many more years of R&D, she refined bamboo-yarn to a precision and infused it with a silk Ikat blend. This Bamboo-Silk Ikat, a first in the history of textiles, is 100% biodegradable, sustainable right from procurement to production. As member, All India Handlooms Board, an advisory body of GOI's Ministry of Textiles which is tasked with formulating policy decisions on the handlooms sector, Madhu hopes to make a difference in promoting artisanal livelihoods. Some of the major awards won by Madhu include: Nari Shakti Puraskar 2017, the "highest civilian honour for women" presented at Rashtrapati Bhawan by the President of India, recognizing Madhu as a torch bearer for the younger generation and as a catalyst of change for women and society.

- **Ms. Parul Parti, Country Manager, Lindex India Pvt. Ltd.**

Ms Parul is a progressive, result oriented sourcing professional and a business leader in the true sense. She is an apparel merchandising and production Management Specialist with expertise in providing strategic direction

and leading Sourcing Operations, Supply Chain management, Vendor Management and Business Growth across all fashion products.

Starting her career as a merchandiser with Pearl Global in 1995, she has grown with every passing year. She has held leadership positions at some of the topmost apparel sourcing offices like Triburg , GAP, Asmara. Her experience includes heading apparel sourcing for Grupo Kaybee from Shanghai, China. She is currently heading the liasion office of Lindex as their country manager.

Her versatile experience, keen sense of Design combined with strong Technical and Product knowledge, Range Curation / Brand Management exposure, Sustainability initiatives have helped her to implement innovative ideas in a pragmatic and profitable way for progressive business growth.

- **Ms. Pratima Pandey, Renowned Fashion Designer**

Pratima Pandey is a NIFT (New Delhi) post-graduate in Fashion design. The label Prama by Pratima Pandey in New Delhi specialises in fusion garb with Indian Sensibility. The emphasis of the label is on the natural fabric and dyeing techniques as well as creating garments focusing on encouraging Craftsmanship and sustainability.

- **Ms. Protima Chakraborty, Founder and MD Jute Land, Bangladesh**

She has experience in implementation of business development services for private sector and management of projects. Progressively complex experience with the chambers /Associations for strengthening the capacities of the private enterprises with Bangladesh Government's policy of private sector economic growth. She is awarded by Women Economic Forum(WEF) as 'Iconic Women Creating a Better World for All/ Iconic Leaders Creating a Better World for All.

- **Mr. R.C. Kesar, Director General, Okhla Garment and Textile Cluster**

Mr R C Kesar, presently Director General, OGTC (Okhla Garment and Textile Cluster), is a highly experienced Textile professional with over 55 years of experience in the Textile Industry. He started his career as a Textile Graduate Trainee and went on to become CEO and Board level positions. He has represented Textile Association during formulation of Textile Policy and Technological up gradation Fund Scheme (TUFS) at the Government and Industry interaction and a Key crusader in getting cotton textiles free of excise duty.

- **Mr. Ramandeep Singh, CEO Boutique International**

Experienced Partner with a demonstrated history of working in the apparel and fashion industry. Skilled in Textiles, Fashion, Strategic Planning, Apparel, and Business Strategy. Strong entrepreneurship professional with a Master of Business Administration (MBA) focused in Business Administration and Management, General from Duke Fuqua School of Business.

- **Mr. Ram Sareen, Chairman and Founder Tukatech Los Angeles, CA U.S.A**

For half a century, Mr. Ram Sareen has served the garment industry with an extensive history characterized by one word: disruptive. This philosophy is ingrained in Tukatech, the fashion technology solutions company mr Sareen founded in 1995.

Tukatech is credited with successfully bringing digital pattern making to dozens of countries and are an innovative leader in virtual sample making for design and fit with real-time motion simulation. They were the first to develop and implement on-demand manufacturing processes and are known for advanced cutting room solutions. Tukatech's robust systems are implemented by fashion experts from all corners of the garment industry.

- **Dr. Roopak Vasishtha, CEO, Apparel Made ups & Home Furnishing Sector Skill Council**

Dr Roopak Vasishtha is CEO, Apparel Made ups & Home furnishing Sector Skill council. He is Phd from University of Rajasthan. and MBA from ISB.

He has Created the National Occupational Standards and Qualification Packs of 45 Job roles in the Apparel Industry. Affiliated more than 4500 Training Partners across the country to carry out trainings on the NOS basis. Affiliated 46 Assessment Bodies of IL&FS, Accenture and E&Y fame to assess the trainees of the 4500 Training Partners. Arranged for more than 1.2 million trainings across the country. Additional 0.45 million currently underway.

- **Mr. Salil Chawla, Director DFU Publications**

Mr. Salil Chawla, Director DFU Publications- He is In the space of T & C (Textile & Clothing) since over three decades and having been a witness to this ever evolving most globalized industry has helped him to gain trade insights and deep understanding. He has blissfully enjoyed every single moment of this fulfilling intriguing journey.

- **Dr. V. K Kothari, Emeritus Professor, IIT Delhi**

Prof. V. K. Kothari is emeritus professor at the Department of Textile Technology, IIT Delhi and worked with this elite institute for more than 40 years. He specializes in Testing and Quality Management, Nonwoven Fabrics, Technical Textiles, Clothing Comfort. He is renowned textile technologist and educator who authored several national and international books in the field of textiles. He has published over 100 research papers and has been in editorial board of several national and international research journals. He has done elaborate research in the development of protective clothing for defence personnel and developed a vast comfort laboratory at IIT Delhi.

- **Mr. Vijay Mathur, DG & CEO and Executive Director, Apparel Training and Design Center**

He has over 42 years of experience in the Fashion & textile industry is Currently Executive Director in Apparel Training and Design Centers, managing 138 Training Centers and 10000 Training. Former Additional Secretary General AEPC, looking after garment exports of \$ 17 billion; policy making in Commerce, finance, labor issues. He was the Former Chairman Glocal Skill Management Pvt Ltd New Delhi; managing skill Assessment in Apparel skill space. Former Sales Manager in Maharashtra State Textile Corporation. Former Assistant Manager in National Textile Corporation. Worked in Glaxo Labs Ltd; JK Tyres.

- **Mr. Yudhveer Singh Ahlawat, VP DAKS India Pvt. Ltd.**

He is the Vice President at DAKS India which is a systems driven manufacturing and export house that translates values of humanity and empathy into quality. With more than 25 years of experience, Mr Yudhveer has made a mark for himself in Marketing, Merchandising, Product Development, Operations and Vendor Development in diverse apparel manufacturing and sourcing set-ups. With an educational background in Production Technology from NIFT, he holds a strong technical knowhow and conceptual framework to achieve organizational goals and its objective.

His career path has grown from strength and strength with experience in manufacturing, project management, merchandising, business development, team building and profit- centre management across companies like Triburg, Hollit International, Kasba and DAKS India.

Contents

| | |
|---|------------|
| Editorial Board..... | i |
| Message from Vice Chancellor | iii |
| Message by Conference Chairperson (INCFAT `21) | iv |
| Brief Profile of Invited Speakers | vi |

Technical Session I Sustainable Fashion & Textile

| | |
|---|-----------|
| 1. Using Social Media Platforms to Attract Customers to Sustainable Fashion | 3 |
| <i>Sagar Sehrawat, Prof (Dr.) Pradeep Joshi</i> | |
| 2. Amalgamation of Weaving and Painting – A Step towards Sustainability Perspectives on Fashion and Textile Education..... | 8 |
| <i>Prof. (Dr) Madhu Sharan, Mamta Kumari</i> | |
| 3. Scope of Sustainable Practices in Indian Textiles Industry | 12 |
| <i>Dr. Smita Bagai</i> | |
| 4. Green Fashion Impact on Young Customers and their Concerns for Sustainability | 20 |
| <i>Priya Malik</i> | |
| 5. An Attempt to Review Sustainable Block Printed Textiles of Pipar | 24 |
| <i>Dr. Akanksha Pareek</i> | |
| 6. Role of Packaging in Fashion Industry & Re-usable Packaging Methods for Sustainability..... | 29 |
| <i>Deepali Mudalgi, Hemalatha I Doddamani</i> | |
| 7. Horticulture Waste towards Sustainable Textile and Fashion | 32 |
| <i>Sumi Haldar, Prof. Madhu Sharan</i> | |
| 8. Sustainable Fashion - Reuse, Repair and Reconstruct..... | 36 |
| <i>Anupama Patil, Hemlatha I Doddamani</i> | |

Technical Session II Marketing and Merchandizing for Fashion and Textile

| | |
|--|-----------|
| 9. An Investigation of College Going Student's Buying behaviour Towards Athleisure | 41 |
| <i>Jasleen Kaur, Dr. Anu H. Gupta</i> | |
| 10. Product Involvement & Perceived Value: Influencing Nature of Brand Loyalty in Apparels Sector | 48 |
| <i>Neha, Prof. (Dr.) Pradeep Joshi</i> | |
| 11. Marketing and Merchandising in Fashion and Textile..... | 51 |
| <i>Sabira Fernandes</i> | |
| 12. Impact of Social Factors & Cultural Factors on Consumer Behavior..... | 55 |
| <i>Vanshika Bansal, Prof. (Dr.) Pradeep Joshi</i> | |
| 13. To Understand Consumer Perception and behavior of Online Shopping of Lingerie | 63 |
| <i>Shalini Verma</i> | |

Technical Session III Advancements in Apparel Manufacturing

14. **Visual Techniques as a Tool for Advancement in Apparel Factory Management** 69
Dr. Ishwar Kumar
15. **A Study on Preferences amongst Women and Trans Women in Relation to Brand Choices**..... 75
Neha Singh, Dr. Pintu Mishra, Dr. Rena Mehta, Dr. Divya Sharma
16. **Integration of Masks with the Garment as an Essential Accessory** 79
Mohan Kumar, Dr. Vandana Bhandari
17. **Impact of Pandemic on E-commerce Fashion Industry** 84
Shivani Chandra
18. **Occupational Health Hazards in Small Scale Garment Manufacturing Units** 87
Anima Mishra, Dr. Chanchal, Dr. Bhupinder Kaur
19. **Skill Development - A Paradigm for Multidimensional Growth of Textile & Fashion Industry** 94
Yamini Jhanji

Technical Session IV Innovations in Textile & Apparel

20. **Evolution of Waterproof and Water Resistant Fabrics for Garments** 101
Abhishek Kumar, Dr. Manpreet Manshahia
21. **Cosmetotextiles: A Futuristic Technical Textile** 104
Dr. Anima Jamwal
22. **Green Technology in Textile Industry** 108
Sharina Mahajan , Krishma
23. **Need to Develop Reuseable Cotton Fabric Diapers: A Sustainable Approach** 111
Dr. Charu Kohli, Dr. Rita Kant
24. **Offering Ornamental Textiles as a Devotional Practice**..... 116
Rati Arora, Dr. Anu H. Gupta
25. **Engineering Ideal Stretch Compression Apparel** 121
Dr. Surinder Tandon
26. **Weaving the Recycled Fabric (Cigarette Butts) with Traditional Art (Hase Chittara) to Create Contemporary Dress** 125
Tejashvi V., Hemalatha Ishwar Doddamani
27. **A Short Note of Importance of Grain in Fabric and Sewing Pattern** 128
Rashika
28. **Resource-Use of Oak Tasar Silk Waste Via Blending with Viscose Fibre to Evolve Resultant Yarns and Knitted Fabrics**..... 132
Dr. Pooja, Dr. Sandeep Bains

29. **Craft Cluster Implementation in Government Girls Schools- Employment for Girls** 136
Neetu Malhotra, Prof. (Dr.) M.K. Nair

Poster Presentation

1. **A Study on Dominance of Hollywood Styles on Fashion**..... 144
Parvati Sharma, Vasundhara Saluja
2. **A Qualitative Study on Consumer Behaviour towards Customized Digital Prints which are Self-Expressing and Appealing for Urban Millennials** 144
Prathishta Singh, Vandana Tripathi Nautiyal
3. **A Study on Role of Sakhi Entrepreneurs in Growth of Rural Area** 145
B C Anant
4. **Study on Consumer Behaviour of Gen-z towards Vibrant, Bold and Artsy Prints in High Fashion Apparel at an Affordable Price** 145
Sakshee Saitwal, Vandana Nautiyal
5. **Goth : A Strong Sense to Portray Androgynous Fashion for Menswear**..... 146
Shivangi Singh, Vasundhara Saluja
6. **Celebrity Fashion Influence Over Millenial Men** 146
Udisha Singh, Vasundhara Saluja
7. **A Qualitative Study on Consumer Behavior Towards Customization for all Sizes and Body Types** 147
Shriti Das, Vandana Tripathi Nautiyal
8. **Rethinking Pink for Indian Men**..... 147
Udita Shree, Vasundhara Saluja
9. **Unconventional Sustainable Textile Fibres for Luxury Fashion Industry** 148
Shaista Atiq, Dr. Simmi Bhagat
10. **A Study on Silver Metallic Material for Menswear**..... 148
Shweta Dagar, Vasundhara Saluja

TECHICAL SESSION I
SUSTAINABLE FASHION & TEXTILE

Using Social Media Platforms to Attract Customers to Sustainable Fashion

Sagar Sehrawat¹, Prof (Dr.) Pradeep Joshi²

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ABSTRACT

The purpose of this study is to investigate the factors that influence consumer engagement with sustainable fashion firms across various social media platforms such as Instagram, Facebook, and others in order to answer the research question: what factors influence the popularity of sustainable fashion among digital consumers? A limited number of global fashion retailers have been identified and classed as (a) sustainable fashion brands (SFB), (b) sustainably aware mainstream corporations (SAB), or (c) conventional fashion brands (TFB). The content of the retailer's Instagram postings over the past few weeks was reviewed and categorised by content topic. Data was analysed for the number of Likes and Comments in order to develop engagement strategies for each of the brand groupings (engagement). This research provided sustainable fashion best practises and social media strategies for three brand categories of fashion shops. This research looked at a number of global fashion corporations to uncover "best practises" for connecting digital customers with sustainable messaging through Instagram. The results are novel, especially in the field of fashion marketing, which use social media to convey brand identity to digital customers in order to grow the firm.

Keywords: Brands, sustainability, social media, consumer participation, and digital consumers.

1. INTRODUCTION

In the fashion business, companies with a focus on sustainability have acquired customer trust, incentivizing additional firms to prioritise sustainable activities (Rosmarin, 2020). These initiatives correspond to customers' growing willingness to buy from companies that support a social or environmental purpose (Amel et al., 2009; Shen et al., 2013). Consumers are becoming more environmentally conscious, including an increased awareness of fashion consumption and disposal (Amel et al., 2009; Shen et al., 2013; Rosmarin, 2020). Millennials (28%) and Gen-Z customers (31%), more than any other problem, regard environmental protection to be their top priority (Deloitte, 2020).

Many companies are utilising social media to express their goals to customers as they establish sustainability projects (Onete et al., 2013; Li and Dou, 2017). Social media is defined as "new media tools that facilitate interaction and co-creation and enable the production and sharing of user-generated content within and between organisations and people" (Filo et al., 2015, p. 4). Social media fits perfectly with today's digital atmosphere as a platform where

postings may be utilised to deliver long-term messages (Amed et al., 2017). Social media enables companies to interact directly with customers and get rapid feedback via likes, shares, and comments (Nelson et al., 2019). At the start of 2020, there were 3.8 billion social media users globally (an increase of around 9% from the previous year) (Kemp, 2020a), and by October, the number had risen to 4-billion, with 2-million new users added every day (Kemp, 2020b). As of October 2020, the typical social media user spent around 15% of their waking time on social media (Kemp, 2020b).

A number of branding messages are communicated through social media (Briggs, 2010). As organisations manage social media communications, it is vital to understand successful consumer contact strategies for development, especially when it comes to the "sustainable" message. However, participation may differ based on the kind of organisation, such as those that are focused on sustainability vs others who utilise sustainability as a sidebar to the primary marketing statement. Previous research has looked at social media as a platform for sustainability (Reilly and Hynan, 2014; Li and Dou, 2017), A cross-section research of global fashion

enterprises' sustainability marketing through social media is still needed to identify best practises for customer participation. Furthermore, although sustainable fashion companies convey both fashion and sustainability principles, it is uncertain whether style of marketing elicits the most reaction from buyers.

The purpose of this research is to investigate the elements that impact customer involvement with sustainable and environmentally aware fashion companies on social media (described in the methodologies section: Phase 2). The section "Phase 2: Consumer Engagement via Likes and Comments" in the methods section covers "Phase 2: Consumer Engagement through Likes and Comments." The study's purpose is to address the following research questions:

- What message tactics do fashion companies use to interact with their customers?
- What messaging tactics do fashion companies use to interest shoppers in the concept of sustainability?
- What are buyers' reactions to fashion companies' messages regarding sustainability?

2. REVIEW OF LITERATURE

Content-based social media advertising is an important way to reach customers (Ramanathan et al., 2017). There are social media communication platforms including Facebook, Twitter, Instagram, and TikTok. Several research have focused on consumer interaction through Facebook (e.g., Escobar-Rodrguez and Bons on Fernandez, 2017; Jin and Rye, 2019a; Nelson et al., 2019), whereas others have focused on customer involvement via Instagram (e.g., Bakhshi et al., 2014; Jang et al., 2015; Li et al., 2018; Jin and Rye, 2019b). However, there is a chance to investigate consumer interaction with sustainable message via social media, especially Instagram, in order to uncover best practises for fashion company marketing. This opportunity is timely since consumers have shown growing interest in environmental and social sustainability issues (Chery, 2020).

Instagram users may utilise posts to share photographs or videos with other account holders. With over one billion monthly users (Kemp, 2020a), more than 200 million Instagram users visit at least one business profile per day (Instagram Business, 2020). While it is not the most popular social media site, Instagram is often regarded as

the most important social media channel for fashion brand marketing (O'Connor, 2018). It is responsible for 50% of all fashion posts posted on social media sites. The popularity of Instagram illustrates the need of doing fashion marketing research on this platform. As a consequence, the emphasis of this study will be on consumer engagement with long-term brand messaging delivered through Instagram.

Instagram users connect with one another using the "Likes" and "Comments" features. Users may "Like" another user's post by double-clicking on it, or they can react to the post with a particular "Comment." Instagram posts may also be in a number of forms, such as a single picture, multiple images, videos, [image of] text, text-embedded photos, or text-embedded videos. According to Gandomi and Haider, the format of a post influences consumer engagement (2015). As a consequence, the post format was recorded in this research since it may have an influence on total consumer participation. Sustainable communications delivery approaches to customers have been investigated. Reilly and Hynan (2014) investigated how organisations tackled sustainability by reviewing Chief Executive Officer (CEO) letters and annual Corporate Social Responsibility (CSR) reports from several major corporations. They discovered considerable disparities in sustainability communication across sectors, especially among organisations that labelled themselves as "green." Dovleac (2015) investigated the use of social media as a tool. For disseminating knowledge about sustainability concerns and found it to be a relevant and effective tool. According to Rettie et al. (2013), displaying sustainability inside typical marketing communications may mainstream notions. According to Johnstone and Lindh (2017), social media influencers (i.e., people) influenced customers' sustainability awareness.

While academic research on sustainability engagement has been conducted, no formal research on best practises for promoting businesses' sustainable values and activities via social media has been conducted. Furthermore, there is a lack of study comparing the social media messaging approaches of businesses concentrating on sustainability versus corporations with sustainability as a peripheral message in order to find industry marketing best practises for optimum customer participation. As a consequence, this research will look at how customers engage with sustainability messaging via Instagram feeds in order to uncover best practises for sustainable fashion businesses, sustainably conscious fashion brands, and TFBs.

Researchers have recognised the unique purpose and effect of the paid, owned, and earned media (POEM) paradigm. POEM was chosen as the best framework to guide this research since social media has emerged as an important route of communication (Jackson and Deckers, 2013). Paid media refers to advertising paid by the firm, such as promoted posts, social media banners, and partnerships with influencers. Websites and social media accounts are examples of owned media that belong to and are controlled by the corporation. Earned media includes free media, exposure, and user-generated content. Owned media has been shown to be more powerful in the field of marketing (Jackson and Deckers, 2013). Furthermore, studies discovered that consumers trust user-generated material on social media more than sponsored social media marketing (Coker et al., 2017). As a consequence, this research focuses on brand-generated social media posts meant for their followers – individuals who want to receive media given by the firm rather than paid advertisements accessible to non-followers.

3. METHODOLOGY

This research used a mixed methods approach (Shekhar et al., 2019). Thematic, qualitative, and content analysis were utilised to examine the visual content of social media posts (Braun and Clarke, 2006). In addition, quantitative analysis was used to analyse customer involvement via Likes and Comments across post kinds, brands, and brand groupings. This technique is endorsed for social network analysis by Stieglitz et al. (2018), who identified three essential areas of social media analysis: trend or topic identification, sentiment analysis, and statistical analysis. As a result, the research was divided into three stages. In Phase 1, identify main themes by qualitatively examining Instagram posts from three different companies (sustainable fashion brands, sustainably aware fashion businesses, and traditional fashion brands). Phase 2 saw the development of a tool to measure and compare customer engagement across brand types and social media message types. This includes the Like-ratio, which is discussed in length in the "Phase 2" section below. In Phase 3, qualitative and quantitative conclusions were triangulated using aggregated data. Fashion brands were carefully picked to highlight a broad spectrum of environmental issues. Sustainable fashion brands, environmentally conscious fashion brands, and conventional fashion companies were separated into three groups. Sustainable fashion brands were described as those established on one or more sustainable principles (SFB). Sustainably aware fashion companies (SAB) are

those that did not start with sustainable values but have made a public commitment to sustainability. Traditional fashion brands (TFB) were defined as businesses that had not made sustainability a public policy priority. An initial list of brands was compiled in equal parts per brand type. The overall number of brands was then reduced but the total number of Instagram posts by each brand group remained constant. Because of the different frequency of postings by brand group, more brands were kept in the SFB and SAB groups than in the TFB group during the group reduction phase. This, however, guaranteed that each group got a comparable amount of total postings for both qualitative and quantitative analysis.

4. FINDINGS

There were 772 total posts evaluated throughout the three brand groups, including 239 posts from SFB (31%), 195 posts from SAB (25%), and 336 posts from TFB (36%) (44 percent). SFB posted 1.14 times per day on average, SAB 1.16 times per day on average, and TFB 2.29 times per day on average. Each post received an average of 38,573 Likes. SFB earned an average of 10,302 Likes per post. SAB earned an average of 51,903 Likes per post, but TFB received an average of 51,673 Likes each post.

Thematic content analysis showed 19 themes, including sustainability, charity, social awareness, fashion, lifestyle, current events, general branding, promotion/sale, celebrity, meme, art/creative, animals, cuisine, and beauty. Eight new subjects have emerged in the realm of sustainability. Topics addressed included general sustainability, social sustainability, environmental sustainability, philanthropy, social awareness, and current events. There were eleven lifestyle-related issues that emerged. Fashion, Lifestyle, Celebrity, Meme, General Branding, Promotion/Sale, Art/Creative, Animal, Beauty, and Food were among the categories.

The most popular sustainable fashion labels did not overtly mention "sustainability" in their articles. In terms of sustainability, there is just a sliver of agreement between "activity and awareness." In the present research, there was a contrast between sustainable aware persons and sustainable post-engagement individuals. Significant relationships between social identity and fashion engagement were observed when comparing across fashion and sustainability, providing a possibility for further research.

It's probable that fans of sustainable goods are aware of environmental issues, and that by supporting such firms, they're demonstrating their activism, obviating the need for a regular sustainability message on social media. Despite the fact that there were much less postings on sustainability across environmentally aware and traditional fashion enterprises, reactions to posts about sustainability were often higher than the average response rate. It's conceivable that these buyers were unfamiliar with sustainability and/or didn't expect to see it from companies, making the message more enticing. Consumers were most engaged with single picture uploads across all brands. There were considerable disparities in engagement between Likes and Comments. According to the research, video postings garnered little comments despite obtaining a large number of likes. In contrast, likes for multiple picture postings were low, but comments were high.

5. CONCLUSION

The purpose of this study was to discover how customers felt about sustainability and sustainable fashion firms on Instagram. In this research of environmentally friendly fashion firms, emergent, intriguing topics were uncovered, as well as specialised forms for general and environmentally friendly fashion messaging to keep followers engaged. In summary, several successful methods were discovered. Instagram followers are looking for posts that are both entertaining and visually attractive whether it comes to SFB, SAB, or TFB social media strategy.

Sustainability was incredibly engaging to a customer who was unfamiliar with the issue or how it linked to the brand, although consumers who were previously acquainted with the brand's sustainable message were engaged by exciting new information or when it was presented in an unexpected manner.

Academics, industry experts, sustainable fashion enterprises, and brands interested in sustainable initiatives may find the study's findings interesting. This study might help sustainable fashion companies by demonstrating "best practises" in consumer interaction and providing academics with a baseline for measuring fashion sustainability social media participation on a bigger scale. This study contributes to our knowledge of how sustainable fashion companies vary from traditional fashion businesses in terms of follower engagement. Future research possibilities exist to continue studying

sustainable best practises. Because of the possibility of skewed responses from Comments, such as "Comment for a chance to win!", the majority of the analysis in this research concentrated on Likes; as a result, variations in involvement via Likes and Comments may be investigated in future studies. It is also feasible to compare best practises from various social media sources. The contrast of Instagram, a visual social media tool, to Twitter, a vocally engaged one, is especially intriguing. Because this was a broad fashion research that encompassed any store selling clothing, footwear, or fashion accessories, the opportunity to examine certain parts of the company existed. Furthermore, as technology progresses and consumer preferences change, academics and business experts will need to examine consumer interaction preferences on a frequent basis and adapt policy appropriately.

This research looked at a number of global fashion companies to uncover "best practises" for engaging followers with long-term messaging on Instagram. The findings of this research are unique, particularly in the field of social media-based sustainable fashion marketing.

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Amalgamation of Weaving and Painting – A Step towards Sustainability Perspectives on Fashion and Textile Education

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ABSTRACT

Bhagalpur, a divisional town in Bihar is situated on the bank of river Ganga. It is popular for its Tassar fiber and its variety. So It is also known as “silk city” of India. Another than this, Bhagalpur also has its own traditional folk art i.e. “Manjusha painting”. “Manjusha” art is only an art form in history of India which has a sequential series of representation of the story. This painting is based on a story which is related to “Bihula – Bishari Gatha”. In this painting mainly three colours are used i.e. pink, green and yellow. Characters are displayed as “X” letter of English alphabets. Main motifs of Manjusha art:-Snake, Champa flower, Sun, Moon, Elephant, Turtle, Fish, Maina bird, Lotus flower, Kalash, Arrow, Shivling and Tree. Border is important in this painting so lots of border design are used eg-belpatra, laheriya, triangle, mokha and series of snake. Border is important in this painting so lots of border design are used eg-belpatra, laheriya, triangle, mokha and series of snake. So Bhagalpur is a great platform of artist and weavers for their showing talent and creativity in present and future both by producing innovative textile designs and consequently products. Creating designs from local traditional art (Manjusha Painting) will have dual purpose. It will help the revival of traditional art as well as innovative designs for weavers the motifs from Manjusha, the designs created will be unique preserving traditional art and weavers will be able to bring new design and products in the market. Post pandemic, the craft industry holds the largest potential to grow as there is growing demand for sustainable, organic and slow object. Creativity, culture and economics and technology have enough potential to generate income, job and export. Co-creation help in creating product without guilty. So It is amalgamation of weaving and painting a step towards sustainability.

Keywords : *Bhagalpur, Manjusha, Tussar silk, weaving, Painting, Handicraft*

1. INTRODUCTION

Handloom sector is a good example for sustain our environment and tradition. It is the oldest method of making cloth by hand. So the meaning of sustainability is that avoidance of the depletion of natural resources in order to maintain an ecological balance.[1] The sector provides millions of employments to rural regions of the country either directly or indirectly. This is considered one of the largest employment sectors next to agriculture. Handloom products occupy approximately 40% of the products produced in the Indian market. The handloom industries are termed as the art and craft sector, and it is a part of Indian heritage by representing the richness and diversity of our country. [2]

In traditional textile mainly used organic, recyclable or compostable material because they had treated by traditional method. It is safe and non-toxic and social impact is fair. Handloom textiles is attracting growing interest in fashion markets because of increasing concern

about exploitation in production, thus encouraging interest in the economic benefits of fairly traded, high quality materials and the potential contribution of handloom to sustainability in the fashion industry. [3]

The handloom product provides large employment for improving lifestyle. So the revival of textile tradition is unique idea and this area the government has offered lots of scheme like –skill India, Digital India, Aatamirbhar Bharat and Vocal for local also. They are showing positive result and as a result leading to a much better position of handloom and handicraft rural industry. Investing in the craft to improve the economic, environment and social condition of rural communities.[4]

The handloom sector is currently facing numerous problems attributed to obsolescence of technology and traditional production techniques, high price of yarn, inadequate availability of dyes, paucity in designs, inadequate skill retention and upgradation, inter-generational shift in occupational preference and

inadequate marketing and sales. Marketing handloom products currently requires appropriately oriented statesupported micro-economic strategies that augment livelihood security.[5]

In spite of this there are lots of need in handloom sector like –infrastructure support, composite growth based scheme leading to modernization and machinery upgradation in technology. In this area weavers service center plays a vital role in skill –up gradation and building capacity in technical area. It is also sponsor for weavers to various trade fair and exposition to help them in establishing direct market for linkage. In the field of designing area they can also provide CAD training program. Indian handloom brand is an important initiative in the marketing and branding context. It was launched by the Honourable Prime-minister of India on the occasion of first national handloom day on AUG 7, 2015. The Branding product are high quality with zero defect and zero effect on the environment. Also E-marketing of handloom product is a big step for this purpose. It is a transparent, competitive and affective manner of selling product.

By building such a market place the artisan can be empowered to earn a decent livelihood. Also GI protects the traditional knowledge of the communities of weavers and artisans and affords legal protection against unauthorized usages.

After the handloom there are lots of traditional form found in Indian culture like –Scroll Painting. Scroll painting is a form of our traditional oral stories those are sung by people. Oral tradition is always considered as the mode of instruction. Oral communication unites people in groups. In the earliest human society, human lived, people created stories, sometimes to entertain themselves, sometimes to educate others, and for several other purposes. Before the introduction of the writing system, such stories were transmitted orally from generation to generation[6]. Each area or village developed its own scroll painting and hence these paintings carry with them rich history of tradition and culture. Manjusha painting is such type of painting found in Bihar. It is a very popular folk tale of Bhagalpur region i.e. Bihula-Vishari Gatha. The gatha and songs are in Angika language which is the local dialect of Bhagalpur and its adjoining areas. The tale of Bihula –Vishari is a product of this genre of Angika writing in Devnagari.

Manjusha art is an ancient folk art of ANG PRADESH. Ang Pradesh is currently known as Bhagalpur city of

Bihar. This art has been prevalent in Bhagalpur for a long time. Manjusha Art came to the forefront between the time periods of 1931-1948. [7] Bihar government has been making a lot of efforts to review this craft and many skill upgradation training have taken place both in Bhagalpur as well as in the nearby villages. They have made good effort in trying to make people aware of this craft. This painting is also known as snake painting.

In other side Bhagalpur is also known as the most economically and socially stable district of Bihar because it has produced a large amount of tassar silk and Tassar yarn. The various types of tassar silk are Katiya, Ghicha, Thigh reeled and machine reeled etc. The tassar silk yarn also combined with other kind of silk cotton to make various types of texture. In Bhagalpur weaving are mainly dominated by male and trained in all areas like rearing of tassar silk, their cultivation, weaving and designing. The popular product of this silk are tassar silk saree and other dress materials. They used handloom and powerloom also, but in large amount the weavers of Bhagalpur are generally used in handloom. The main cluster for silk weaving in Bhagalpur are Hussainabad, Nethanagar, Champanagar, Manpur and Bihar Sharif and also Bhasnara and Sigori cluster. The main cluster are Nathnagar and Champanagar of Bhagalpur. They are the backbone of silk industries. In Champanagar cluster there are many skilled weavers who have developed in weave structure with the combination of different yarn and always ready to accept new design and idea.

The Weavers service centre of Bhagalpur was established in the year 1974 for development of handloom industry. The main ambition of Weaver service centre is develop the product, design and market for promotion of handloom exports. For this purpose different kinds of training programme and workshop are conducted to create awareness among the handloom weavers. It also provides assistance to solve different textile related problems by interacting with various Government and Non-Government organization. There are many sections which have created in weavers service centre like –design section, weaving section, dyeing laboratory and printing section. Use of improving appliance of weaving like Dobby, Jacquard and drawboy –arrangement have been introduced in the field. Today the weavers of Bhagalpur frequently use jacquard loom for creative designs. The demand of silk product are very high in all over in India. Mainly the saree of Bhagalpur has created a good platform in the market.

But in generally the design of this saree is limited. If they using new creative design the demand of this saree could be increase. For this purpose Manjusha art is a good option for variety of motives. In the motifs of Manjusha art they can easily transferred on cloth in weaving method. It has limited colour and straight form of design. Manjusha art and Silk saree of Bhagalpur are local for each other. The artisan and weavers can be communicate with transferring skill and creativity for this new step of designing and weaving. Manjusha art motifs should be weaved in jacquard handloom and extra weft technique. So these types of works can make basic structure in their society and culture.

2. METHODS/MATERIALS

There are two sources for collecting information for this work .

[a] Primary source

[b] Secondary source

Primary source – In primary source collecting the information about Manjusha art and visiting weaver service centre, Bhagalpur. In weaver service centre talk to their director, assistant dying manager, manager of design department and other staff also. Talking with masters' weaver and trainer also. Also conduct an interview with the artist of Manjusha Painting. The main artist of these painting are Manoj Pandit, Pawan Kumar Sagar and their relatives. There is also a female social worker (Sweta Sudarshan) doing lots of work using this art form. Ulupijha is also a contemporary artist of this field.

Secondary sources- In secondary sources the information has been collected by books, internet journals and articles also.

3. RESULTS AND DISCUSSION

Manjusha art is a traditional painting of Bhagalpur. It is characterized as line drawing and mainly three colours pink, green and yellow are used in it. Manjusha art is traditionally being produced by a particular caste i.e. Mali (gardener) a large population of which is still found in Bhagalpur.

Being a low caste and illiterate people they seem to have produced Manjusha and decorated it with the purpose of communication promoting conformity, identity and solidarity. Often such art are thought to have magical and

protective value same is the case with Manjusha art [8]. The art has religious connotation which further comes out during the month long Bihula Vishahari festival, organized in Champanagarmohalla in the month of August, when it is made in numbers for sale.

In this painting borders are very important and usually made in the form of belpatra, lehariya, triangle mokha and series of snake. All the characters are displayed as X letter of English alphabet. In the form of humane figure some specialised feature has been found like nose is pointed, lips are small, eyes appear to be very prominent and gives a feeling that it is coming out of the face. In female figure has narrow waists and are dressed with designed petticoat and upper garment topped with ornaments. For decoration purpose wavy lines are used. In this painting lots of motives have found like: flower, sun, moon, turtle, mainabird, lotus flower, kalashpot, arrow bow and shivling and tree

Method of production:- Manjusha painting are done by hand that's why it is time consuming and laborious process. These painting can be brought down on the cloth and handmade paper by using same technique to reach wider audience.

Raw materials:- Pencil, eraser, colour (natural/powdered colours/fabric colours/paints), For base using handmade paper, fabric cotton cloth or silk cloth.

Designing: The main motifs for designing in Manjusha art is

- [a] **Belpatra**: It is the symbols of holy leaf of Belpatra. In hindu tradition, the worship lord shiva with Belpatra leaf
- [b] **Lehariya**:- It is a symbol of waves of river. Waves depict the ups and downs in life and how we overcome from difficulty. It signifies struggle and strength.
- [c] **Tribhuj**- The triangle, a symbol of lord shiva in Hindu religion
- [d] **Mokha**:- Mokha illustrates the design and decoration used by ancient people of Ang region in their house.

So the new product can be produced by using motifs and create new materials with their regional acquaintance.

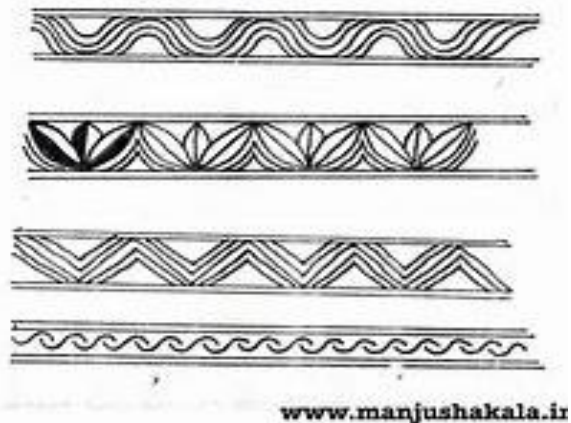


Fig. 1. Manjusha Motifs

4. CONCLUSION

Bhagalpur has a distinctive feature that contains historical and religious culture. Manjusha arte holds the believe of purity and respect the religious culture of their society. The other side a traditional weaving technique also maintain a balance of modern life style and give hope in future. So the blending of both could be up to date the coming product and make a bright popularity bt artisan and weavers also. Because of this a large platform should be sustain by demanding to new product and support their economical status.

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Scope of Sustainable Practices in Indian Textiles Industry

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ABSTRACT

The world and principally India, has been a witness to the overwhelming influence of the `Ongoing Climate Change` that has been happening for past few years including natural disasters. the discussion on Sustainability is on but real Sustainability by the industry is far from being practiced.

It is now the high time to actively and seriously align our Textile Industry to more `sustainable` process in manufacturing with Low or optimum use of key resources like sustainable materials, solid fuel based energy and especially water consumption in Cotton growing practices, and in dyeing of all Textile materials.

With consumers and global Retail chains pushing the sustainability agenda, it is now high time for the global Textile Industry to adopt sustainable materials and practices; and contribute to the damage control.

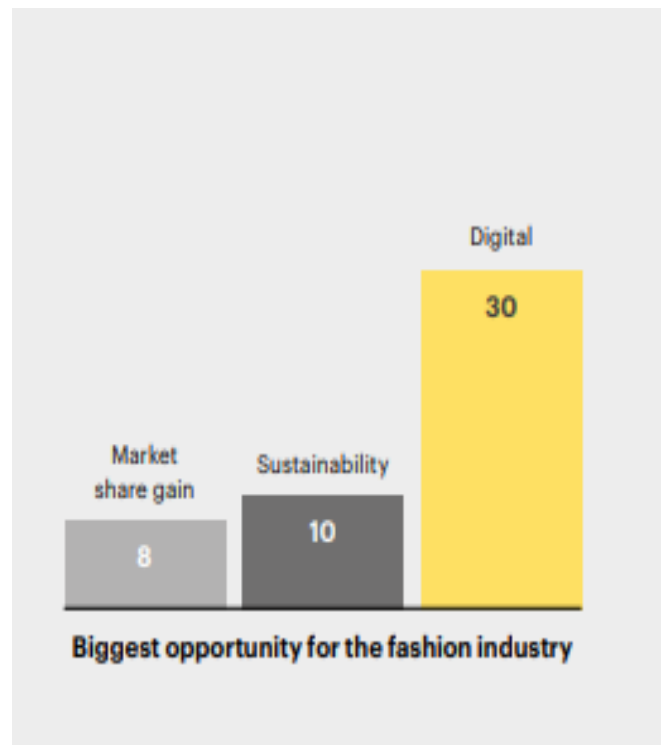
The study aims to highlight Ongoing impact of climate change, Core pillars of sustainability, Roadmap ahead for strengthening sustainable practices in Indian textiles industry. The study also highlights that how On a broader level, establishments can announce different methods to adopt this change and begin somewhere.

Keywords: Indian Textile Industry Sustainability, economic growth, core pillars, implementation of actual sustainability in Textile industry

1. INTRODUCTION

Sustainability is the buzzword today. Everyone is discussing “sustainability” and desires to make our resources sustainable Globalization all over the world has led to the economic growth which has given a lot of impetus to the issue of environment in the developing countries. This is because most of the manufacturing units were shifted to these countries. In developing countries environmental issues are not considered as priority, but it is a big threat for the entire world. (Prakash u.d.) Sustainability is the word which is being used as a way and means to save the planet in the future. Currently with upsurge in population the use of products and their wastes have been augmented and have triggered hazardous impacts on the environment. The most suitable definition of sustainability recommended by the world Commission on Environment and Development is ‘meet the needs of the present without compromising the ability of future generation to meet their needs and desires’. (World Commission on Environment and Development) .

As per Mckinsey State Of Fashion 2021 Survey , Sustainability is considered to be one of the biggest opportunity for the Fashion Industry and hence has been considered relevant in the Post pandemic time



SOURCE: BOF – MCKINSEY STATE OF FASHION 2021 SURVEY

Indian textiles Industry Market Size

India's textiles industry added 7% to the industry output (by value) in 2018-19. The Indian textiles and apparel industry contributed 2% to the GDP, 12% to export earnings and held 5% of the global trade in textiles and apparel in 2018-19.

The share of the India's textiles and apparel exports in saleable quantities was 11% in 2019-20.

Textiles industry has around 4.5 crore employed workers including 35.22 lakh handloom workers across the country.

Cotton production is expected to reach 36.0 million bales and consumption is expected to reach 114

Ongoing impact of climate change

The world, and particularly India, has been a bystander to the distressing influence of the 'On-going Climate Change' that has been happening for last 2 decades with all its ruthlessness via Earthquakes, ocean tsunami, occurrence of pandemic, melting of ice caps and increase of winter temp in otherwise cold areas like Siberia. While the discussion continues, the real Sustainability by the industry is far from being practiced. It is now the high time to actively and seriously align our Textile Industry to more 'sustainable' process in manufacturing with Low or optimum use of key resources like sustainable materials, solid fuel based energy and especially water consumption [eg consumed heavily in Cotton growing practices, and in dyeing of all Textile materials like Fibers/Yarns/Fabrics/Garments, esp. Denims]

The fashion apparel & textiles industry has some astounding statistics on environmental degradation. For occurrence, it can take 2,700 litres of water to yield the cotton needed to make a single T-Shirt. As per World Resources Institute, 5.9 trillion litres of water are used each year for fabric dyeing only. Around 20% of industrial water pollution in the world comes from treatment and dyeing of textiles, and about 8,000 synthetic chemicals are used to turn raw materials into textile. As per another report, every second, an equivalent of one garbage truck of textiles is either burnt or landfilled. As per Ellen MacArthur Foundation, the global textile industry emits 1.2 billion tonnes of CO₂ equivalent per-year, close to the level of emanations from the automobile business.



Source: <https://www.monterail.com/blog/how-is-technology-changing-sustainable-fashion>

2. OBJECTIVES OF THE STUDY

Objectives of the study are as follows:

1. The current study is an attempt to analyse the prominence of Indian Textiles
2. To determine the Core pillars of sustainability
3. To highlight the scope of sustainable practices in Indian Textiles industry

3. RESEARCH METHODOLOGY

The section below deliberates on Methodology used. The nature of the study is qualitative the use of primary data. A structured interview had been developed for data collection and the collected data had been analysed to determine the methods and analysis tools used for this study. The Research is purely descriptive in nature

Instrument development

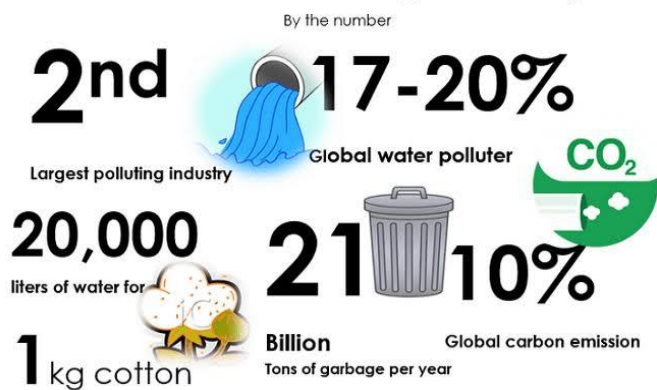
We used a structured interview to have inputs on the primary survey

Findings:

- 3.1 **Core pillars of sustainability** -Based upon the study conducted in Indian textiles industry, the following Core pillars of sustainability were being identified:

- To accept and expand the activity of recycling textile wastes, and to restore fibres from consumer used textiles.
- To adopt and intensification of deployment of Alternate sources of energy generation like Solar power
- To reintroduce and replace the used up Forest cover, e.g for creating pulp resources for Viscose fiber industry,
- To adopt and practice Low water consuming technology like Soft flow dyeing for fabric dyeing, and Digital Printing for printed fabrics.
- Adapting Slow fashion with vis a vis fast fashion with too much of fashion and color forecasting etc

Textile & Clothing Industry



Source: <https://textiletutorials.com/sustainability-issues-in-current-textile-apparel-industry/>

3.2 Roadmap ahead for strengthening sustainable practices in Indian textiles industry

1. To use Renewable/Eco-Friendly Raw Materials which are sustainable
2. Cumulative Production Efficiency through Enhanced Processes
3. Increasing the lifespan of clothing or recycling of existing textiles
4. Proper treatment and disposal of by products and subsidiary wastage of textile Industry
5. Fetching in Automation and Digitalisation in the correct manner

6. Using Renewable/Eco-Friendly Raw Materials
7. Increasing Production Efficiency through Improved Processes
8. Accepting and up surging the activity of recycling textile wastes, and to restore fibres from consumer used textiles.
9. Adoption and intensification of deployment of Alternate sources of energy generation like Solar power
10. Reintroducing and replacing the used up Forest cover, e.g for creating pulp resources for Viscose fiber industry
11. Adoption and practicing Low water consuming technology like Soft flow dyeing for fabric dyeing, and Digital Printing for printed fabrics.
12. Adapting Slow fashion with vis a vis fast fashion with too much of fashion and color forecasting etc

1. To use Renewable/Eco-Friendly Raw Materials which are sustainable-

Sustainability has been suggestively achieved in this aspect. Organic Cotton, Jute, Hemp, Bamboo, Wool, Sea Weed, Oil-based Fibres, Wood-based Cellulosic and other naturally-occurring materials are being constantly introduced by big and small brands. All known Brands & eminent designers have committed to the mission of using completely eco-friendly material and clothing by 2030.

2. Cumulative Production Efficiency through Enhanced Processes

The deliberation of cumulative efficiency through sustainable processes has resulted in manufacturers introducing modernization in the manufacturing and procurement of raw materials production lines, logistics, conveyance, production, labour and vendor management. Textile manufacturers are generating processes having marginal human interface, focussing more on the packing and considering create sustainability.

3. Increasing the lifespan of clothing Fashion apparel and textiles, is believed to be having the shortened lifespan of textiles usage. With easy

availability through e-commerce and online shops, the higher purchasing power of the new customer-base, and heavy competition, the lifespan of a garment has reduced from the average of 3 years to 1 year and hardly a season in the past 5 years. But many brands are coming up which are completely focussed on providing sustainable clothing and recyclable clothing for sale. Brands are making the concept of 3 r's very popular and using it as their marketing tool besides actually playing their role in sustainability

4. **Proper treatment and disposal of by products and subsidiary wastage of textile Industry**

The textile industry is disposed to a lot of subsidiary wastage. The procedure of production had its own drawbacks, with a lot of water and air-pollution being caused, the use of harmful chemicals in the dyeing processes, and growing mounds of non-degradable synthetics. However, in recent times, the augmented use of degradable/compostable materials has helped reduce these issues. Besides, government regulations and strict guidelines issued by governing bodies have helped to curb these problems drastically.



Source: <https://bioplasticsnews.com/2020/03/04/accelerating-circularity-textile-waste/>

5. **Fetching in Automation and Digitalisation in the correct manner**

Digitalisation is partially necessity and somewhat discretionary for textile manufacturing industries. Introduction of various technologies, data analytics, and artificial intelligence, not only in the ongoing processes but even in consumer interactions, labour-management, and overall decision-making adds to the value brought about through digitalisation. This has drastically increased the scope of sustainability for the industry and it continues to be explored at a very rapid rate.

6. **Using Renewable/Eco-Friendly Raw Materials**

Sustainability has been significantly attained in this aspect. Organic Cotton, Jute, Hemp, Bamboo, Wool, Sea Weed, Oil-based Fibres, Wood-based Cellulosic and other naturally-occurring materials are being constantly introduced by big and small brands. Brands like Nike and Prada have committed to the mission of using completely eco-friendly material and clothing by 2030.



Source: <https://immago.com/sustainable-fashion/>

7. **Increasing Production Efficiency through Improved Processes**

The focus of increasing efficiency through sustainable processes has led to manufacturers bringing in innovation to production lines, logistics, transportation, manufacturing, and even labour management.

A good example of this is the ongoing pandemic and how the processes need to adapt to the transformed consumer psyche towards safety and precautions. Textile manufacturers are creating processes with minimal human interaction,

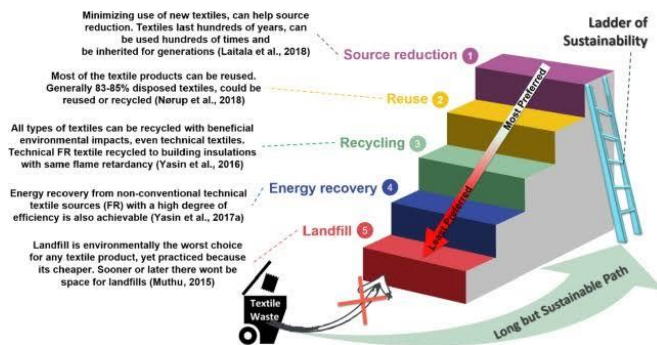
focussing more on the packaging and looking to create sustainability in their processes to have long-term results.



source: <https://www.indiantextilemagazine.in/innovation-l-automation-l-digitization-lmw-to-showcase-futuristic-spinning-technology/>

8. Accepting and up surging the activity of recycling textile wastes, and to restore fibres from consumer used textiles.

The after-life of fashion is tremendously indispensable to deliberate given that the fashion apparel and textiles industry is considered the second most polluting one in the sphere after that of oil. When anything is recycled – typically plastics, paper, metals or glass – it is broken down so the basic supplies recuperated can be remade into something new. These products, however, are usually lower quality than what they were before being recycled. The term "recycle" denotes the progression in which an item or its components are used to create something new. Recycling is theoretically a form of reusing, but it denotes more specifically to items that are discarded and broken down into their raw materials. Textile or apparel waste is normally characterized as either pre-consumer or post-consumer waste. The pre-consumer waste entails of by-product materials from the yarn, textile and apparel industries. Post-consumer textile waste mainly instigates from household sources and consists of garments or textiles which the owner no longer needs.



source:

<https://www.sciencedirect.com/science/article/abs/pii/S0959652619319547>

9. Adoption and intensification of deployment of Alternate sources of energy generation like Solar power

The Indian Fashion apparel & Textile Industry has always been congenial in familiarizing newer and more efficient technologies. Electricity is most indispensable input that mill needs today and it has always remained area of apprehension in this segment. Textile industry has been early adopter of renewable energy in India and has contributed largely in the growth of clean energy in the country. Many textile mills have set-up confined power plants, wind mills and now solar power plants. With the evolution of solar ecosystem in India and perceptive of the numerous advantages of solar energy, textile industry has encompassed the solar power and started to deploying solar systems in a fairly big way. To tap the vast potential of solar power and provide efficient and cost effective solutions, many companies (EPC players, developers and installers) are working closely with the textile industry providing tailor made solutions based on customer requirements. The companies have dedicated team to service customers from this segment.

The textile sector is one of the premier energy consuming sectors in the country. Textile processing covers steps ranging from singeing to finishing and printing of the fabric and manufacturing polyester, polyester filament yarn, acrylic, nylon, viscose, cotton textiles, etc.

Processing of Textiles necessitates a lot of hot water in the range of 40–110°C at innumerable phases of the process.

The indispensable heat can easily be generated through solar energy. Adopting solar heating methods will contribute a total saving of 383 ktoe per annum. Such solicitation of solar energy in textile industry has the potential of saving Rs. 770 crore per annum. A total saving worth Rs. 13940 per annum has been identified in the sector according to PGCIL. The saving can further be increased by employing more energy efficient systems



<https://www.slideshare.net/tharakakaushalya/textile-industry-sustainability-report>

10. Reintroducing and replacing the used up Forest cover, e.g for creating pulp resources for Viscose fiber industry-Viscose Fiber Industry is another area of serious sustainability concern in Textile manufacturing. Today’s current practise moving towards sustainability is to keep on replacing the forest cover that is depleted by Viscose fiber Industry .and also to reduce or recycle. the water from the affluent that it creates. And finally in case of Viscose, now the new sustainable practise is the recycling of Viscose Fabrics and their regeneration back into fibers and filaments

11. Adoption and practicing Low water consuming technology like Soft flow dyeing for fabric dyeing, and Digital Printing for printed fabrics.- soft Flow Dyeing is a new development in the Dyeing process towards sustainability In this system a less amount of power and less amount of water is consumed in comparison to traditional system of Continuous dyeing. . This is an important step ahead for sustainability but may soon be replaced in next 5 years by more

sustainable and water free technology called Nitrogen dyeing

12. Adapting Slow fashion with vis a vis fast fashion with too much of fashion and color forecasting etc- The fact that the younger generation want to dress themselves in a way that shows their personality and express themselves in different ways led to the development of fast fashion. It led to Fashion products that were really beautiful but now because of the system behind it, it has become something that people talk about in a negative way. It’s the system behind it that is fragmented, and hence it is the responsibility of the Fashion Apparel & textile fraternity to change it



Source:<https://insideoutstyleblog.com/2018/11/life-expectancy-of-clothing.html>

4. Summary & Recommendations Steps to introduce sustainability in Fashion apparel & textile industry:

The textile industry has determinedly and staunchly made determinations to practice sustainability in their methods but in this also the levels of adoption vary as per organizational policy. While some brands have absolutely focussed on eco-friendly production or processes, many big and small brands are slowly transforming their present practices to adapt sustainability. However, it might be a long way before the balances are more in favour of the earth's sustenance.

On a broader level, establishments can announce different methods to adopt this change and begin somewhere.

Novel ideas and design approaches

In recent times, all the novel ideas and design developments are primarily focussed on sustainability and all efforts are towards saving the environment. If companies are not confined by financial, geographical, societal, or environmental constraints, they can turn towards executing the latest innovations in the field to bring about sustainable changes:

- Executing newer design approaches
- Turning towards newly-developed resources like eco-friendly dyes or fibres
- Introducing processes like exhaust piece dyeing, continuous dyeing, or cold-patch dyeing.
- Exploring waste-recycling options like composting, regeneration or non-woven methods

Consciousness and enlightening the masses

Increasing Consciousness and enlightening the masses, as well as educating the labour force or people involved in the manufacturing process is a great way to reduce wastage. In a McKinsey report, it was seen that 60% of consumers are enthusiastic to pay additional for products that are made in an eco-friendly manner. Correspondingly, educating the labour force also upturns their productivity and judgement, leading to long-term benefits.

Pre-emptive approach through external governing bodies

Companies can take the help or be part of governing bodies like GOTS, OEKO-TEX, Sustainable Clothing Action Plan (SCAP) 2020 by Global Fashion Agenda, Sustainable Apparel Coalition, and so on, to proactively take processes for utilising resources, reducing pollution and proper treatment of wastage.

Crafting the right environment (Environment Management Systems)

Businesses can confirm good practices and ethics to create sustainable future for them. This can comprise of proper treatment of pollutants, restocking naturally-occurring raw materials like wood through plantation drives, turning towards solar, wind, or other sources of non-polluting energies to run factories and so on.

4. CONCLUSION

In the light of above discussion it is established that Sustainability has turned out to be an indispensable characteristic of today's Fashion textile and apparel industry, the process of transforming textile industry into more sustainable one is very sensitive, needs a lot of knowledge, abilities and assurance.

Though the textile industry will be thriving considering the increased use of Fashion apparel and textiles in our day-to-day lives, it is necessary for the industry to proactively take steps towards sustainability.

Sustainability today has become a necessity driven by consumer awareness and preference for sustainable products, compliance norms, and a realization that sustainability is so very relevant not only for the existing generations but also for future generations as well.

Following are to be introduced in making sustainable practices effective and efficient:

1. Phase out constituents of alarm and micro fibre discharge.
2. Contrivance safer and better employment conditions.

3. More compliantly meet demand by providing more possibilities for the way apparels are sold or borrowed, to break free from their increasingly throwaway nature.
4. Drastically improve permanency, reuse and recycling by transmuting clothing design.
5. Profoundly expand recycling and assemblage systems.
6. Make more operative use of possessions and move to renewable contributions.

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Green Fashion Impact on Young Customers and their Concerns for Sustainability

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ABSTRACT

Design for sustainability is design with the intention to achieve sustainable outputs. It is plan that concentrates on the natural and social effects of an item, administration or framework at the very level that monetary concerns are thought of. Presently manageability of design in the overall is a significant generous issue. In late year, design brands have carried out a model called "fast fashion" that uses modest assets to make stylish styles for minimal price. This is uniquely designated at youthful purchasers who need admittance to these styles at reasonable costs. As a result of simple accessibility of quick design, clothing is treated as expendable item. Conversely, buyers have begun to progressively esteem style choices that are practical and moral, yet how much would they say they will settle for their qualities? Likewise, buyers may have to migrate on what is truly crucial in their lives, explicitly their wellbeing through reconnecting with nature. Maintainable design is a current development inside the style business that intends to consolidate material waste and natural weariness while the objective is the extension of esteemed methodology for advancement and answers for supportability. This paper endeavors to answer green fashion impact and green clothing information and its effect on youth concerns towards sustainability.

Keyword: Green apparel information, impact, maintainable style, green purchasing rehearses, natural worth, young consumers.

1. INTRODUCTION

Right away, design and maintainability seem like two intrinsically problematic ideas; the previous is characterized by narcissism and short item life cycle particularly in quick – style while the later suggests morals, solidness and the reuse of items. In any case, the thought is that clothing could be made in a manner that create "environmental, social and social variety" and empower "green purchasing rehearses" grounded what might be a sizeable development and takeoff away from the wonder of "quick style".

Green clothing named also as sustainable, organic or eco-friendly clothing are textile products that incorporate social, environmental and fair-trade practices (Gowork et al., 2012). As the improvement of wording recommends, the connection among design and maintainability and asset utilization plan has advanced through number of stages. Green apparel is considered economical as it utilizes regular cycles and filaments and advances the security of normal assets. The acquisition of green apparel prompts the decrease of asset utilization and contamination.

We are in the period of industrialism where, purchasing new piece of clothing is really less expensive then fixing or reusing them. An equilibrium should be kept up with between our contending needs-the need to push ahead innovatively and monetarily and the need to secure the climate where we reside. Sustainable development meets the needs of the present without compromising the wellbeing of future generations.

A primary online survey conducted via google structured form targeting young adults between age group of 18 to 28 years of age outlined how youth are aware of the term "Green Fashion" and regardless of whether they are settling on cognizant maintainable buying choices according to considering both natural and financial perspectives. From an environment perspective the ideal aim should be to minimize any undesirable effect of the product manufacturing process.

2. RESEARCH SETTING

2.1 Fast design industry

" Global clothing production has doubled in past 15 years, with garments on average being worn much less and

discarded quicker than ever before". (Ellen MacArthur) Foundation

Quick design organizations produce clothing which design cognizant customers who decide to wear beautiful and reasonable dress for brief period, shows that they have purchased 'removal' pieces of clothing, in view of bad quality and less cost. In the hour of Instagram world, nobody needs to be clicked in a similar outfit twice and as a result of the modest quality and low value its helpful for them to discard the articles of clothing and buy new once.

2.2 Pollution brought about by style

The wide spread utilization of manufactured strands biggestly affects the climate. The creation of polyester delivers up to multiple times more carbon dioxide than different filaments like cotton. Around 2 billion sets of pants are delivered each year and a solitary pair takes around 7, 000 liters of water to create which is comparable to measure of water an individual devours in 6 years (Sustainable Fashion Matterz). It takes 2, 700 liters of water to make single shirt (EJF). Around 1.6 million perilous synthetics are utilized in the creation of these pieces of clothing, which cause never-ending sway on the climate. More than 7% of material waste winds up in the landfills.

3. LITERATURE REVIEW

Inventive and imaginative plan practices and exploration - through-planning for maintainable fates can be viewed as productive component that fall under an overall pennant of planning activism. Presently style is turning into a worry for shoppers who are looking for energy proficient cycles and sweat shop free workers. Besides, buyers and makers are hoping to work on the recyclability of the articles of clothing, restricted utilization of water and land and low outflow of poisons in the climate. In this research paper the overall setting of examination will be empowered, clarifying the explicitness of green apparel in style industry, youth purchasing decisions in premise of utilization esteems and investigation of mindfulness among youth in regards to different brands which are involved for the moral item plan , creation and promoting like H&M, Rustorange, Okhai, Gulaal, Anokhi, Khara Kapas, Jodi, Amrapali shop.

3.1 Green style Products Characteristics

Material and apparel industry add to different social and ecological issues (Mc Neill and Venter, 2019). It is liable

for the creation of the world's fossil fuel byproducts, which makes it second most contamination delivering area universally. Consequently, the execution of green attire rather than customary apparel turns out to be increasingly famous and required in worldwide scale.

Bring issues to light

Essentially, one should focus on aggregate buyer attention to commercialization and related wellbeing chances. Purchasers assume a critical part in the maintainability of style industry, even though they are not frequently mindful of this. For shoppers to settle on acquainted decisions regarding their attire is significant for their own just as climate is important. Youth mindfulness on the part they can do to extend supportability in design. What they can do as purchaser for their concern for sustainability.

- Buying moral dress really look at information on brand tags.
- Buy second hand/thrifted garments
- Support local products
- Shop less
- Advocate various natural fabrics like hemp, bamboo
- Reuse old garments

4. PROBLEM STATEMENT

The absence of mindfulness regarding the effect of quick design on climate and shopper purchasing conduct and fascination towards green style, supportability and quick style.

5. OBJECTIVE

- To evaluate the information among youth regarding green style and supportability and its effect on design industry.
- To investigate inclinations of youth towards sustainability; evaluating their attire decisions.

6. HYPOTHESIS

H1: That young will show inclination towards green design and maintainability more and lessen quick style motivation purchasing.

7. RESEARCH DESIGN

Observational examination was led to comprehend the view of shoppers with respect to green style items and

maintainability and incorporates all the exploration interaction beginning from determination of examination to recording eventual outcome.

8. RESEARCH METHODOLOGY

The current review depends on essential information gathered and is of exploratory nature. This quantitative examination investigations the reaction of 60 female and 40 guys. The data was gathered through an internet-based survey with all around organized inquiries. The poll was intended to concentrate on the mindfulness among youth (18-28) towards green design, their inclination towards sustainability and evaluating their decisions to purchase and putting resources into green attire.

8.1 Sampling

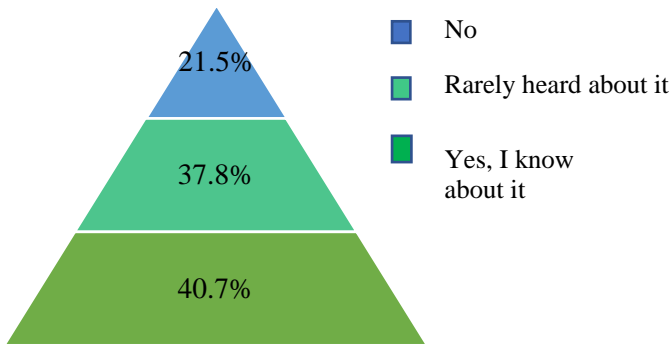
Random sampling is utilized in doing this exploration. Age between 18-28 years.

- Sample size-The example size of study was 60 female and 40 guys.
- Sampling Technique-Random Sampling.
- Method of information assortment Primary Data is gathered through organized google structure.

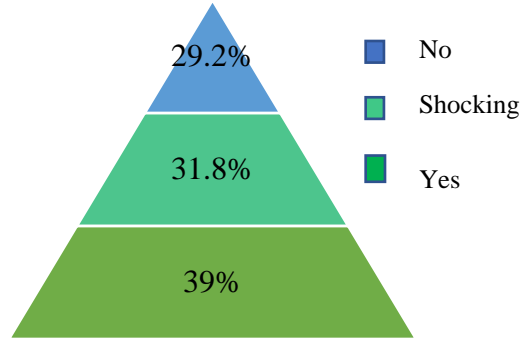
9. DATA ANALYSIS AND INTERPRETATION

Investigating the information gathered by the method for poll essentially uncovered various things, four primary inquiries and their understandings are as following:

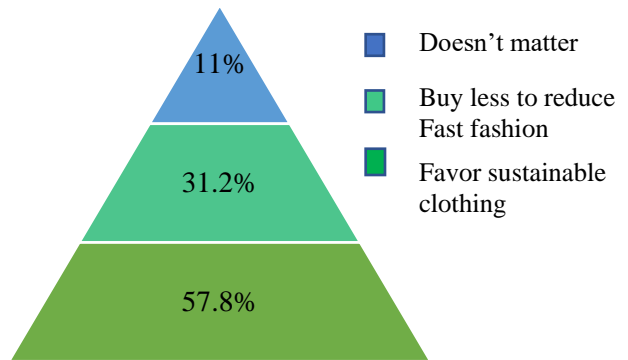
I. Only 40.7% of the inspected information knows about the expression "Green design" and 37.8% have infrequently caught wind of it and 21.5% have no clue about it .



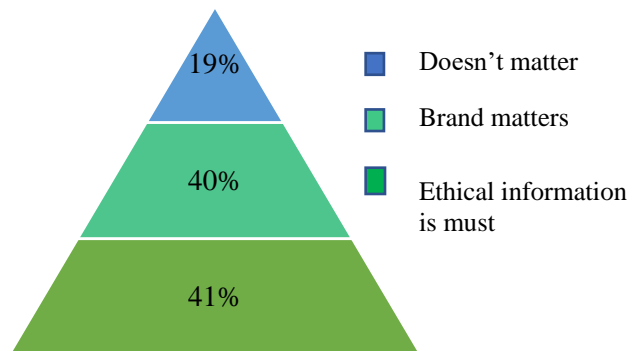
II. Only 39% respondents knew that fashion industry is second largest polluter.



III. 57.8% prefer to use green clothing compared to reduce overall fast fashion clothing.



IV. Only 41% respondents look at brand tag for ethical information about sustainability rather than blindly following brand name.



10. TESTING OF HYPOTHESIS

H1: was confirmed genuine on the grounds of information gathered.

11. RESULT

Expectation to purchasing economical and sustainable attire. Generally, purpose to purchase green style is moderate and there is no relationship amongst age and

intention to buy maintainable dress. Be that as it may, there is a generous uplifting outlook of youthful customers towards design and their readiness to buy green style. Being aware of manageability and creating dependable receptions can contribute in battling the confusions of ecological changes and a dangerous atmospheric devastation. A few Indian designer's and brands are attempting to condense designs bothersome impact on the climate. They are making pieces of clothing by upcycling and reusing the different items. They additionally decide to make assortments from natural/ organic fabrics and utilize natural colors to make them liberated from any sort of wellbeing hazard of buyers and just as for the general public by decreasing the quick style and advancing green design and practical buys.

12. LIMITATIONS

While development of this research some obstacles were observed. First and foremost, the extent of idea of green design, feasible style in style industry. Its exceptionally simple to stray from the fundamental goal and entering in other related inquiries of this theme. Besides, the study was led online to save time and meeting such countless individuals during Coronavirus subsequently a few respondents left a few inquiries without addressing. At long last, it's imperative to refer to that this examination is bound to just young customers (18-28) age bunch.

13. CONCLUSION

As one can finish up from this exploration, that from the level of association supportability in general is acquiring mindfulness among purchasers. At the point when we talk about manageability in style industry and its execution, customers can distinguish its need and one can see that its influencing purchaser purchasing inclinations in a positive way. Furthermore, it was additionally distinguished by the reactions given by the respondents during this exploration.

Information has a start however no closure and it's hard to ask ourselves, "How might we bring the change and what actions do we have to take?"

Regardless we need to defeat the crazes and quick style driving forces which lead to the heap of modest garments in our closet which end in the landfills adding to the contamination, which many individuals don't know about. However, presently many brands in the design business have attempted the drive towards green style and consequently prompting change in the design situation and reception of eco-style. Its likewise significant for our people in the future that we don't put them in danger.

There is far to go, generally, it very well may be inferred that there is a need to make mindfulness and illuminate purchasers better with regards to the green style, maintainability and its need. Likewise, the design business is presently in transit towards the right methodology for need to change. At long last, it's the buyer just who can bring the change by settling on ideal decisions.

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An Attempt to Review Sustainable Block Printed Textiles of Pipar

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ABSTRACT

Balancing the eco system of mother nature by practising natural ingredients and energy is prime objective of sustainability. Our ancestors have mastery in living life in the profit of environment, this traditional knowledge has been continuously transmitting from one generation to another. However, adverse impact like global warming, water crisis, pandemic etc may be observed across the globe due to industrialization and ignorance of responsibility towards the environment. India is home for the diverse sustainable hand crafted textiles such as Patola, Ikkat of Orissa (Bandhas), Banarasi Brocade, Paithani, Ajrakh Printing, Baluchari weaving, Kanchipuram, Kotadoria, Jamdani etc. The manufacturing process of these textiles are complex, labour-intensive and time taking which makes these textile unique in the nature. Many evidences of rich Indian Textiles have been excavated from the period of Indus Valley civilization. The traditional method of production includes various stages of hand spinning, dyeing, sizing, warping, weaving, printing and painting. Recipes of Indian hand block printing is one the oldest and sustainable practices. Initially, done with the Mud blocks and eventually metal and wood is used. Required designs are engraved on the wooden blocks. Number of blocks required for a design depends on application of number of colours.

India is consider one of the biggest producer of block printed textiles. Block printing is an age old craft of natural dyeing and printing, executed by the extracting natural ingredients and wooden blocks. This is exercising in many states like Rajasthan, Gujarat, Madhya Pradesh, Andhra Pradesh etc where printing is popularly known as Bagh, Kalamkari, Sanganeri, Bagru, Ajrakh, etc. Pipar block printed textile is traditional method of printing with sustainable practices.

The study covers the contemporary practices of Pipar block printing and record the changes with reference to the traditional methods of dyeing and printing. Pipar is small town located around 65 km from Jodhpur district of Rajasthan state. The primary data is collected from the master artisans belong to Chipa Muslim Khatri community having more than 20 years of experiences in the field. The Books, Journals and websites are referred for literature of review. The research is exploratory in the nature where qualitative research method is adopted. First-hand information is collected through Interviews, Photography, Focus group and observations.

Keywords: Pipar Block Printing, Natural Dyeing, Sustainable, Handicrafts, , Environment Friendly

1. INTRODUCTION

The process of extracting Indigo blue color from Indigo plant leave is an age old process from Indus valley civilization. One of the oldest example of Indian block printing is recorded as a printed cotton piece excavated in many areas of Al-Fustat near Cairo, Egypt. This process of extracting natural colour for dyeing and printing is considered as secret recipes which are transferred one generation to another. In 1900 century, one of the main focus of business was Indigo cultivation and natural block printed fabrics popularly known as “Chintz” by the Britishers. Block printing is one of the oldest style of hand printing. Block printing is method of applying dyes/pigments into thicker from by engraving required

design on piece of block, mostly wooden block on the fabric.

Many villages in Rajasthan state of India practices this traditional ancient method of printing and dyeing. Bagru, Akola, Balotra and Pipar located in different districts of Rajasthan are main center of practicing the Craft. Pipar is one hour far away, around 65 km from Jodhpur district by drive.

The father of Yaseen Chipa late Shahbuddin Chipa was the main craft person for Indigo dyeing and printing. When majority artisans left the practice of natural dyeing and printing in Pipar in search of more money making occupation, the family of late Shahbuddin and his wife

continued the traditional process of dyeing and printing from flowers, vegetables, fruits, leaves and barks and roots of the various plants.

Earlier, designs and colour combinations of block printing was restricted with the identity of many communities in the rural areas of Rajasthan and Gujarat, additionally some part of Sindh, currently located in Pakistan. *Ghaghra* (Skirt), *Odhani* (Veil), *Jajam* (Large bed sheet), mattress cover, yardages, dupattas, saris, home furnishings like cushions, bed sheets etc. are manufactured by the artisans. The objective of the study is to record the current practices of Pipar block printing and record the changes with reference to the traditional methods of dyeing and printing.

2. METHODOLOGY

Descriptive study was planned to achieve the formulated objective. The data was collected from the various primary and secondary sources. Field visits were conducted to Pipar to collect primary data. The study was conducted with the unit of late Shahabuddin Chipa, presently handled by his eldest son Yaseen Chipa. Convenience sampling was used for the selection of artisan for the study within the possibility of the limitations. The artisans are practicing the craft from last 25-30 years. Open ended questionnaire, interviews and observation method were adopted to collect the first-hand information about the natural ingredients and production process of the craft. Secondary data was collected from the libraries by referring books, journals and websites. Discussions from the people familiar to the craft were also recorded.

3. RESULTS AND DISCUSSION

Primary and secondary data was compiled to attain the objective of the study undertaken and presented as below-

3.1: Sustainable Printing Practices of the Craft

The process of sustainable printing practices is divided under two categories-

Pre Process 3.1.2 Main process

3.1.1 Pre Process

Pre-process includes washing of the fabric, preparation of the paste and preparation of the fabric for adaptability of natural dyes. Artisans use natural dyes synthetic dyes both. As natural dyeing and printing methods are labor intensive, time consuming and involves expensive natural ingredients, therefore the costing of the end product goes higher than synthetic dyeing and printing process. Artisans found skilled in both Natural and Synthetic dyeing & printing process.

Artisans choses appropriate dyeing & printing method according to the demand of the customer and price point. Artisans also informed that as natural colours are having weak washing fastness, therefore natural dyed fabrics sometimes bleed the colour which impact the brightness and freshness of the fabric. Whereas Synthetic colours gives bright and variety of shades. The fabric is first of all washed and sun dried. Washing takes many steps, as artisans make sure that fabric is free of impurities. After washing, the fabric is first treated with *Harda* (Myrobalan) Figure 5.

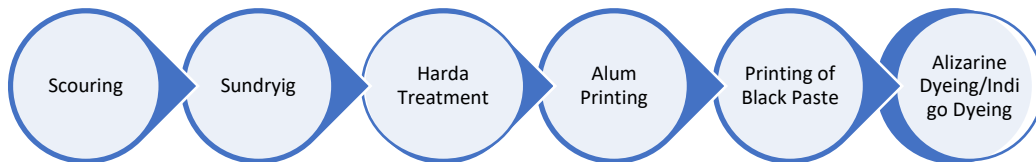


Fig. 1. Flow Chart of Printing Process

3.1.2 Main process

The main process includes mordanting, printing and dyeing. After washing, the fabric is then spread on printing table followed by marking the fabric and dividing according to the borders and panels of required design lay-

out. The dye or pigment paste is prepared and poured in wooden square box of around 6 inches depth. Artisans do not dip directly the blocks into the paste because paste might come out unevenly. Layers of jute along with iron membrane is put into the tray, so the color would come out evenly by pressing the blocks on these layered jute. After

printing, the fabric is kept for sundry and with the help of oxidation colors come out properly on the fabric. Artisans follow their traditional recipe which can vary from one artisan family to another. Artisans use synthetic binders like poly vinyl Alcohol with synthetic dyes. These synthetic dyes are purchased from Jaipur and Ahmedabad. Natural binders

are used with natural dyeing and printing process. The designs are sent to Ahmedabad for wooden blocks. Locally in Pipar, two artisans make wooden block with bold designs. For fine designs, blocks are developed in Ahmedabad.

Following are the list of colors obtained by using various natural ingredients in Pipar block printing-

TABLE 1: Natural Ingredients commonly used

| Sl. No. | Name of the Natural Ingredients | Obtained Colour |
|---------|--|--------------------|
| 1 | Iron Rust + Jaggery + Tamarind Powder | Black |
| 2. | Harda (Myrobalan) | Pale yellow |
| 3 | Turmeric | Ochre Yellow |
| 4 | Alum + Madder (Manjistha) + Dhawadi Flower | Bright Red |
| 5 | Pomegranate Peel | Redish-Brown |
| 6 | Sunflower | Light Yellow-Cream |
| 7 | Indigo Leaves | Indigo |

Artisans experiment to obtain other shades by mixing and applying multiple natural ingredients. Natural colors appear differently on different materials. The list of other natural ingredients used by the artisans are indicated in Figure 3. The detail process of obtaining the shades is described as below-

- **Black Color:** Rusted iron is soaked with jaggery in a mud pot in water. After around 30 days, a layered crust comes up on the top of the solution in the mud pot. This is collected and strained to use as black paste by mixing tamarind powder. As when this paste is applied on *Harda* (Myrobalan) treated fabric, it turns into black. Tamarind powder is also mixed to thicken this paste.
- **Red Color:** The Red colour is obtained by dyeing the fabric. Wherever red is required in the design, the

fabric is printed first with mordant *Fitakari* (Alum) then it is boiled into hot water which consists of Alizarine (Synthetic dye to obtain red colour). Traditionally, Manjistha (madder roots) was used to obtain the red colour, but at present this ingredient is no longer used by the artisans. Dhawadi flower is also mixed in the hot dye bath for the red colour. These Dhawadi flowers are sourced from Madhya Pradesh. When this hot solution comes into contact with Alum, it turns into bright red colour.

- **Indigo Color:** Artisans use their traditional household pit for indigo dye bath. As it is a cold dye, the fabric is directly dipped into the dye bath and with oxidation indigo colour appears on the surface of the fabric.



Fig. 2. Scouring (Washing)



Fig. 3. Natural Ingredients



Fig. 4. Dhawadi Flower, for Bright Red dye bath



Fig. 5. Harda (Myrobalan) Treatment



Fig. 6. Printing



Fig. 7. Alizarine dyeing with Dhawadi Flower



Fig. 8. Washing



Fig. 9. Indigo Drying

**Note: All images are self photographed.*

4. CONCLUSION

Presently, artisans use both natural and synthetic ingredients. The application of synthetic ingredients are not environment friendly and artisans also affecting with health issues. It was observed that artisans are not willingly use the synthetic dyes, they prefer natural dyes, as it does not harm the health of the artisan and environment. The unit of Yaseen Bhai is known for its natural hand block printing process, where designers and writers reach to learn the technique of natural dyeing & printing. Although, the synthetic application is not sustainable but it reduces the cost of end product therefore are likely be preferred by some of the exporters and designers. Artisans are continuing the practices of sustainable natural dyeing and printing, which is flourishing by experimenting with different techniques.

5. ACKNOWLEDGEMENT AND FUTURE SCOPE OF STUDY

The family of Yaseen Shahabudin Chipa and his family supported the study with great patience and sincere involvements. In future, the study may be carry

forwarded by documenting and exploring each of the natural ingredient with different materials. The changes in past and current natural dyeing process may also be recorded.

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Role of Packaging in Fashion Industry & Re-usable Packaging Methods for Sustainability

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ABSTRACT

The ever growing economy globally, especially the social economy and as the competition increases in the end user market, they have brought into focus the important principles of the brand that really affect the consumers mind to make the bit for a successful decision. But this traditional packaging design does not meet the demand of the fashionable consumer market. The brands therefore need to refocus on their packaging that can reflect the visibility, reputation and highlight the core advantage of its brand or the product, attract the potential consumers and promote the product to buy it. Packaging is although a minor part of the sales and product marketing strategy, the correct method has a large impact. Good packaging design can view the merchandise, price, channel and promotion marketing strategy of a brand. Packaging not only brings a way of security, but can also provide customers with convenience and promote product sales. Packaging represents the communication with products and customers.

Packing also truly becomes a sort of promoting power of buying for consumers. This is where the purpose of awareness amongst the consumers comes in reality with respect to green packaging or reusable packaging. Several enterprises provide major plans to make reuse packaging a mainstream for renowned brands which makes e-commerce trash free without costing the earth. On e-commerce sites the customer has the option to select to use Re-Pack as the online order's delivery packaging. This packaging are often returned to Re-Pack by dropping it to an area letterbox then are often reused, on the average up to twenty times. Another way of putting an end to the trash is the collection of the waste fabrics during the manufacturing process and making packaging bags out of them for the apparel products. The data information which is printed onto the tags or packaging can be executed on the fabric itself. In this way the utilization of paper will be minimized and efficient usage of the waste fabrics will be incorporated. These methods of reusable packaging systems have the potential to get rid of a key obstacle within the movement towards a circular clothing industry that of plastic packaging waste. The paper aims for bringing focus on reusable delivery systems thus accelerating the movement by providing brands with a practical solution to the challenges of embracing the buzz of sustainability.

Keywords: Reuse, Packaging Materials, Sustainability, Low Impact

1. INTRODUCTION

The clothing industry is that the second largest polluter within the world. A bit of fashion apparel can do immense damage to the environment right from the cultivation of staple like cotton to the assembly of apparel, its use and its disposal? great deal of water is employed in cultivating cotton fiber, harmful pesticides are utilized in farming, toxic dyes utilized in manufacturing, excess energy and water utilized in manufacturing and laundering of garments during use and waste generated during manufacturing, and from discarded clothes which reach landfills, of these contribute negatively to the environment. It's identified that environmental and social problem facing the style industry with reference to the materials, manufacture, supply, consumption, use and disposal of fashion products. Consumer preference for fast

fashion has forced fashion apparel brands to look for manufacturing efficiencies in lower cost countries, offer products at affordable prices and introduce multiple collections during a year. Fast fashion has become synonymous with a disposable culture as apparel is discarded at a quick pace by consumers who believe that the apparel has outlived its utility once it's out of fashion. This creates the matter of unsustainable consumption behavior. the matter of over production and unsustainable consumer behavior behooves the industry. The main environmental impacts of the world occur during staple cultivation, production, consumption and waste produced during production and subsequently thanks to discarding of clothing much before its life is over by consumers.

The ever growing economy globally, especially the social economy and because the competition increases within the

user market, they need brought into focus the core values of the brand that basically step into the consumers mind to form the key for successful decision. But this traditional packaging design can't meet the demand of the fashionable consumer market.³ The brands therefore got to refocus on their packaging which will reflect the visibility, reputation and highlight the core advantage of its brand or the merchandise, attract the potential consumers and promote the merchandise to shop for it. Packaging is although a minor a part of the sales and merchandise marketing strategy, the right method features a large impact. Good packaging design can show the merchandise, price, channel and promotion marketing strategy of enterprise. Packaging not only brings how of security, but also can provide customers with convenient and promote product sales. Packaging represents the communication with products and customers. Packing also truly becomes a kind of promoting power of shopping for consumers. Companies don't act for altruistic reasons to assist the environment. When implementing sustainable packaging, investments need to be wiped out order to get new raw materials and technologies. However, companies are using **its** marketing tool to extend brand equity or sales.⁴

The purpose of this research paper is to address the impact of packaging on environment, opportunities in incorporating sustainable packaging and **to** bring awareness on reusable packaging opportunities in fashion industry. The Impact of carbon footprint on environment through packaging is determined, when the companies and consumer work together.

2. METHODOLOGY - EXPLORATORY RESEARCH

The reusable packaging is better for the planet than disposable packaging. In order to adapt this into our daily lives, the best solution which can be executed in fashion industry would be utilization of the left over fabrics (during manufacturing of garments or the fabrics from inventory which are not going used) for the packaging of the products. For example – the garments manufactured can be packed by using the waste fabrics thus reducing the plastic or paper packaging. The tags also can be replaced with the same fabrics to provide the data of the garments and the brand. The paper explains the importance to switch to the reusable packaging in various ways. Below is a study of comparison between single use system and reusable system.

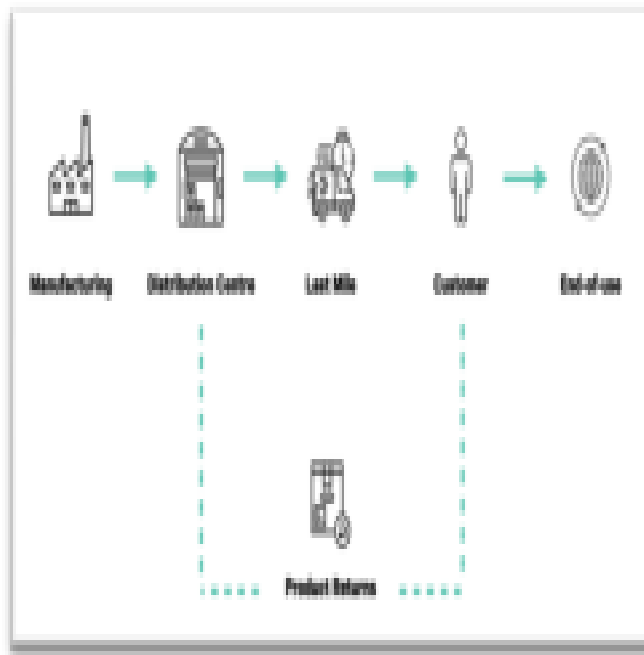


Diagram – 1 – Single-use System

The Single-use System

The diagram above shows the journey of a package from the purpose of producing through until its end-of-use in e-commerce. Globalization has meant that packages are travelling further, through longer and more complex logistics networks. Customers are increasingly demanding faster, more convenient shipping methods whilst brands are jostling for a competitive advantage through providing unique experiences within the unboxing process. During this e-commerce driven market, packages are handled 20 times more frequently than during a traditional retail market, where an item moves from the manufacturing to a mercantile establishment on a pallet. Whilst the present system is very optimized and convenient in delivering packages to the buyer, the infrastructure doesn't yet exist to make sure the packaging used is reused or recycled. Resealable rarity Polyethylene (LDPE) mailers became the quality packaging solution across most e-commerce categories, with the style sector being no different. While presenting a low-cost, protective and light weight solution, such mailers have a really short lifespan and aren't designed to be reused multiple times.

Moreover, robust recycling solutions don't exist on a worldwide scale, with only a few effective biodegradable alternatives, thus leading to the generation of an enormous amount of landfill waste.

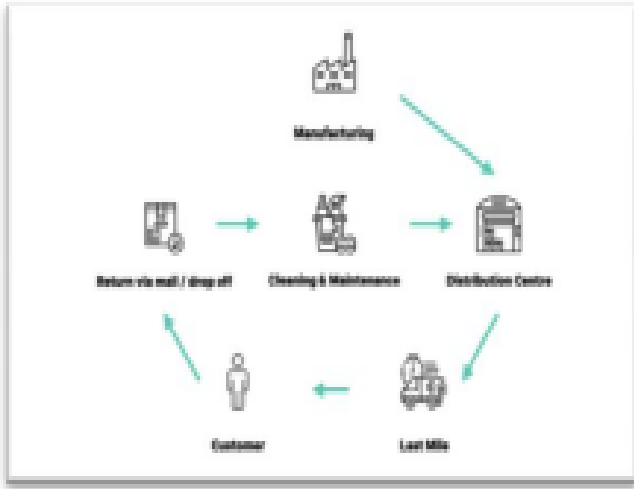


Diagram – 2 – Reusable System

The Reusable System

The reusable system of e-commerce packaging represents a closed-loop process, transforming packaging from a single trip to a multitrip asset. Despite the nascency of innovation, there are two slightly different models being implemented at this point. In both contexts, the packaging follows an equivalent journey as single use packaging to the purpose of the customer - from manufacturing, to distribution centre and thru walk delivery. However, once the customer receives the package, they're instructed to return the package, either via a mailbox or drop-off point. Within the centralized system, this package is first transported to a further node where it's cleaned and any necessary repairs are made. From that time, it's sent back to the brand's distribution centre and therefore the cycle starts again. This approach is getting used by RePack, who has their European Returns hub located in Estonia.

3. CONCLUSION

The exponential growth of e-commerce, including optimized global supply chains has meant that we are consuming more packaging than ever. Whilst the present system of single-use plastic provides a low-cost and highly functional solution, it often comes at the expense of the environment. Increased consumption of packaging is fuelling the continued extraction of fossil-derived raw

materials, whilst low recycling rates for flexible plastic packaging are resulting in the generation of giant amounts of plastic waste. Fortunately, there's unprecedented interest in new packaging materials, new business models and new technologies that are spearheading the transition towards a more sustainable and circular packaging industry.² At the forefront of this are closed-loop reusable systems, which reorient packaging from a linear model of 'take-make-dispose' into a circular multi-use asset that's returned and reused on multiple occasions. Over the past decades, we've witnessed a declining use of reusable packaging and increased use of single -use packaging. The increased environmental pressures (due to e.g. material use, waste generation, littering) of single -use packaging, demand a change within the trend towards single-use packaging. Reusable packaging systems seem to demonstrate environmental and potential economic benefits over single-use packaging systems. This paper presented an overview. These methods of reusable packaging systems have the potential to get rid of a key obstacle within the movement towards a circular clothing industry that of plastic packaging waste. The paper aims for bringing focus on reusable delivery systems thus accelerating the movement by providing brands with a practical solution to the challenges of embracing the buzz of sustainability.

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APPENDICES

- Diagram 1 – Single-use System
- Diagram 2 - Reusable System

Horticulture Waste towards Sustainable Textile and Fashion

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ABSTRACT

Flowering plant waste like trunks, leaves, stems after harvesting is considered as a horticulture waste. Pink lotus with its botanical name nelumbo nucifera gaertn is a potential aquatic plant grown and consumed worldwide. This flower is of great economic importance throughout India, being used as an offering to gods and goddesses. Raw material availability in bulk is the prime factor for exploring any new fiber so the researcher began research on the basis of exploring wetlands near and around the Vadodara region of Gujarat, contacting the peoples involved in the marketing and growing of lotus. It has been observed that lotus growers pluck flowers with small stem lengths, leaving the rest as 'waste'. In the present study, the effective utilization of this horticulture waste was explored in the field of textiles and fashion. 300 gms of fibers were extracted by hand to prepare 100 % lotus handspun yarn, Lotus: Cotton and Lotus: Silk ply yarn using different traditional spinning techniques. Results revealed due to the natural cohesive property of the fiber, 100 % and its blends were easily spinnable on different traditional spinning techniques. Due to the excellent inherent properties of fiber like it is soft, lustrous, fine in character, high moisture regain property leads to wide applications in high and luxurious fashion world. The entire chain from fiber to fabric is sustainable in a true sense as there is a no use of additional chemical finishing in each and every step.

Keywords: Sustainable, Textiles, Lotus, Petiole, Horticulture.

1. INTRODUCTION

Waste disposal has become a serious problem all over the world. (Robo & Dora, 2019). The need for diversification in the horticultural sector was recognized by the Government of India in the mid-1980s by focusing on investment in this sector. Today, horticulture shows the credibility of improving income by increasing productivity, creating jobs and increasing exports. As a result, horticulture has moved from rural borders to profit companies. The Indian horticultural crop scenario is very promising. The proportion of horticultural production in agriculture is 33%.

In agricultural and allied activities, the share for horticulture was 3.9 % during IX plan which has elevated to 4.6 % during XII plan. Horticulture production has increased in India over last few years. Commendable progress has been made in expansion of area which leads to higher production. In the last decade horticulture area grew by 2.6 % per annum and annual production increased by 4.8 %. From an area of 25.43 million hectares the production of horticultural crop was 311.71 million tons in year 2017-18 (Horticulture statistics at glance, 2018). It is estimated that in year 2019-2020 the horticultural

production was 3.12 % more than 2018-19. In 2020-2021 total horticultural production was estimated to be 326.58 million tones with the growth of 5.81 million tones over 2019-2020 (Final Estimates of area and production of horticultural crop, 2021).

Looking to the current status of minor cellulosic fibers, the major problems are availability of raw material for mass production in entire year in all season, need of modification some treatments in basic fiber stage to make it capable of converting into high quality yarn for textiles and clothing purpose, trial and error in different spinning systems due to the harshness, low strength and also maintaining the fineness suitable for clothing purpose. Managing the cost factor in manufacturing and developing the high quality and sustainable product for particular consumer segment also plays a very important role in uplifting these untouched fibers in textile world.

Spinning is the process of drawing and twisting the textile fibers and filaments making them into yarn [Przybylek, 2020]. Fibers were extracted manually. Later the extracted fibers were experimented for the spinning on different traditional spinning techniques. Ply yarns are always in the great demand it is twisting together of two or more

yarns for aesthetic and functional properties [<https://www.britannica.com/technology/ply-yarn>]. 100 % Lotus handspun, Lotus: Cotton and Lotus Silk Ply yarn was prepared and its applications were further suggested.

2. OBJECTIVE

To prepare 100 % Lotus hand spun yarn, Lotus: Cotton and Lotus: Silk ply yarn using different spinning techniques and recommend its suggested end uses.

3. METHODOLOGY

Procurement of fibers: Lotus petiole is the basic raw material for fiber extraction that was procured from the local lotus cultivator Mr. Isabbhai Rathod from the Vadodara District of Gujarat. Lotus fibers were extracted by the hand extraction process. Hand spun Cotton and silk yarn was procured from Khadi Emporium, Vadodara. Physical properties of the lotus fiber are mentioned in Table 1:

TABLE 1: Physical properties of fibers

| Sr. No | Test | Results | Standards |
|--------|-------------------------|--|--------------------|
| 1 | Fiber length | 60-105 cm | - |
| 2 | Fiber diameter | 2-6 μm | - |
| 3 | Length to breadth Ratio | 269, 000:1 | - |
| 4 | Fineness | Denier- 32 Tex- 4 Cotton Count -166s | ASTM-D 7025-09 [6] |
| 5 | Fiber strength | Maximum load (gf) – 161.52 Extension at maximum (mm) – 1.5589 Stress – 5.0476 Strain (%) – 1.5589 | ASTM-D 3822-07 [7] |
| 6 | Moisture Regain | 11.8 % | ASTM D 2495-07 [8] |

4. SPINNING OF YARNS

Initially the extracted fibers were spun using box (Peti charkha). Further for fast production and to achieve uniform twisting quality, fibers were spun on 2-spindle Ambar charkha. 3 sets of yarn were prepared: 100 % Lotus yarn, Lotus: cotton and Lotus: silk ply yarn. In Lotus: cotton and Lotus : silk ply yarn preparation- one set of lotus and another set of cotton yarn was taken similar for the lotus: Silk ply yarn.

5. RESULTS AND DISCUSSIONS

Spinning the fine quality yarn without any additional treatment is one of the challenges for minor fibers. For spinning three factors are very important – length, strength and cohesiveness means ability of the fibers to stick together. Lotus fibers possess all the essential qualities inherently it has good cohesiveness, higher length to breadth ratio and moderate strength. Initially the fibers were spun on peti (box) charkha, which requires lots of human effort and uniform twist is also not achieved.

In case of Lotus fibers since right from hand- extraction of the fiber, hand spinning and hand weaving makes the entire process time-consuming and end product come up

with the high cost. So the efforts have been taken to spin the 100 % lotus fibers on Ambar Charkha. It was observed that there were no breakages during spinning. And the yarn quality and productivity also increased. For decreasing the cost of end product and adding the aesthetic and functional property, ply yarns with cotton and silk was prepared.





Fig. 1. Spinning on 2-Spindle Ambar Charkha

6. RECOMMENDED END USES

1. **100 % Lotus hand spun:** As per visual appearance and feel, fibers were soft, lustrous, anti bacterial by nature as per the test confirmation AATCC 147 [9] moderate strength but low elongation property. Yarns prepared were suitable for kids wear, lingerie in combination with little percentage of elastomer, scarves and stoles.
2. **Lotus: Cotton Ply yarn:** Cotton is a cheap fiber. The main aim of mixing with the cotton is it can give a good strength to the lotus. Almost all the natural fibers like cotton, wool and silk are prone of bacteria. Lotus fibers are antibacterial by its nature so in combination with the cotton it can resist the attack of bacteria. Another major aspect of combining with cotton is majorly all the minor fibers are used in the weft but the Lotus: Cotton ply yarn can also be used in warp and weft. Moisture is one of the most important property of the textile fibers. Cotton has nearly 7 to 8.5 % of moisture regain whereas lotus has 11.5 % so the resultant end fabric will be comfortable and breathable. Resultant fabric can be used to prepare light summer dresses.

3. **Lotus: Silk Ply Yarn:** The major property of silk is higher strength. Lotus fibers have a similar property to silk in case of luster, hand and fineness. Combining with the silk can give high strength and elongation to lotus. Resultant fabrics can be used in the sheer materials.



Fig. 2. 100 % Lotus handspun yarn



Fig. 3. Lotus: Silk Ply yarn



Fig. 4. Lotus: Cotton Ply Yarn

7. CONCLUSION

Lotus fiber has a potential to come up with the sustainable fabric in the true sense. Right from pond, plantation of the lotus is beneficial for the environment because it has a capacity to absorb all the toxic pollutants as per the scientific evidence. Procuring the petioles on the daily basis cleans the pond. It opens up the new avenues for lotus cultivators they can sell petioles also which is a waste after picking flower. Due to the promising properties of the fibers it was easily spinnable on Ambar Charkha. One spinner can spin 3000 m of yarns on Ambar charkha in 6 hour with the continuous spinning and uniform twisting. Mixing with cotton and silk with lotus can give both functional and aesthetic properties to each other. Further efforts can be taken to spin the fibers in the Solarized Ambar charkha and Industrial spinning systems. Lotus fibers opens up the opportunities for high end fashion designers and academicians to come up with their luxurious collection. Future prospectus of the work is training the extraction and spinning process to the rural peoples, developing the innovative fiber extraction technological mechanism and preparing variety of products in clothing and

technical textiles focusing on the medicinal properties of the lotus plant.

ACKNOWLEDGEMENTS

Authors are thankful to the lotus cultivator Mr. Isabbhai Rathod from Vadodara district of Gujarat for providing the waste petioles which was the backbone for the research. Authors are thankful to Expert Mr. Bakul Shah for spinning the 100 % Lotus and ply yarns.

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Sustainable Fashion - Reuse, Repair and Reconstruct

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ABSTRACT

Sustainable fashion is a term which is often used with terms such as green fashion, eco-friendly and ethical-fashion. The terms fashion and sustainable appear to be in one sentence. This is because when we say fashion it implies high investment and putting great effort into clothing, while sustainable the new buzzword refers to effective and minimalistic use of the resources. Sustainability in fashion is considered to be a part of Slow Fashion movement is applicable to part of all aspects of our lives. In present times, we produce three to four times more garments than we did in the beginning of 21st Century. As the demand for clothes increases, the scrap/waste also will get increases. Much of the clothes and waste as we call it heading for disposal are in usable/reusable condition. A effective waste management strategy must considered to ensure the sustainability objectives as defined in the 17 goals of the UN, However, the rapid increase of fashion purchases and subsequent disposals, finding alternative solutions to managing waste is becoming an important issue. As re-users of old clothes, look for ways to reuse them, there are several ways or how to use your old clothes even if it's faded. "Repairing, Reusing and Reconstructing use of clothes has increased more importantly than ever. Reconstructing old clothes into new style you wish to create for example jeans pant into tops, skirts, tops or exclusive patterns, remaking into unique Garments. This paper evaluates Reusing, Repair and Reconstruct as three sustainable waste management strategies for the fashion industry and consumers.

Keywords: Fashion Sustainability, Reuse, Repair, and Reconstruct

1. INTRODUCTION

The perspective of the old days: Population was less, needs were few, and resources were less. The generation of waste was such that it got naturally recycled, being biodegradable. Conversely, after the industrial revolution, different types of wastes came into existence which are often both non-biodegradable and highly hazardous.

After plastic and paper, textile sector is the third largest source of waste. According to the data released by The Indian Textile Journal, it is estimated that more than 1 million tons of textile clothes are thrown away every year, with most of this coming from household sources

Clothing is reported to account for between 2 to 10% impacts on environment. Clothing and footwear comes after food and shelter, transport and housing that together are responsible for 70 to 80% of the environmental impact consumption (Hawley, 2006)

In present life style we cannot limit the production but we can find out infinite alternative ways of Reuse, Repair and Reconstructing to reduce the burden on nature. These Eco friendly ways are very important not only to save nature but to secure our future generations.

Rather than disposing clothes and textiles, Reusing, Repair and reconstructing them would be more environmentally sound.

Reusing-If you've grown tired of some clothes or you have clothes that don't fit, you can repurpose them rather than throwing them away. By turning clothes into different patterns, or using them to create home décor etc.

Repair- When old clothes start to look a little worn out, or your favorite garment has a big hole in it, don't think about throwing away your clothes until you've tried converting into something else. Consider giving your clothes a second chance and try to repair them. Even if you do not have the skills to do this, there are lots of alternatives out there so that you can make your clothes wearable again

Reconstructing -is making new clothes from previously worn garments. This can mean individuals who turn a dress into a skirt or a men's shirt into a top to wear themselves. Reconstructing can also mean people producing multiples of one items to sell like skirts from old t-shirts.

The ability of informants to forget about their waste and to disregard the consequences is perhaps symptomatic of

the way consumer operates. Alternatively, it may be the result of successful socialization against waste.

Therefore, the objective of this paper is to study the channels of reusing, repairing and reconstructing of sustainable fashion.

2. METHODOLOGY

Most of us have old clothes we do not want to part with it. They just sit in our closets, without a purpose. As a result, they take up our wardrobe space. While turning up clothes is not a particularly fun activity, turning them into something useful reusing, repairing and reconstructing by different methods like cutting , stitching, painting, patch work, embroidery etc.

Reusing-Clothes are made of fabric, which has endless possible uses. If you've grown with many clothes or you have clothes that don't fit, you can repurpose them rather than throwing them away. By turning fabric or garment into different patterns, converting them or using them to create home décor, you'll never let good clothes go to waste again.

Restyle the design- If a piece of garment has gone out of style, you can try updating it to a more current look that is in fashion. Embellishment of adding buttons, zippers, studs, embroidery and glitter can jazz up a tired shirt or skirt and turn it into something new.

If the hems of your pants are frayed, if not fit you well, try cropping them into shorts. You can also turn a long skirt into a shorter skirt or a T-shirt to a crop-top.

Sew a contrasting pocket on an old T-shirt for an update.

Use waste clothes to make new accessories- Use the fabric from your old clothes to convert into headband, or use thin strips of multiple fabrics to braid a bracelet or necklace or waist band. Turning old T-shirt into a tote bag.

Create toys- Create teddy bears for kids using waste clothes. It can be particularly use of baby clothes or another cherished garment from the kid's early years. We can even stuff the teddy bear with fabric scraps /waste of other old clothes.

Use buttons from old clothes to stitch eyes and a nose onto teddy bear.

Create Curtains- Patchwork curtains could be a unique addition to home. We need to measure the dimensions of your existing curtains. Cut similarly-sized squares of

fabric from old clothes, the number of colors and patterns among your squares makes look better. Join all the square pieces together along with edges into one piece of fabric.

Stitch pillowcase- Old clothes like T-shirts, skirts, pants, particularly soft clothes, make great pillowcases. Cut off the arms of a T-shirt and the edge around the neck. Stitch the holes, and turn the shirt inside out, so the seams are on the inside.

Repair- Mending clothes are a beautiful, meditative way to extend the life of your clothing, and it makes a powerful statement about your values. Mending clothes has become an endangered art form over the past few decades, fast fashion consumption often means it's easier and cheaper to buy new clothing than to repair old clothing, and many of them should learn the basic sewing skills and try to do simple repairs, like replacing buttons and darning socks. Different ways of repairing the garments are:

3. REMOVE ARMPIT DISCOLORATION WITH LEMON JUICE/ BAKING SODA

Add lemon juice and water and scrub at those discolored armpit stains. For marks, make a paste out of baking soda and water, and scrub it into the stain. Leave it for a few minutes, and then put the garment in the normal wash.

4. SIMPLE HAND STITCH FOR LONG TEARS

If you find a long tear on a fabric you can repair it easily with a matching thread and thin needle. Cut out loose threads from inside the tear (not too much though) Make the Running stitches you have a good enough mending.

5. EASY ADJUSTMENTS FOR PINHEAD HOLES

If you find a knit fabric dress/top/leggings whatever, small holes (pinhead sizes) are a given. Reverse the garment out. Use a big needle and carefully arrange the nearby threads to cover the small gap. Ever so lightly, stretch the fabric in all the directions and the hole most probably will cover itself.

6. MENDING FUSIBLE WEB/ IRON ON MENDING FABRIC

The tear is very small and is on thin fabrics like t-shirt knits an immediate solution is to keep a thin lightweight fusible interfacing under the tear and press with hot iron. The small hole will mend, as the cut thread will fuse to the interfacing underneath.

7. MENDING WITH CLOTHING PATCHES

This involves getting a fabric piece from the same garment or any other fabric and then using it to repair the tear/hole with the help of running or buttonhole stitch.

There are many ways you can sew hand cut / handmade clothing patches on to the fabric and many ways to make those clothing patches. Patching and Darning

8. THIS IS A METHOD OF MACHINE DARNING

My favorite method of sewing the clothing patches involves combining darning stitches with the patch. Keep a correctly matching color fabric (of the same weight) or a knit fabric under the hole, use your free motion stitching skills (straight stitches or zigzag stitches) and a matching thread – run the stitches over the hole just like the thread is woven in the fabric- till you are sure the whole hole is covered. If it is a matching fabric it will look almost invisible.

Reconstructing- is making new clothes from previously worn garments. It can mean individuals who turn a dress into a skirt or a men's shirt into a top to wear themselves.

9. HOW TO RECONSTRUCT A GARMENT

Clean the garment if bought second hand or it's very old (It may not withstand a wash, which will save you from using it).

Take apart the entire original garment to use the fabric differently or to use with a flat pattern.

OR take off only pieces that will not be part of the new garment like sleeves, front plackets, collars or patch pockets.

Start converting into a new garment. Design may get change as you develop it. This is where the dress form helps. On the form you can try out ideas before sewing by simply pinning pieces on or out of the way. The dress form lets you get a better visual of how these ideas will look, drape and or be sewn together. Use a volunteer or yourself and a mirror if you do not have a dress form.

Use the same construction techniques as you would with a new garment when possible. Some seams may need to be hand stitched or top stitched instead or machine stitched.

Add interfacing if needed as in new garment construction.

Quilting will give strength and support to weak areas in the original garment or any textile needing it.

Facings, bindings can be made from other fabrics or swatches if you do not have enough fabric from the original garment.

You may need to add facings to a seam in order to put in a zipper or a placket for buttons or to turn under to hem.

Ruffles and smaller details can hide stains, patched areas, and use up smaller pieces of fabric.

10. CONCLUSION

The purpose of this article is to increase understanding of how clothing and textile consumption can become more sustainable. It shows how members of a network view and deal with the problem of clothing being tossed in the garbage rather than being reused, repair or reconstruct. The results demonstrate that in order for the consumption of clothing to become more sustainable, the network approach in this study has contributed a number of different solutions to solving the problem of increased waste of clothing and textiles. These include increasing consumer knowledge about reuse, repair and reconstruct, making the collection bins more accessible, increasing the collection of old clothes making into a new one.

To make the earth a better place to live we have to work on waste management. As a consumer, we should highly contribute in reusing, repairing and reconstructing the fashion sustainable products we use and help the nature heal. It's time to think.

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TECHNICAL SESSION II
MARKETING AND MERCHANDIZING FOR FASHION AND
TEXTILE

An Investigation of College Going Student's Buying behaviour Towards Athleisure

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ABSTRACT

Athleisure is the trend of wearing clothing designed for fitness and performance as casual wear in a variety of social situations. It usually looks like athletic wear but is characterized as functional and fashionable garments. The study investigated the buying behaviour of college-going students towards athleisure. This quantitative study utilized an online survey conducted at Panjab University with randomly selected sixty college-going students. Analysis of collected data revealed that most of the respondents preferred to wear athleisure at home other than in the gym. Nike, Puma, Adidas, Reebok were the most popular brands among them. Fit, fabric and function ability were the most chosen attributes. Furthermore, comfort is the sole reason behind preferring athleisure as casual wear. This study provides marketers with an opportunity to enhance their marketing strategies so that they can cater to the actual needs and demands of young consumers.

Keywords: Athleisure, Buying Behaviour, Functional, Fashionable

1. INTRODUCTION

Athleisure is a piece of clothing harmonizing routine life, work life and recreation. The word 'athleisure' has become the part of Merriam-webster dictionary and is defined as "casual clothing designed to be worn both for exercising and for general use". It represents fading of the distinct boundaries of high fashion and street fashion. The true beauty of athleisure is that it is functional as well as completely fashionable. While designed for a particular use, athletic clothing has become increasingly integrated into everyday fashion trends. Athleisure has its foundations in two perfect inverses, 'athletics' and 'leisure'. It is observed that there are two principal growth drivers for athleisure. Firstly, the increasing interest of consumers in health and wellness trends. Secondly, it's also a lifestyle movement, fueled by social media specially Instagram and Snapchat which have had tremendous impact on athleisure. With the help of social media many bloggers and celebrities are able to share their healthy lifestyle and what they wear to massive audience. High end athleisure demand from consumers has forced many luxury brands like Dior, Louis Vuitton and Chanel to launch new sports inspired collections. The age long distinction between luxury fashion and activewear no longer exists. The target market for athleisure is clearly the

younger millennials because these are the people spending their incomes on experiences and fashion significantly (Jain, 2019). The five main attributes sought in athleisure wear are comfort, durability, flexibility, luxury and fashion (Zhou, 2018). Since final product ought to be able to support active as well as social lifestyle, textiles used to construct athleisure need to support functional and design needs. Perhaps this trend really fit in well and is not going anywhere. Garment industry is witnessing athleisure as a segment which is flourishing as compared to the other apparel segments. More competition usually is a sign of healthy growth and validates the message that athleisure is a very lucrative business. Furthermore, this product category is predicted to grow rapidly because of various reasons. According to Euromonitor International¹ (2018), the athleisure or sport inspired apparel and footwear segment is exploding in India at the rate of 20-25% annually. One of the leading factor is the fitness obsession among Indians these days. Many Indians are taking up various fitness as well as recreation activities such as yoga, running, cycling, swimming and aerobics to improve their lifestyle. Consequently, there is an increase in the consumer expenditure on wellness and health, which has increased the popularity of athleisure segment.

¹ Euromonitor International is an independent, world-leading strategic market research organization.

2. REVIEW OF LITERATURE

O'Sullivan, Hanlon, Spaaij and Westerbeek, (2017) explored that women are adding active wear into their wardrobe and give importance to fashion even in their sports attire. This is evident with the use of active wear as casual wear, office wear, loungewear and evening wear. Also, active wear consumption pattern is affected by the age and generation of women. The distinct boundaries between sport and casual daywear is fading. As a result, these active wear garments are used as routine wear mainly among the youth who are considered as the future of the upcoming trend in the market (Bramel, 2005). With the growth and diversification of market, many market analysts have observed the popularity of active wear in urban places. The prevalence of active wear as routine garment has made yoga pants favourite attire restricted not only for yoga class, but to go on an outing with friends while paired with a fur coat (Horton, Ferrero-Regis & Payne, 2016). Specifically, there are many needs on active wear because current trends of unorganized sports and recreation activities such as jogging, yoga and pilates are introducing new clothing designs and opens up for a 24/7 attitude to wear active wear garments (Borcherding & Bubonia, 2015). Consequently, it is hard to understand what people purchase and wear is entirely for workout and exercise, when those same garments and footwear are consumed while they are not exercising and not heading to gym (GWI, 2019). Researcher conducted an online investigation to find out the perception of six apparel companies in relation to ten attributes namely quality, fit, durability, comfort, fabric, innovation, style, social responsibility, comfort, function and overall value. The results concluded that Adidas, Nike are leading in all categories followed by Under Armour, Athleta, Puma and Champion (Conway, 2017).

3. JUSTIFICATION OF THE STUDY

Athleisure trend is evolving worldwide, especially in emerging market like India. Many researches have been conducted to study the U.S athleisure market and consumer behaviour. There are limited studies that explored this trend in Indian apparel market and among its end users. This is a key area of research as initially introduced as trend, athleisure has now shifted to a lifestyle movement. It revolves around health and wellness as status symbol. One of the key drivers of this scenario is the excessive promotion of fitness and appearance through social media. Internet has created a societal pressure to look a certain way especially among

young people. The study will find out the consumer buying behaviour towards athleisure among college going students. Selection of good apparel always matters a lot in student's life and their choice reflects their buying behaviour. This study is an opportunity to the marketers to enhance their marketing strategies. So that they can fulfil the real need and wants of the young consumers. The above discussion draws logical reasons to conduct this study.

4. OBJECTIVES OF THE STUDY

1. To workout the buying behaviour of college going students towards athleisure.
2. To find out the gender differentiation in buying behaviour of college going students.

5. LIMITATIONS OF THE STUDY

The study is limited to the students of Panjab University, Chandigarh.

6. METHODOLOGY

For the collection of primary data, the survey method will be used in this research. College students from different departments of Panjab University, Chandigarh were purposely selected. Multistage random sampling was employed for the selection of the sixty students consisting of thirty males and thirty female students from different departments of university. An interview schedule was framed that contained questions regarding the buying behavior of students towards athleisure. The data collected from respondents was coded, tabulated and analyzed.

7. RESULTS AND DISCUSSION

The results obtained from the present investigation are discussed below:

1. *Preference for working out or exercising by the respondents*

The data revealed that most of the male and female respondents like to work out with 90 percent and 87 percent respectively. Fitness and healthy lifestyles are matters of concern for most of the respondents. While a few respondents do not like to workout at all as they don't feel exercising is important to maintain good health and some have many excuses for not exercising.

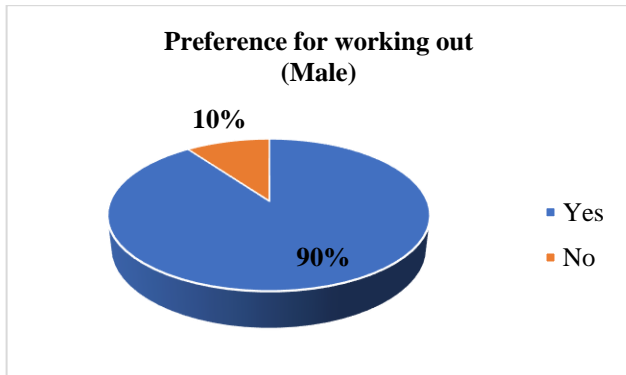


Fig. 1. Preference for working out (Male)

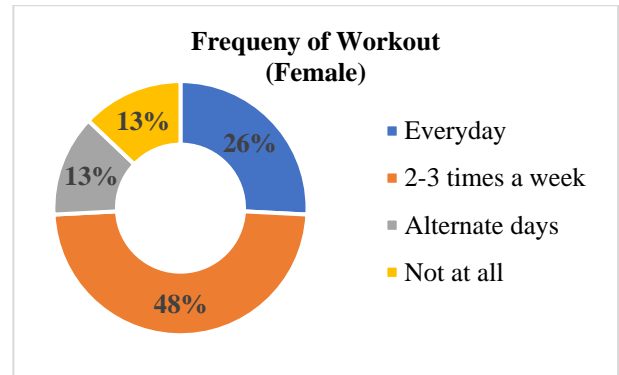


Fig. 4. Frequency of workout (Female)

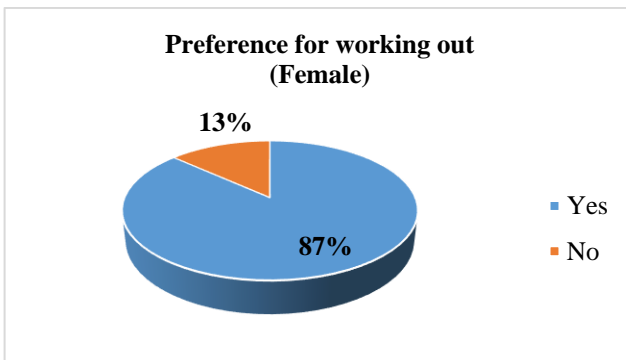


Fig. 2. Preference for working out (Female)

2. *Frequency of workout*

It is observed from the data that 43 percent of male students exercise daily followed by 27 percent of male students like to exercise 2-3 times a week and 20 percent preferred it on every other day. Whereas in the case of female students 26 percent of male students exercise daily followed by 48 percent of male students like to exercise 2-3 times a week and 13 percent preferred it on every other day.

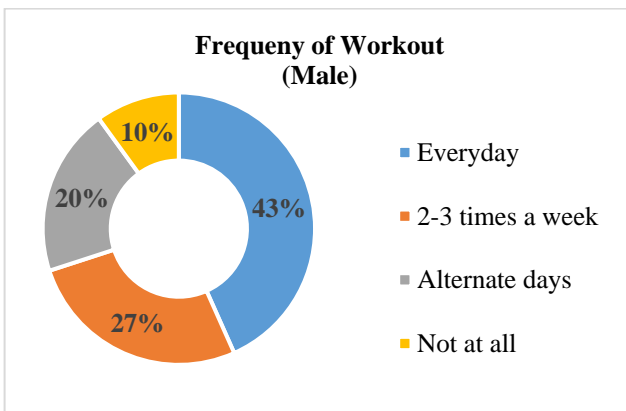


Fig. 3. Frequency of workout (Male)

3. *Preference of athleisure as casual wear*

The data indicates that athleisure is preferred by maximum number of male as well as female students with 89 percent and 90 percent respectively. Most of them wear athleisure to the university, at home, even while outing with friends and shopping. A few of them are the students that don't exercise and still like to wear athleisure as casual wear whereas some only wear athleisure while exercising which are 11% male and 10% female.

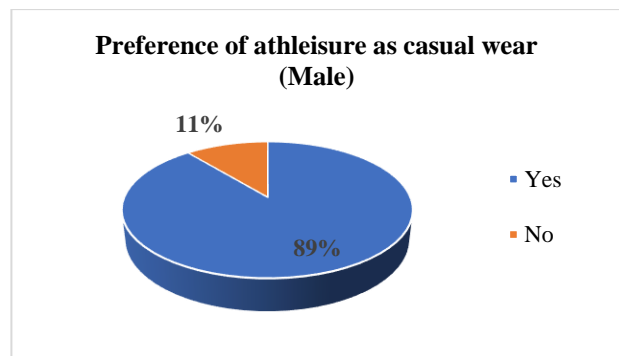


Fig. 5. Preference of athleisure as casual wear (Male)

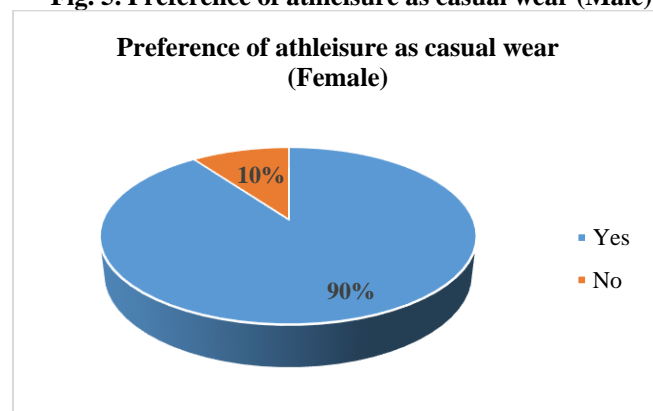


Fig. 6. Preference of athleisure as casual wear (Female)

4. Frequency of purchasing athleisure

It is observed from the data that majority of male students (33%) purchase any piece of athleisure once in a month followed by 27 percent purchasing athleisure once in 3 months and 20 percent of male students prefer to purchase once in a week. Only 13 percent and 7 percent of male respondents purchase any athleisure article 2-3 times a month and once in a week respectively. On the other hand, majority of female students (38%) purchase any piece of athleisure once in a month followed by 32 percent purchasing athleisure once in 3 months and 21 percent of male students prefer to purchase 2-3 times a month. Only 6 percent and 3 percent of female respondents purchase any athleisure article once in 6 months and once in a week respectively.

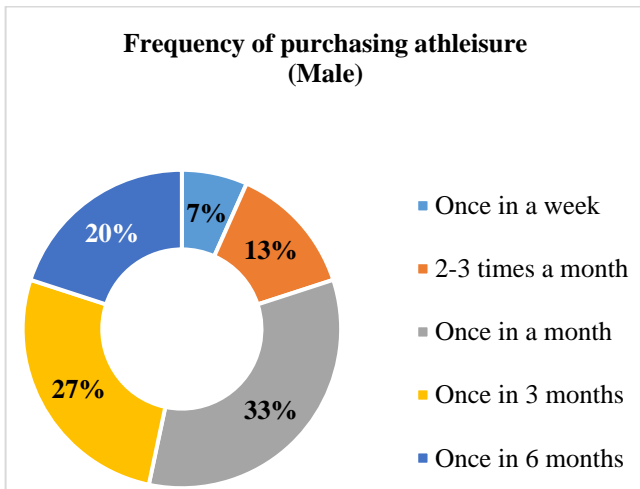


Fig. 7. Frequency of purchasing athleisure (Male)

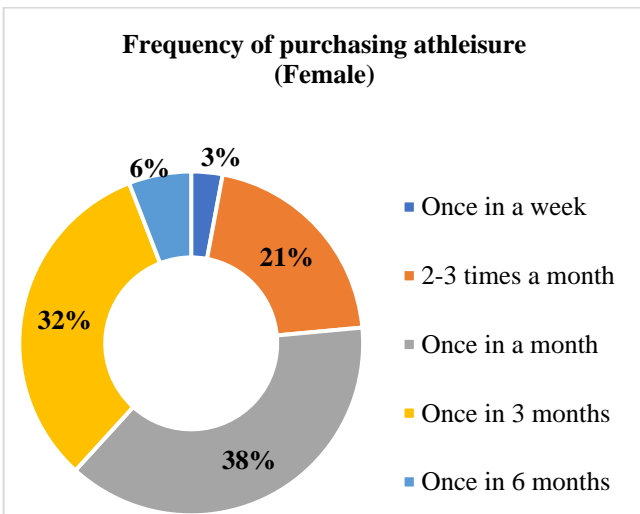


Fig. 8. Frequency of purchasing athleisure (Female)

5. Most preferred type of athleisure

Maximum number of both male and female respondents preferred to buy tshirts consisting of 60 percent and 43 percent respectively. Followed by joggers (male 17% and female 27%), 20 percent of male students preferred shorts whereas 13 percent of female students preferred sweatshirts. Female students (10%) preferred athleisure innerwear like different styles of sports bras.

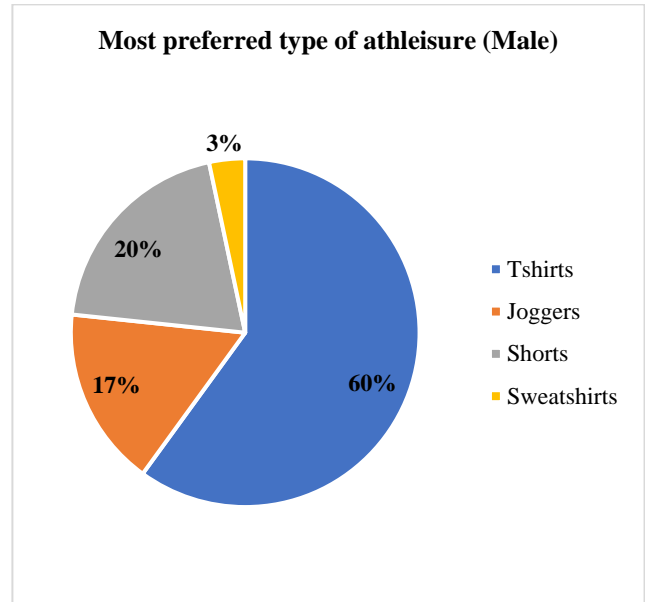


Fig. 9. Most preferred type of athleisure (Male)

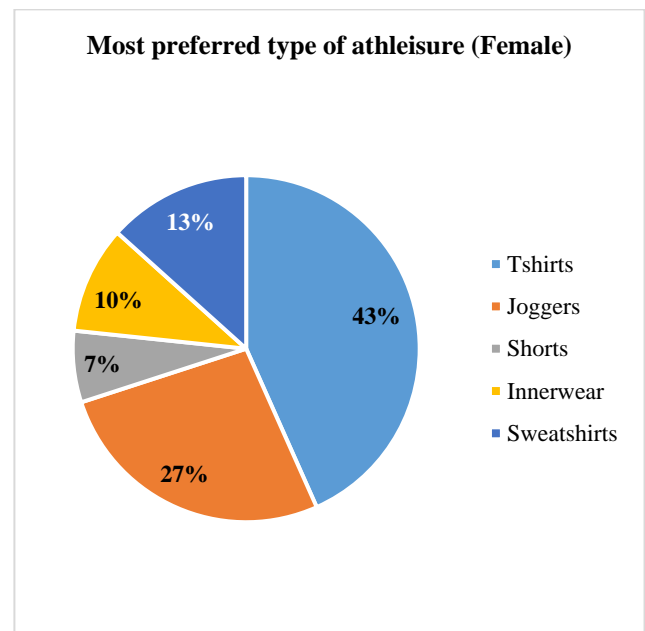


Fig. 10. Most preferred type of athleisure (Female)

6. Most preferred athleisure brand

It is observed from the data that most popular brand among male students (60%) in athleisure is Nike followed by Adidas (23%) and Puma (17%). They also specified some other brands they prefer like Under Armour, Gymshark and Bewakoof. The most popular brand among female students (41%) in athleisure is Adidas followed by Nike (31%) and Puma (28%). Other than the option female students specified athleisure brands namely Kappa and Superdry for their shopping.

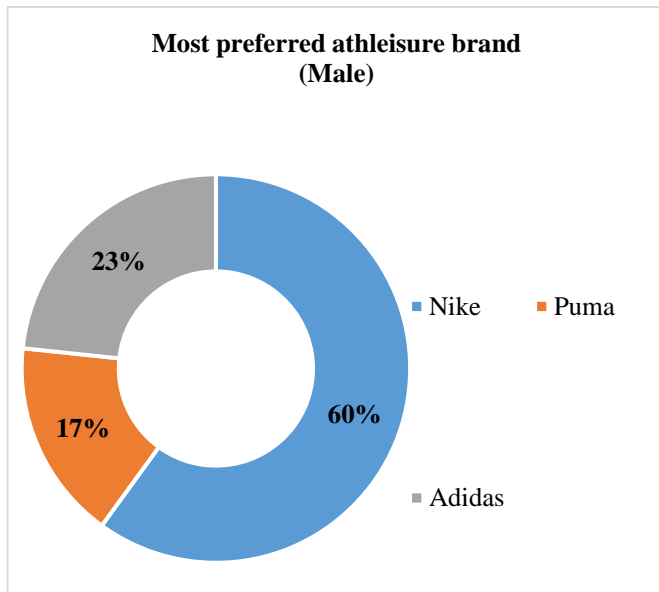


Fig. 11. Most preferred athleisure brand (Male)

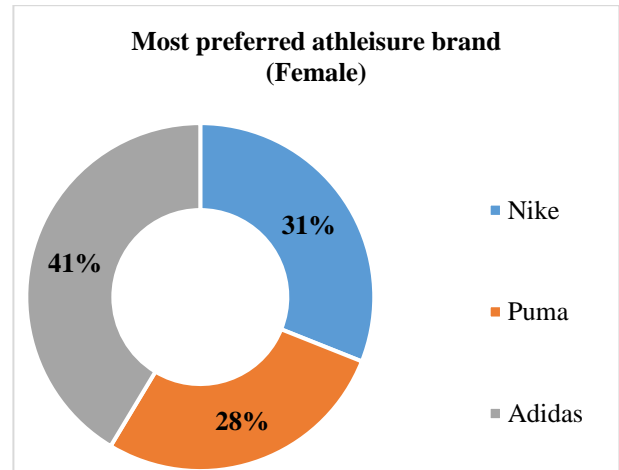


Fig. 12. Most preferred athleisure brand (Female)

7. Factors affecting buying decisions towards athleisure

According to the data it can be observed that male students (73.33%) preferred functionality more than any other attribute while purchasing athleisure. It is followed by fit (66.67%), fabric type (63.33%), colour (67%), brand (50%). Male students moderately preferred the factor like fashionability (66.67%) and cost (49.67%). On the other hand, female students (76.67%) preferred fabric type more than any other attribute while purchasing athleisure. It is followed by fit (63.33%), colour (50%), brand (56.67%) and functionality (63.33%), Female students moderately preferred the factor like fashionability (63.33%) and cost (76.67%).

TABLE 1. Factors affecting buying decisions towards athleisure (Male)

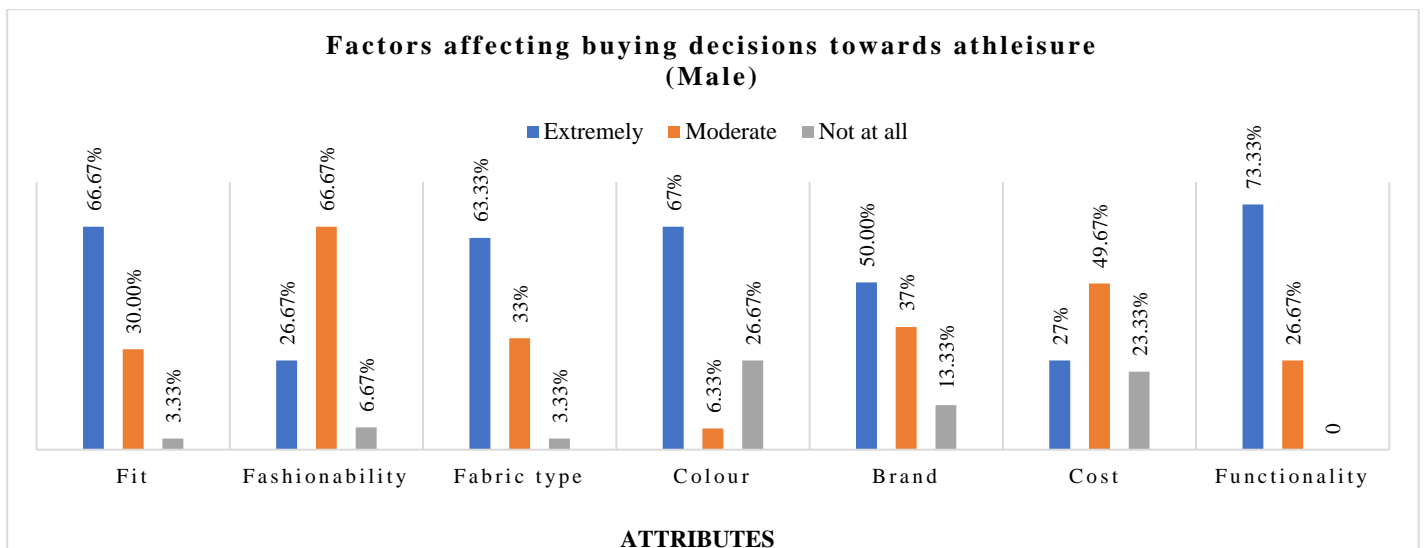
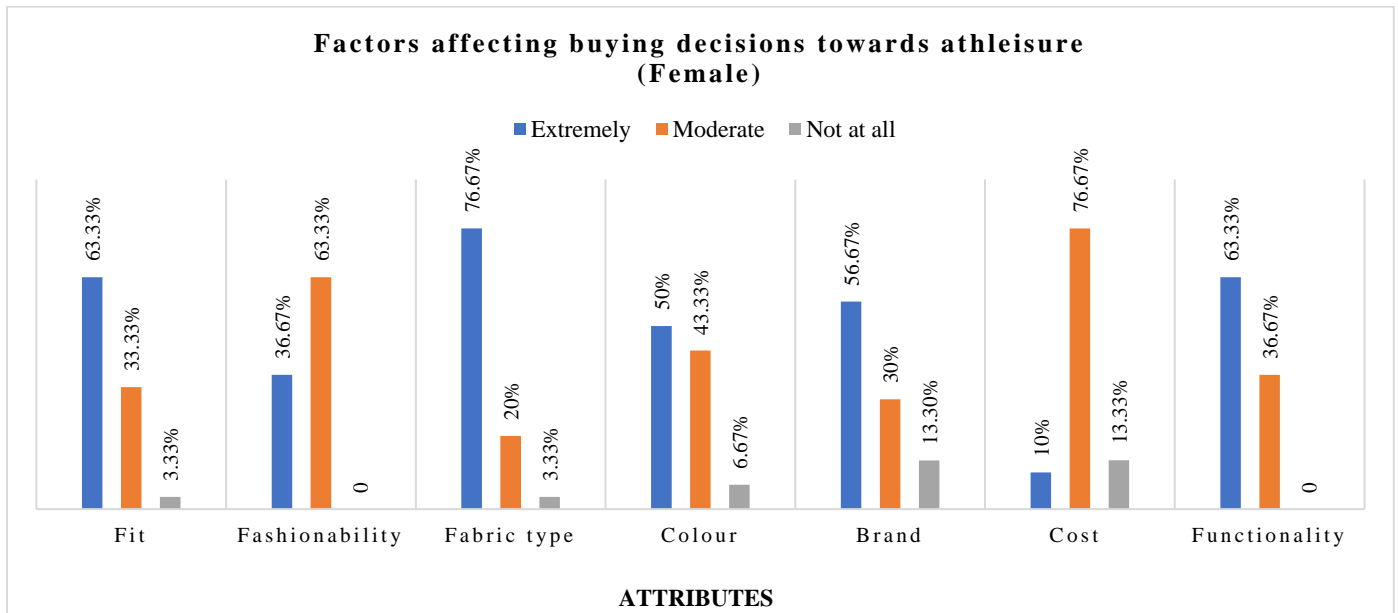


TABLE 2. Factors affecting buying decisions towards athleisure (Female)



8. Reasons for preferring athleisure

The data revealed that the most significant reason for preferring athleisure as the favourite piece of clothing by respondents is comfort by both male students (73%) and female students (77%). 20 percent of male students preferred fit whereas 13 percent of female respondents chosen the option trendy by following the social media trends. Only a few male students (7%) and female students (7%) preferred trendy and fit option respectively.

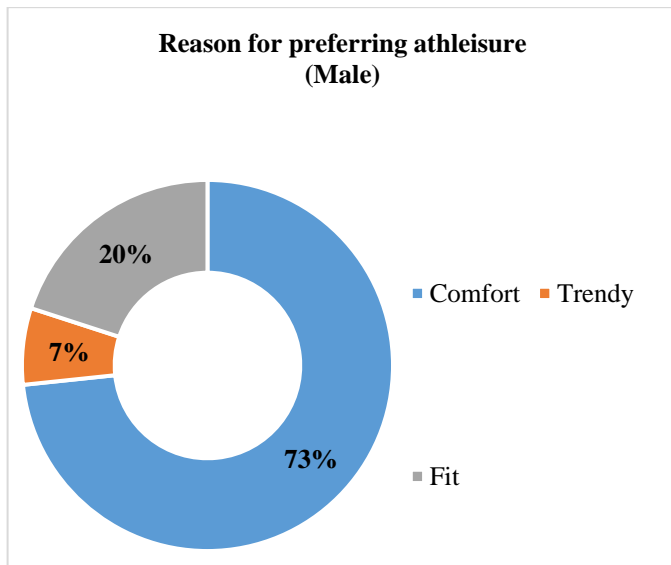


Fig. 13. Reasons for preferring athleisure (Male)

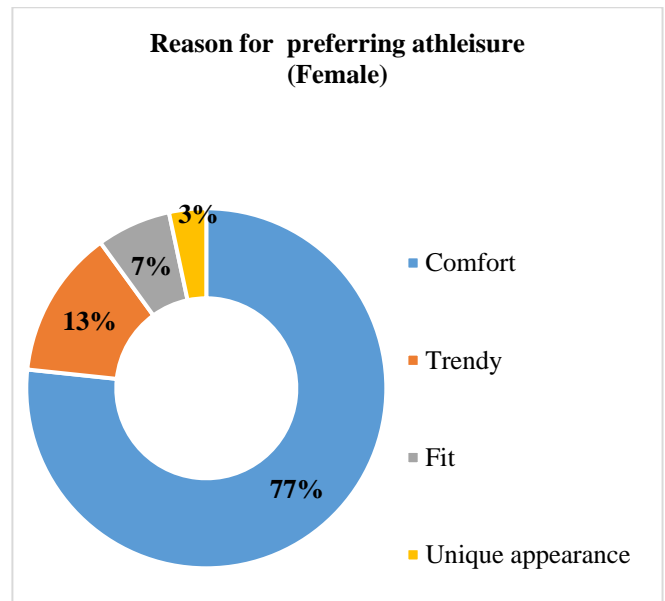


Fig. 14. Reasons for preferring athleisure (Female)

9. Frequency of wearing athleisure

Maximum number of male students (43%) and female students (60%) like to wear athleisure a few time in a day followed by 40 percent of male students and 33 percent of female students prefer to wear to wear athleisure for most of the times of their day. While 17 percent of male students and 7 percent of female students love to spend their day in athleisure.

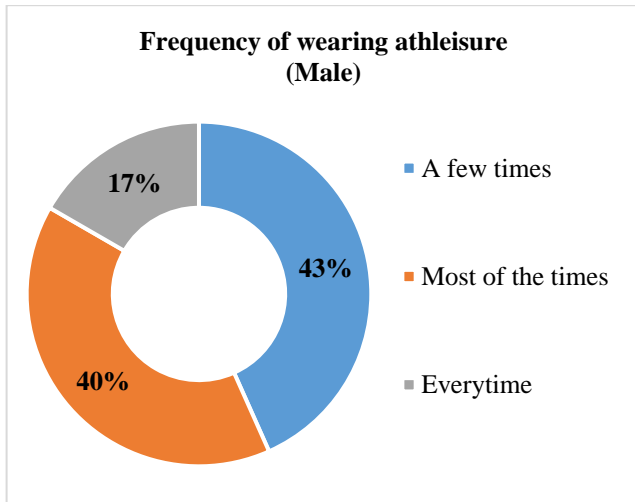


Fig 15. Frequency of wearing athleisure (Male)

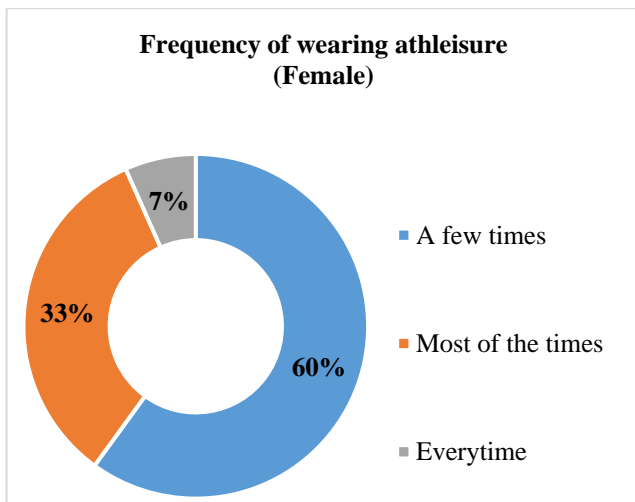


Fig 16. Frequency of wearing athleisure (Female)

8. CONCLUSION

On the basis of the study it can be concluded that most of the college going students like to work out and focuses

on their physical well being. Fashion of being fit is popular among both male and female students. Male students prefer to work out regularly whereas female students prefer to exercise 2-3 times a week. Both male and female students like to wear athleisure as casual wear. Also, both of them purchases any piece of athleisure once in a month and Tshirt is the most preferred article while purchasing. Nike is popular brand among male students whereas Adidas is famous among female students. Functionality is most important attribute while purchasing athleisure for male students. On the other hand, fabric type is extremely valuable for female students while buying athleisure. The common reason for popularity of athleisure among young students is its comfort. Therefore, both male and female students spend a few of their day in the athleisure.

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Product Involvement & Perceived Value: Influencing Nature of Brand Loyalty in Apparels Sector

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ABSTRACT

The strength of the relationship between an individual's relative attitude and repeat purchase intention towards a certain brand is referred to as brand loyalty. The goal of this study is to look into and focus on behavioral approaches to brand loyalty in the Delhi-NCR area. To determine Indian millennial' behavioral intentions for apparels, quantitative research and a cross-sectional survey approach were used. A questionnaire was utilized as a survey instrument to reach out to people aged 18 and up. Businesses should focus their strategies on reinforcing consumers' product involvement in order to increase brand loyalty, according to the study's findings. This can be accomplished through emphasizing the value consumers place on specific product/brand features, whether functional or symbolic.

Keywords: Brand loyalty, Fashion Apparels, Millennial, Attitude, Repeat Purchase Intention

1. BACKGROUND

Brand loyalty is viewed as the strength of the relationship between an individual's relative attitude and repeat purchase intention towards a particular brand (Dick et. al. 1994). The nature of brand loyalty is a concept that reflects the motivation for repeat or concentrated purchasing. The relationship is based on and stimulated by social norms and a number of situational factors. It is one of the important strategies' companies rely upon for a sustainable competitive advantage, (David 1996, Anselmsson et al. 2017, Çifci 2016, Keller 1993). Among several factors that influence customer loyalty Perceived Value (Keller et. al. 2011, Nguyen 1997) and Product

Involvement (Lewis et. al. 2006) have been considered in this study focused on Fashion Apparels.

Fashion can be defined as the latest and well-liked trend being followed in the apparels industry (Krugman 1965) Fashion Apparels is majorly influenced by latest styles, quality and right price of product (Ilonen 2011). There are a number of National & International brands existing in Indian Apparels market offering a vast range and choices. Therefore, it becomes essential for the brands to study and identify the nature kinds of brand loyalty—true and spurious. This study intends to examine and focus on behavioral approaches of brand loyalty in Delhi-NCR region.

Proposed framework of study is as follows:

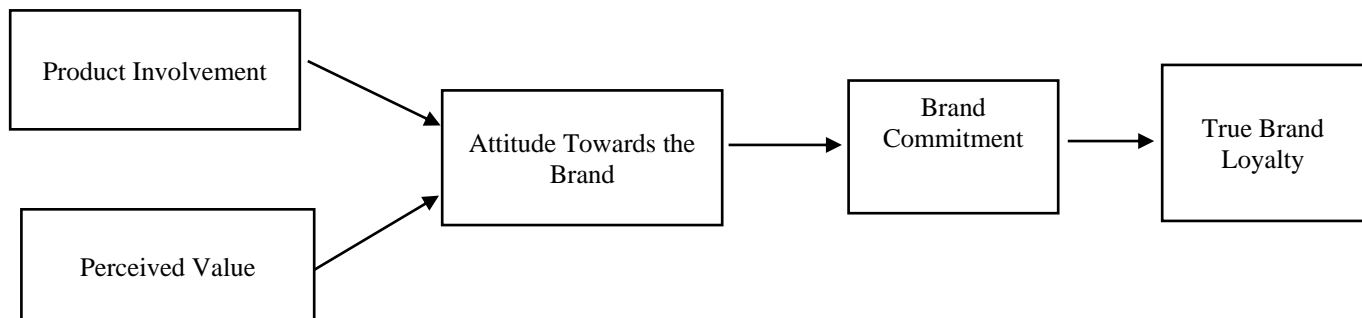


Fig. 1. True Brand Loyalty Framework

2. METHODOLOGY

To determine Indian millennials' behavioural intentions for apparels, quantitative research and a cross-sectional survey approach were used. A questionnaire was utilised as a survey instrument to reach out to people aged 18 and up. The educated millennial can simplify and absorb product information more easily. Youth between the ages of 18 and 34 were chosen for investigation since they account for more than 30% of the total population not only in India but also in Asia. According to a 2016 DuPont survey, youngsters in India have a high level of understanding of clothing, and the majority of them are confident in its environmental benefits.

Respondents were approached in malls and other retail places and asked to participate in the survey voluntarily, with the assurance that the data would be used for academic research rather than commercial gain. Respondents were reached using a non-probability convenience sampling technique based on the researcher's subjective judgement at popular retail stores in the Delhi-National Capital Region (India). Because some respondents insisted on sharing the survey instrument because they were short on time, it was also distributed through social media channels. A total of 320 surveys were delivered to eco-friendly clothing buyers. All 212 responses are complete. Out of the total respondents, 41% were male and 59% were female. The majority of respondents were graduates 49% followed by postgraduates 27% and others. 55% respondents were having family income in between 50000-100000 per month.

Reliability of Data was checked. The analysis was based on data as to each aspect/ characteristics in tabulated form. Data was tested with the help of test of significations besides using various other statistical technique. SPSS 21.0 was used initially to obtain the univariate statistical

measures and the proposed relationship was tested using linear regression.

3. STUDY FINDINGS

Exploratory factor analysis a dimension reduction technique was employed to determine the factors for the proposed model. Identified factor establishes construct reliability with cronbach alpha greater than 0.7. Identified loading was also found to be greater than the threshold of 0.5. Table 1 details the reliability of constructs in model.

TABLE 1: Reliability and Factor Analysis

| Factor | Item | Factor Loading | Cronbach Alpha |
|---------------------|------|----------------|----------------|
| Product Involvement | PI1 | 0.765 | 0.732 |
| | PI2 | 0.811 | |
| | PI3 | 0.615 | |
| Perceived Value | PV1 | 0.756 | 0.759 |
| | PV2 | 0.522 | |
| | PV3 | 0.714 | |
| Attitude | AT1 | 0.895 | 0.719 |
| | AT2 | 0.825 | |
| | AT3 | 0.82 | |
| Brand Commitment | BC1 | 0.578 | 0.633 |
| | BC2 | 0.633 | |
| | BC3 | 0.809 | |
| True Brand Loyalty | TBL1 | 0.577 | 0.805 |
| | TBL2 | 0.785 | |
| | TBL3 | 0.889 | |

Linear regression was used to examine the cause and effect model in study. Causal factors are found to be the significant predictor for outcome variable. Brand commitment was found to be the most significant predictor followed with product involvement and others. Coefficient of determination of model was also found to be more than 30% and significant (Figure 2).

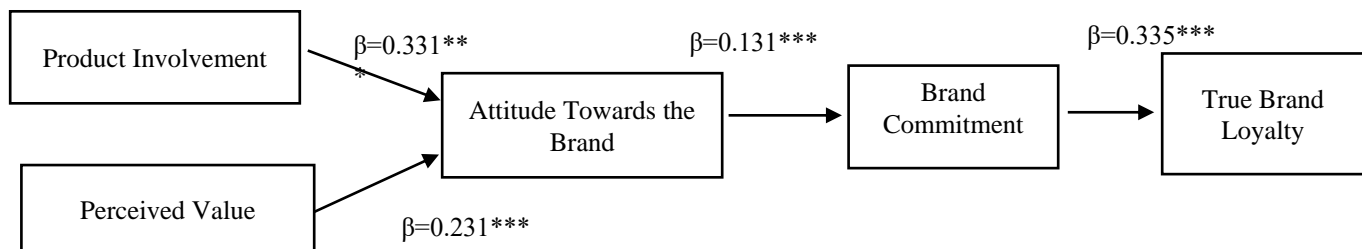


Fig. 2. Result proposed relationship

4. CONCLUSION

In recent decades, understanding consumer characteristics that influence brand loyalty has been a major study focus. This study aimed to expand on that line of inquiry by looking into how product involvement and perceived value interact to impact brand loyalty. In general, the findings back up the hypothesis. Product engagement has a greater impact on brand attitude than perceived value, followed by its impact on repeat purchases and brand loyalty.

Businesses should focus their strategies on reinforcing consumers' product involvement in order to increase brand loyalty, according to the study's findings. This can be done by emphasising the importance that customers have on specific product/brand features, whether functional or symbolic. Various types of deals have different effects on brand loyalty, therefore brand managers must pay particular attention to the sales promotion strategies they employ. The attributes of the sales promotion and the promoted product influence consumer perceptions of value and product participation.

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Marketing and Merchandising in Fashion and Textile

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ABSTRACT

Marketing and Merchandising seem to be the two sides of a coin that now, especially during the pandemic, seem to have challenged the conventional norms of industry. Fashion – as in ready garments; and Textile – the fabric needed to make these garments; have undergone a change in how a retail organisation views it, and how the consumer understands it. My Research Paper will entail understanding the value of Marketing and Merchandising in Fashion and the Textile Industry. We will briefly present the role of Marketing in the value chain with relation to the Fashion Industry. We will also exhibit how Merchandising in Fashion Retail ensures that consumer tastes are valued and understood. The marked differences in the retail of these two aspects in Fashion and Textile marketing and merchandising is what the paper will entail to decipher.

The Paper will further elucidate the significance and the fundamentals of marketing and merchandising in both, the fashion industry, and the Textile industry. We will aim to expound on the knowledge and skill required to perform both these tasks for success. The Paper ends with a proper denouement to unravel Marketing and Merchandising in Fashion and Textile and what is the need right now to proper decipher the nuances of each, reaching out to the consumer and ensuring that marketeers gain traction and ultimately, profits.

Keywords: Marketing, Merchandising, Fashion, Textile, Communications

1. INTRODUCTION

There are four aspects to the topic ‘Marketing and Merchandising in Fashion and Textile’ – the role of both marketing and merchandising in the industries of Fashion and Textile. What needs to be impressed upon is that at the end of it is the Consumer. As oft quoted *Consumer is King*, during the pandemic we have seen the influence of the consumer in purchase power.

If 2020 has taught us anything is that consumerism was high before the pandemic and marketing of products was skewed towards garnering a share of voice in this highly competitive industry. Products and categories that were deemed essential were at the top priority to curtail and eliminate the risk of the virus. Buying of fabric and ready garments was a low priority with most consumers and also governmental norms prohibited or curtailed major fashion items.

We shall look at these four aspects and see its value that lead to consumer buy-in.

1.1 Marketing in the Fashion Industry

Philip Kotler expounds on the value of marketing under the 4 P’s of Marketing– Product, Price, Place, Promotion

(Kotler, 1989). Marketing of a product or service is the need and the apparent impact of that need is the sales of the product. It may be an existing category, a new introduction, or one that has been unheard of. Where, how, what and at what cost are factors in the marketing mix.

Marketing in the Fashion Industry has undergone a change. Initially, it relied on word-of-mouth; products then relied on advertising in the Press and TV during festive seasons. This was the means to increase top-of-mind-recall. The boom in print and TV led to an increase in advertising, advertising agencies and the audio-visual medium to create ads. Marketers reigned supreme and that was a new height and peaked in the 1980s. Consumerism was the key to brands.

The industry has undergone a distinct alteration through the last 30 years. There were a few Indian designer brands then and consumers bought garments from international markets. Imports opened, people travelled due to rising income, there was progress. This led to distinct ascertaining of consumer preferences. Marketers used sales tracking data, coupled with focus groups, dipstick and *vox populi* feedback to ascertain feedback from target audiences. Designers and brand companies gained insight of the type, quality and quantity of end products to be

produced to meet rising tastes and demands. (Rapp & Collins, 1986)

Fashion slowly attained a new peak. This led to the growth of Brands. Brand and Fashion marketing was the go-to word. International brands entered the market and Indian designers made their way into the mind-set of consumers. Clothes were tailored according to the individual's needs. Impulse buys too; what traditionally people bought new clothes during festive or the marriage season. Today marketing in the Fashion Industry translates into the use of social media to advertise their brands – Instagram, Facebook, Twitter, and to some extent LinkedIn. 'Influencers' are the new media heads to promote brands.

Contextual Advertising gained traction. Contextual advertising is targeted ads placed in the environment according to what the individual is watching. Talk or search of a holiday destination and you will see Facebook ads of spots and deals around the place. The receptive frame of mind leads a person to solidify their resolve to that destination. A lot of research has gone in to pulling up ads according to the current individual consumer mood. The ad placement is based on keywords, web content and other metadata. The 'metaverse' of a different category, though. It doesn't collect user information, so no privacy issues, but leverages the context. Real time metrics ensure performance optimisation.

Marketing in the fashion industry is to gain traction and persuade and influence consumers to buy.

1.2 Merchandising in the Fashion Industry

Merchandising in the fashion industry on the other hand, has a larger role to play. There are two aspects. Merchandising as in the buying of material and accessories that are needed for a garment and the other aspects: Visual merchandising –Product Merchandising, Retail Merchandising, Digital merchandising and Omnichannel Merchandising. Such is the power that it is stated that in India the annual consumer expenditure on footwear and clothing is close to US \$68 billion.

Fashion Merchandising is the planning for producing a product/garment to introduce it to the consumer. This is an organised, skill-based task that ensures the right product reaches the masses. It is the buying of the raw materials to construct a garment, and the accessories needed to embellish it.

The other forms of merchandising are Visual Merchandising which uses psychology of display to influence purchase. Omnichannel Merchandising is the integration of advertising and promotions on various channels - physical (hoardings, press advertising) combined with social media to reach consumers. This interaction with the consumer and aligning with the product ethos creates a consistent brand experience (Marketing Evolution, 2021). Product, Retail merchandising is getting the brand out into the public. Digital marketing is promotions through digital channels or online media – apps, email, social media, websites, intranet, and search engines.

Merchandising is necessary to understand brands in their entirety and to market them to the end consumer.

1.3 Marketing in the Textile Industry

Marketing in the textile industry differs from the ready garment industry. Textile is the fabric produced and is the first step in the retail of the end garment. Marketing for textiles include innovating fabric. Many moons ago we had animal skin, leaves and fibre as dress material of basic covering to shield from the elements. Textiles now encompass natural fibres as also manmade fibres including plastic, nylon, acrylics, polyurethane and polypropylene polyester; polyamide (nylon), viscose, made from wood bark. Textile marketing leads from the hidden front as manufacturing fabric needs new goals and objectives as in the case of Kevlar and Nomex high-performance fibres. Distribution of these fabrics is specific and manufacturers, retailers and even importers define the distribution channels.

The Indian textile industry is estimated to be around US \$108 billion and expected to reach US \$223 billion by 2021. This sector is also one of the largest contributors to India's export with approximately 13.5% of total export amounting US \$42.24 billion. Marketing of textile fabric is thus for a purpose, specifically the retail or end use of the material. Additionally target markets differ for different fabrics. Handloom v/s machine loom all these factors play a distinct role in the final fabric. Indigenous fabrics have specific outlets in India run by the Central government or the State government. These are across states and the latest trend towards traditional wear and handloom fabrics are seeing an up incline. Centres like the Khadi Village Industries Commission (KVIC) showrooms, various State run showrooms showcasing and

selling yardage and textile fabric increase visibility and give the myriad textiles of India a place to shine.

1.4 Merchandising in the Textile Industry

The Indian Textile Industry contributes approximately 5 per cent to India's gross domestic product (GDP), and 14 per cent to overall Index of Industrial Production (IIP). (Fashion United, 2016). To do that understanding fabric and textile is imperative.

Merchandising in the Textile Industry entails how a fabric is planned, developed, manufactured and then distributed to the buyer. The presentation of these fabrics is dependent on the entire manufacturing process – from start to finish, from raw materials to the end fabric yardage. Fabric presentation includes forecasting, an important part to the manufacturing process.

Merchandising is not merely purchasing raw material for the development of textile, but also has an eye on the distribution and use in terms of the psychological, social, economic, and physical needs of consumers. Understanding the role and the properties of fabric enables a manufacturer to develop fabric suited for the activity in question.

Merchandising in textile means the value of each product that goes into the making of fabric. This led to developments of newer fabric with newer goals and objectives leading to high performance fibres as in the case of Kevlar and Nomex high-performance fibres. Breathable fabric for sports, clothing for warmth, and lightweight clothing for cold climes were developed and the growing need for clothing for self protection and medical diagnoses are now being developed.

2. CONSUMERS AND THE PRACTICALITY OF MARKETING AND MERCHANDISING

In all this the consumer need not be left behind. Tastes change, tastes are cyclical and evolution of products and fabric reflect the norms of the times. During the pandemic where the norm was 'work-from-home' the use of comfort clothing was necessitated, formal outdoor clothing took a backseat and were relegated to the depths of the cupboard.

What consumers want, and what they need are the ideations that marketing and merchandisers forecast. Trend forecasting and future planning are what a wearer will aspire to. Globally, 3, 000 billion textile and garment companies enter the market daily. That is a high number

to interest the consumer. Marketing attempts to maximise sales. It influences a customer to buy. This leads to profitability. Fashion Merchandising is end product-centric. It is about understanding trends before they become trends. It is creating raw material for products before they become the latest 'thing'. Contextual marketing pushes the brand till you effectively see value and execute a purchase.

The other side of fashion merchandising is the consumer 'eyeball' Visual merchandising delves into the psychological and emotional connect the consumer has with the product on display and that effects in a purchase. Digital and omnichannel merchandising ensures that consumers has consistent recall. Various web marketing strategies and market research ensures the reach and share of voice of a product or in our case the garment is high.

Being at the right place, at the right time, at the right cost, to the right consumer is the way towards maximising sales. The success of a brand is seen in its profitability. Introducing the consumer to newer concepts in textile is the value of textile in closing the sale.

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Impact of Social Factors & Cultural Factors on Consumer Behavior

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ABSTRACT

Consumer behavior is one of the most complicated, and most important things when it comes to knowing the buying habits of the ultimate target customers of a product or service. It has been observed that there are many specifications and characteristics that the customers follow when they make shopping decisions like purchasing psychology, price, the product they want to buy, and or retailer they prefer. Customer behaviors are mainly influenced by an individual's personal preferences, culture, social class, surroundings, family group, psychological factors, and many more. It is very important to know the societal environment from where the consumers have belonged, and other factors based on which the retailers or a trader try to grab the opportunity by making strategy so that they can develop a marketing message or Unique Selling Point (USP) which can be used in the marketing campaigns of the products. With this manner, the company can understand, and the need, and requirements, and use them to be more in line with their thinking while choosing the target customers. Through this, the company can enhance the sales volume and efficiently make a profit. The current study has evaluated different aspects of consumer buying behaviour alongside with the ways in which cultural factors such as normative influence, self identity and suppression of emotion influence the buying behaviour in an evident manner. This study is based on the secondary data .This study has been based on the the cultural & cultural dimension of individualism and collectivism in which the uses of data from two types of countries that are individualistic that is countries like USA and Australia and collectivistic countries such as Malaysian and Hong Kong has been collected and examined.

Keywords: Social factors, Cultural factors , Consumer behaviour, Target customers

1. RESEARCH BACKGROUND

Consumer behaviour is the study of individuals, groups, or organizations and all the activities associated with the purchase, use and disposal of goods and services, and how the consumer's emotions, attitudes and preferences affect buying behaviour. As stated by Faison, and Edmun (1977), "Consumer behavior helps to make the assumptions which can show the attributes of people's needs, and drive them to purchase the products or services".

According to Engel, et al. (1986), customer behavior (CB) identifies the acts which are involved in consuming, using, and disposing the economic goods along with the decisions which are taken to understand, and those acts".

In addition, with this Kotler (1994), CB is considered as a study of what they purchase, how they purchase, why they purchase, and for what requirement they purchase the products. As opined by Solomon et al. (1995), CB describes the decision-making process of buying goods to satisfy their particular needs or requirements.

On the other hand, Schiffman (2007) stated that CB explained the process which involves the searching habit of the customers for certain goods or services which they believe will fulfill their desire.

With this regard, it can be understood that complementary approaches are there which help to display the theory-based assumption like self-conceptualizing theory, and innovation theory which helps to understand, and, and target the potential consumers. In the case of choosing or targeting the customer in the fashion market, these two theories are much or relevant as fashion is concerned with innovation, and creative ideas which are technically vital in the case of launching a new fashion line. It is more prominent in the case of fashion buying as the customer can see the evidence which projects the image of how the buyers see themselves or would like to be seen as it helps to express the self-image more efficiently in this contemporary advancement in the global market. It has been argued that these complementary approaches are used to implement in especially fashion brands, anding which led to driving for making greater segmentation in

the fashion market. Therefore, it can be stated that the self-conceptualization theory and innovation theory are often used to do a successful fashion promotion.

The buying behavior has been defined by Dawson et al (2006), as a set of dimensions in attitude which shows the pattern of the buying choice of consumers. Some external, and internal factors are considered as the influential aspects behind these buying behaviors, especially the external situation which influences the most. In order to rectify the concept behind the behavioral remodeling, the consumer behavior along with the external situational context causes the buying consequences. The understanding that how the groups of consumers behave is dependent on external aspects like societal culture in which lifestyle, class, convention, custom, religion, norms are the main sub-cultural factors. As a member of the society or being an individual, they acquired the habits and capabilities of culture which is such a complex combination of art, law, custom, experience, knowledge, and belief (Kotler, 2000). The cultural factors are acquired from the surroundings, from the regional arena, and from all the people, and environment which are around us while humans are growing up or learning things. Sometimes culture causes us to develop a boundary within which the people like to think and act. However, in contradiction people also like to think beyond this boundary which indicates the nature of accepting cross-cultural behavior which maybe they adopt from immediate cultural society as deviant. Thus, it can be said that culture is difficult to perceive as a whole, and creates a pervasive influence on our thinking. In order to understand or synthesize this critical concept of culture the in-depth analysis needs to be developed on each, and every artifact that gives the societal distinctiveness. As the main objective of the study is to understand the cultural influence on consumer behavior thus it needs to be especially concentrated on some specific dimensions of culture that make it a powerful source to define the buying nature. Therefore, the culture is defined by Schiffman, and Kanuk (1997) as the set of concise, and conventional ideas that consist of values along with some traditional ideas. In addition to this, it can be stated that culture has a narrow sense of the form of knowledge, learned beliefs, attitudes which leads to the guidance to know the consumer behavior. After all total of previously discussed views, human culture encompasses the set of specific value systems and set of critical beliefs which is handed over generation to generation as the determinants of the basic behavior within the particular society. There is a contradictory

argument which defines that though human behavior is influenced by the culture, however, it is required for people to interact with other cultural beliefs, and value systems so that it can be understood the extent to which one's own culture influences the people. The most common concept behind the influence of culture on consumer behavior is that it creates the boundary which inclined the buying habit, and the form of behavior that is adopted, and transmitted by society to establish the uniqueness of choices and preferences. These sets of beliefs and forms of behavior explain, and define the specific priorities, and feelings that every individual belongs to that culture must be thought of and possessed with. In addition to this, it can be also said that these beliefs and values are nothing but the descriptive thinking that the individual holds some preferences of their needs and desires. There are some sets of values, morals, standards, and principles that influence, and direct the specific behavior of an individual which helps them to determine the assessment of particular goods and services.

The main agenda of marketing is all about creating the needs among the target consumers and makes them realize that they might desire the product even when they initially might not realize it (Page, 1995). Therefore, marketing plays a vital role for the retailers or the brands to understand how consumers behave when they get to know about a particular advertisement method or message. For instance, it has been observed that the consumer behavioral theories like methods of innovative diffusion lead the marketers to understand the different market segments by their thinking characteristics. The consumers play three distinctive roles as users, payers, and buyers which are defined based on the consumer behavioral content. Study shows that consumer behavior is not that easy to assume due to ever-changing global environment, technology, and evolving customer demands. The companies are always on a move to convenience the customers to buy their products for earning the desired profits thus customer behavior plays a pivotal role. From both the point of view like Customer point of view: Customers in today's world get the highest attention, and prioritize the most. In today's highly advanced, and technologically developed society they have a huge amount of options, and choices among which they will decide. There are four P's which dominated the consumer purchase behavior they have a huge range of product options or variants (P1- Product), they have enough attributes of payment choice (P2- Price), they get the advantage of making an order and the product will be

supplied at their doorstep (P3- Place), and they get to know about the products through communication with multiple channels than ever before (P4- Promotion).

In the case of consumer buying behavior where they are fully delighted, and satisfied they only spend their money on that thing thus it is very important to know the traders where they exactly need to invest their time and money. The consumers are preferably buying, selecting, or choosing a product or service if that satisfies their desire behind which different processes are involved. As per Jägel, T et al (2012), the consumption outcomes, and the preferred values to choose a product are driven by ethical product preferences. From the analyzed data five different perceptual patterns are found which dominate the ethical concern with the motives to purchase, value for money concept, well-being, personal image, etc. From the analysis stated by Helen, & Charlotte (2012), the impact of the online-based availability of information, and the general pattern of the product examination are based on consumers' decision-making process. Through the help of product inspection, the buyer can get to know the stimulation by utilitarian effect while from the online-based information the information is collected which show the retailer readiness to understand the stimulation of hedonic effect. According to Krishnakumar &Gurunathan (2012), consumer behavior is not built based on some common set of beliefs or values as not all the customers' preferences, and tastes are similar. In this age of customer-made appraisal, concepts may diminish the next generation consumers. As per Kervenoael, De et al (2011), the purchase habits of the customer in the case of fashion products are influenced by their functional values like cost, quality, value for money, warranty, and the fashion sense like style, image. It has been observed and analyzed from different studies that women are influenced by numerous factors which help them to decide the buying decision of fashionable clothes. As per M, andhachitara, &Piamphongsan (2011) the measure of the impact of hedonic pleasure the price sensitivity is not considered or positively related with it. The concept behind purchasing fashionable clothes comes from the extreme desire to consume the luxurious appeal from an expensive boutique shop. Thus it can be said that the positive expectation or the utilitarian effects create the impact on the positive influence to desire whilst in the case of hedonic attitude the subjective norms don't need to create the influence on desire. Apart from this, it can be also experienced that the desire has some positive effect which is determined from the relationship between

anticipated assumption, and intention behind buying behavior. According to a survey stated by Irani (2011), it has been articulated that women are more likely to prefer clothes in which they look thinner where men prefer clothes that look physically good. The study has also shown that for mature women the factors such as price, quality, retailer, brandimage, and style are most important which influence their purchasing habits. In order to purchase the private level garments, some major factors are playing a pivotal role which develops impact on customer's decision making. Minghuang et al (2011) stated that the internal, and external factors are equally influenced by consumer behavior in which demographic, and standard of living are the internal factors, and cost, quality, style, and brands are the external factors. The examination conducted by Krishna (2011), where the impact of the sales promotional schemes on buying behavior among the students are explored. The study showed that in this case gender does not affect the buying habit of the student but the monthly income does as the students belong from different income groups in the society. Therefore, it can be understood that there is a possible relationship between the intention to buy something, and the available sales offer of that product in the market.

In order to purchase the latest fashionable clothes customers are often visiting the appeal stores, and quality plays a major role in comparison to price in this case. Phoebe (2011) said, likewise the sales promotional offers, convenience, better places for family shopping are more important than brandimage, and also the reference group doesn't create much impact. In other words, it can be said that education plays a vital role when it comes to making purchase decisions. In the contemporary period, the customers are more likely to prefer customization rather than purchase ready-made fashion clothes. Young women are more familiar with choosing off-the-shelf fashion clothes by customizing them according to the current trends. The retailers' experienced market of handbags is increasingly facing the demand to customize their own things among the younger generation which reflects the creative mindset. There is a big difference between the age of the customers, and other variables like durability, price, reliability which directly affected the buying behavior. While the young customers want to prefer the low price of clothing the mature women are more focusing on the durability and sustainability of clothes. The family income and the preference of the retailer store segment are also relatable factors whereas the tangible cues, physical

evidence, and responsive nature of staff are also considerably important (Maria, Anne & Pia, 2011). The study shows that in comparison to men, women are doing much more scrutiny when it comes to purchasing luxurious items, appliances, or clothes. For example, in Pakistan, the main factor while purchasing ready-made garments is the quality of the fabrics on the basis of which the success of the garment industry has been enhanced.

In a general sense, the consumers try to find those commodities or services which they think need to be consumed. After that, they make the decision of purchase based on the greater utility which a brand promises to provide. After that, the consumers like to make the estimation of money which they can spend on that product. Apart from this, there are other major factors that influence the consumer's behaviour (Syuhaily & Fah 2011). The factors are i) psychological, ii) social factors, iii) cultural factors, iv) personal factors and v) economic factors. The factors are discussed as follows:

1. **Social factors:** People or individuals are social animals thus to a great extent the behavior pattern of an individual is influenced by the type of environment and people all around. It is quite common that people seek confirmation before doing any tasks and maintain to not do things that are not accepted by society. As the social factors are highly influencing consumer behavior like family, colleagues, friends, reference groups thus these factors need to be considered (Barletta's, 2006). There are two types of family which influence the most of a buyer such as joint family, and the nuclear family. In the case of the nuclear family concept, the individual gets the preference to decide what he or she needs to be purchased due to the small size family. On the other hand, in the case of a joint family personal preference is less important than group decision making. In accordance with the Indian context, family decisions largely take part in consumer buying habits. Isabel & Graeme (2005) stated the preference, taste, like, and dislike of the family members are highly affected the buying decision, and it influences the buying habit in two ways like the personality of the individual, and the decision-making process. In the Indian context, the head of the family individually or combined with his wife mainly decides what goods or services need to buy. Thus, the traders or marketers try to understand those roles in order to introduce a

product that satisfies the requirement of the whole family rather than an individual. Fatima & Ejaz (2005), observed that the way of upbringing, and the nature of parenting highly influence the buying nature of the family members. For example, an individual who belongs to a Marwari family does not consume eggs or meat to protect the family norms and cultural aspects. It is a totally different thing if she considers the nutritional values of those foods. It has been also observed that after getting married the buying habit of a person has been changed under the strong influence of a spouse. For example, in a family, it is common to see that men are likely to make decisions regarding finance, and investment while women are contributing their decision on health, and food habits. Therefore, from a marketer's point of view, the demand for the products expresses the number of households rather than the number of total family members.

Reference group: This group defines the existence of two or more people who have their own set of values, and beliefs, and the relationship between these peoples make them interdependent. The reference groups are strongly influenced by a person's attitudes, and behavioral attributes while the other member of the group can be associated with them. c) Role, and Status: In order to live within a society a person needs to participate in many different groups like organizations, clubs, NGOs in which they are expected to perform certain roles and maintain a status (Yankelovich, 1964, and Reynolds, 1965). There is a particular status that is consisting of each role thus in the case of consumer behavior people consume a product to maintain social status. The marketers need to understand, and the social symbols and the potentiality to afford the products which differ from person to person.

In the way of formulating, and understanding the segmentation it is very crucial to understand the usefulness of social, and demographic variables which helps to classify the impact of consumer behavior. The potential of the relative importance of the measure has been explored by assessing the social differences which are raised from psychological, and individual variables. The summary which has been analyzed from the authors the complexity of understanding the

customer behavior generalizing the overall impact of the social variants for instance, from a series of investigations the consumer behavior has been concerned about determining the different characteristics of households on the basis of socio-economic aspects which interpret the different concepts of the purchasing behavior. As per (), from the other angle of understanding the perception of consumer buying habits the research has interpreted the social system on the consumer buying process. Through the help of the multidimensional area of socio-economy, the effect of the different social classes can more likely to get the chance of the single angled variable of income. The concept behind the determining variants depends upon the lifestyle within which the customer's social class has been refined. The overall study emphasizes not only the goods, and services that need to be consumed but also what kind of store the marketers require or where the purchase takes place. The influence behind the implementation of innovation always helps to understand what actually drives the customer's mind, and satisfies their demands, and utilizes it to obtain competitiveness.

The satisfaction level is not totally relatable with the specification of class or living style or explaining with the income alone. Therefore, the main motive of the economist is to isolate the influence of the income which is considered as the primary concern and try to understand and explore the influence of the other factors so that it can ankle to hold the continuous effect of family consumption, valuable education, and location of residence to articulate the impact of the consumer behavior (Ferber, 1962, p. 22). However, as per the conceptual content the complexity of the matter to clearly, and concisely understand the influential category which is way more complicated, and verse in nature. From the current survey, the articulation has been made in which the contextual variables are broadly discussed including the demographic variants like age, the proximity of living along with the social factors education, status have been ascertained in order to understand the frequency of store visits, choice of stores, information collected from different sources before making a purchase decision (Rich , and Jain, 1968). It is not only taken for the study

in which the main aspect of consumer behavior is concerned but also chosen to classify different variables which are involved for the current analysis. For instance, on a given conduction two people John and Micheal have taken a decision to consider the family life cycle as their independent variable from a wide range of social classes (Rich and Jain, 1968, pp. 47-8). They have conducted a personal survey which consists of 1056 numbers of women the sample of the probability index has shown most of the women 20 years of age, and older are belong from Cleveland which is a metropolitan statistical region. Though the social class of those participants has been measured by the Warner's Index of Status Classification Model, however, they are asked to submit the income level, education level of household, source of income in a respective manner. Based on the age of the respondents the researcher divides the group into four sections over the age of 40, and under the age of 40, and as per family proposition like having children or no children. As for the example, fashion is the preferable area of research thus the dependent variables are accessibility of source of information, enjoyment in shopping, frequency of shopping, online using rate, frequency of browsing or the type of store preferred. The research has asked the respondents about the responsiveness, and usefulness of the data like social class, lifestyle in order to measure the socio-economic changes based on consumer behavior. However, it has been observed that the present study is different from the previous one as they considered taking food items, and appliances rather than researching fashion items. Therefore the variation of the two studies is slightly differentiated by its nature as the sociological variable which is used in the study of fashion clothes do the categorization on the basis of the responses of housewives including their social class. As per Loyd Warner ISC, it has been ascertained that the connectivity of other dependent variables like occupations of household, source of income, type of residence helps to conduct the overall analysis as a proxy variable. The selecting samples are from the data of housewives who belong to Newcastle java been selected as they are all from the lower social class category and middle-class segment. These little variables are selected which help to ensure the

criteria by dwelling the factors in an effective manner to generate more prominent responses. Though the entire study does not present the measurement based on the proxy variable, the information helps to facilitate the results as compared with the previous examination.

- 2. Cultural factors:** Culture is a very important aspect that tends to create values, perception, preferences and behaviours within individuals right from the early days. Cultural influences tend to influence the pattern of the consumption and pattern of decision making within an individual and the following is used by the marketers to understand the cultural force to create marketing strategies so that the culture is integrated with the products and services so that it is culturally accepted by the individual. It is important to understand that culture is not prominent and is gradually diminishes through progressive assimilation within a society. It is important to understand that having cultural beliefs and values that are concentrated creates a higher influence when compared to cultural beliefs and values that are there between diverse societies. Culture is transferred from one group to another with constant sharing of knowledge from one generation to the next for example food is linked with the culture of a person and the following is also shared with generation to generation for example the Bengali food has a different types of variety including fish whereas in states like Gujarat Rajasthan and Tamil Nadu fish is identified as and an acceptable food item. This shows that the cultural norms and perceptions of people from different cultural backgrounds are different from one another and are shared from one generation to the other. Subculture can also be defined as an effective factor or determinant that influences consumer decision making and creates certain perceptions and attitudes within humans. Subculture is the subgroup of smaller cultures followed by smaller groups of people that belong to a larger cultural background. It is important to understand that social class is one of the modern determinants that tends to define the way in which a person behaves. . It has also been highly observed, and experienced by various learning processes throughout the entire life of an individual. An individual grows up with certain

values, beliefs, perceptions, preferences, cultural aspects, and behavioral patterns which influence them to make decisions regarding their food intake, style of living, fashion sense, etc. These factors are not only acquired from the family but also the people sound the environment which causes the pattern of socialization with family, and other key institutions. With the help of this, the study can develop the general value regarding the different behavioral aspects to a wide range of extent. The value system has consisted of varieties of elements including individualism, efficiency, progress, material comfortability, practical approach, freedom, and many more. Through the help of direct impact of the subcultural, and cultural aspects such as racial groups, religious members along with the different areas of locality the difference in ethnicity, taboos, stereotypical mindset, rigid norms has been ruled over year and year.

Both the cultural factors, and the customer buying habits are interdependent, and both influence the customs, and norms of a certain culture which varies from place to place. In order to develop a gap to understand these factors can create obstacles for the marketers to understand the cultural preferences. The marketers need to do thorough research before entering into a new market or target a particular group of people from cross-culture by adopting and implementing unique strategies. In order to innovate a new product range, the marketers always want to do cultural shifts so that the different culture can effectively influence their product designing. For example, in order to conduct the cultural shift in healthcare marketers find a large scope to extend the business to launch health-consuming foods, health drinks, footwear, equipment, clothes which exaggerate the whole fitness service industry. The demand for leisure time has been utilized by offering different dimensional services, and goods. Culture estimates a boundary within which an individual wants to think and act but if an individual only thinks as per the limitation then he cannot adopt the cross-cultural outlook. The process of one feels the same way that other cultural people think helps to mitigate the bridge between two cultures. Through this manner globalization, and digitalization takes place.

It has been observed and analyzed that norms and customs are making the boundaries that the culture helps to develop, and set in the behavior of the people. Through the help of norms, the cultural values are established through which it has been stated that how a person comes from a particular culture measures the consequences, and activities by defining which are desirable, and which are not. Most of the people come from a particular culture willing to show their respect and follow the norms, and this gives them the reputation, and respect in return. Not only the social norms, but culture also helps to create the boundaries of family norms, behavioral norms. It is important to know how one should greet other people or how one should be dressed in a formal manner or how one should stand beside other business partners that the culture explains all. In a general sense, the culture helps to define the way one needs to perceive things, thinks, believe, and along with all the remaining environment, and people with whom they can interact. In order to understand how social factors influence consumer behavior then it is important to know some major concepts. Among which Hofstede (1980) stated the concept of usefulness of the cultural dimension. As per Hofstede, the culture helps to interrelate with the thought process as it defines the interactive agreement with having the common characteristics that lead to influence a specific group of people or environment (Nokata, and Silva Kumar, 2000). According to Nokata, and Silva Kumar (2000) the concept of Hofstede's cultural dimension is considered as the most influential cultural theory among the research based on this topic so far. Hofstede (1980) has tried to distinguish the cultural dimension on the basis of important factors including:

1. Masculinity-femininity
2. Power distance
3. Uncertainty avoidance, and
4. Individualism-collectivism

The following can be understood that power distance is an extent between formal authority that is regulated and the degree of less power that is accepted within the society as standard. If there is a higher power distance the members that are comfortable in such society are those that are the ones on the top of the power chain. Uncertainty avoidance

is a factor in which the people in the society are unsure about the future uncertainty because of which the consumer buying behaviour is altered. This is because of the ambiguity and low orientation that is there in the society due to rules and regulation that governs the consumption process and maintaining materialistic status. At last the factor of masculinity versus femininity can also be understood as a factor that develops cultural beliefs with a male and female buyers which directly affects the consumer buying behaviour in the market (Pavlov and Chai, 2002).

Culture factors such as belief and values that are culturally motivated create the mental perception that tends to influence the individual attitudes and directly influences the ways a person behaves in different situations. For example when buying clothes the process of evaluating and choosing the cloth also includes the decision making process that is guided by core cultural beliefs and values. This is because the beliefs and values that are only within a person are derived from the society and high degree of persistence that tends to make or create specific attitudes and behaviour in everyday life with humans (Kotler, 2000). The cultural beliefs and values that a person has is derived from their parents and major educational institutions in the early life based on which the social cultural factors are developed which tends to increase the consumer buying behaviour in an evident manner.

With the help of defining the dimension of Individual-collectivism, he tried to develop the concept on the standard of the behavioral regulation acted by individual or group. People belonging to these groups are more willing to think about themselves, and their immediate family members as compared to thinking in a collective way (Sondergaard, 2001). The collectivist are more often seems to be mature when it comes to putting personal feelings besides and focus on the group achievement as a whole. The collectivist can easily shift their attitude based on the situational context in order to obtain the connectedness in a group. The people belonging to the collective group are highly motivated by norms and responsibilities that are imposed by the group. The social pattern of individualism helps to influence the buying habit through the orientation of self-preference, responses to the normative aspects, and the requirement of obtaining the satisfaction level. In the case of individualism, the people most often forget to consider the negative consequences regarding their consumption habit rather they are looking forward to making decisions on the positive consequences of their feelings, activities, and

works. As opined by Triandis (1995), this way of cultural dimension creates an impact on the buying behavior of customers in clothing segments. On the contrary, this concept is the opposite in the case, of a collective group of people as they want to consider negative consequences which help to develop the ethnicity level, and influence in an effective manner. Collectivism is showing the example of the social pattern which consists of the belief of a group of consumers so that it cannot make any hamper on the perception of the marketers.

2. CONCLUSION

The following study has been based on the the cultural & social dimension of individualism and collectivism in which the causes of data from two types of countries that are individualistic that is countries like USA and Australia and collectivistic countries such as Malaysian and Hong Kong has been collected and examined. It is important to understand that the conclusion that is drawn in this study is that collectivists have a buying tendency that is equal to that of individualism and they tend to decrease the negative status and have a behaviour that is consistent with their own cultural norms, beliefs and values. It is seen that the Purchase is done for self-fulfillment which can be seen with individualistic behaviour as well. There are other factors and cultural dimensions as well that tends to influence the consumer buying behaviour which includes factors such as masculinity/femininity, uncertainty avoidance, long-term orientation and power distance. The following can be understood that power distance is an extent between formal authority that is regulated and the degree of less power that is accepted within the society as standard. If there is a higher power distance the members that are comfortable in such society are those that are the ones on the top of the power chain. Uncertainty avoidance is a factor in which the people in the society are unsure about the future uncertainty because of which the

consumer buying behaviour is altered. This is because of the ambiguity and low orientation that is there in the society due to rules and regulation that governs the consumption process and maintaining materialistic status. Atlast the factor of masculinity versus femininity can also be understood as a factor that develops cultural beliefs with a male and female buyers which directly affects the consumer buying behaviour in the market. Culture factors such as belief and values that are culturally motivated create the mental perception that tends to influence the individual attitudes and directly influences the ways a person behaves in different situations.

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To Understand Consumer Perception and behavior of Online Shopping of Lingerie

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ABSTRACT

Now a day's lingerie is not just a basic need but these garments have something that makes you feel comfortable and enhance your confidence from inside. The women of modern India have become more courageous in choosing her lingerie. Lingerie trends is not only a matter of fit, comfort and modesty but also a style statement. As a very related part of the daily apparel lingerie also helps to sculpt the female body according to the fashion style. Lingerie is a timeless essential clothing that has been used by women for ages. It is something that cherish women from inside and also, they appraise this garment as a symbol of passion. The main purpose of the paper is to identify the driving forces which leads women to buy lingerie online.

Shopping of lingerie has always been a terrible affair especially when you demand for different shape brassier in particular style and retailer of the store replies u that particular size of style is not right for you or not available. In India lingerie are mostly sold on retail store and due to area constraint, retailers mostly stocked only those sizes and styles which are best selling products according to the demand of female consumer. Past researches reveals that the women who do shopping offline for their lingerie always faced lots of problem like: -

1) limitation of stock

2) less knowledgeable or male personnel

3) Poor display

4) lack of privacy

5) Unavailability of brands

1. INTRODUCTION

Research shows that half of the population of India is youth and enjoy online surfing which leads to extraordinary rise in the rate of online shoppers. High speed internet aware them about different options and encourage them to search more and more and eventually go for to shop online. The main focus of this qualitative study is to find out the female consumer perception and their buying behavior towards intimate apparel through e-commerce websites. In the present-day context, it is very vital to understand the consumer buying behavior for the success of a business. The main focus of this paper is to contemplate and analyze the age and occupation wise profile of female consumer and their effect on consumer buying behavior towards intimate apparel. Many past researches states that consumer shopping is highly influenced by visual merchandising display.

2. OBJECTIVE OF THE STUDY

To analyze whether the age and occupation of the consumer affect the online shopping and offline shopping

3. METHODOLOGY

The main objective of this paper is to study the female consumer perception and their buying behavior towards online shopping of intimate apparel. Specially focusing on female consumer of age group of 20-36 years and above. Explorative research is considered most appropriate for this study. A sample of 400 female respondents of Delhi city was selected.

First, primary data were analyzed to find out, whether age and occupation wise profile of consumer has an impact on online and offline shopping behavior of consumer.

Primary data were analyzed using charts. to find out the Primary data, a total of 400 samples was analyzed.

Collected data showed that there were majority of female consumers who disagreed to buy lingerie through online source.

4. RESULT

*Age * Which is the most preferred place to buy lingerie? (Online) Crosstabulation*

| | | | Strongly disagree | Disagree | Neutral | Agree | Strongly agree | Total |
|-------|--------------------|------------|-------------------|----------|---------|-------|----------------|--------|
| Age | 20-25 years | Count | 2 | 36 | 3 | 5 | 20 | 66 |
| | | % of Total | 0.5% | 9.0% | 0.8% | 1.3% | 5.0% | 16.5% |
| | 26-30 years | Count | 1 | 77 | 3 | 12 | 56 | 149 |
| | | % of Total | 0.3% | 19.3% | 0.8% | 3.0% | 14.0% | 37.3% |
| | 31-35 years | Count | 3 | 96 | 2 | 5 | 22 | 128 |
| | | % of Total | 0.8% | 24.0% | 0.5% | 1.3% | 5.5% | 32.0% |
| | 36 years and above | Count | 4 | 42 | 0 | 4 | 7 | 57 |
| | | % of Total | 1.0% | 10.5% | 0.0% | 1.0% | 1.8% | 14.2% |
| Total | | Count | 10 | 251 | 8 | 26 | 105 | 400 |
| | | % of Total | 2.5% | 62.7% | 2.0% | 6.5% | 26.3% | 100.0% |

The above analysis as regards preference for buying of lingerie through e-commerce website has been done age wise. The above analysis states that women of age group between 26-30 years are more specific about purchasing of lingerie through e-commerce website. 68 female respondents which account for 17% agreeing and strongly agreeing with their preference in purchasing of lingerie through e-commerce website. While 78 women which account for 19.6% of age group between 26-30 years

denies to buy their lingerie from e commerce websites followed by 27 women of age between 31-35 years and 25 girls of age 20-25 years which account for 6.8% and 6.3% of total population prefer to buy lingerie from e commerce websites while 99 women of age between 31-35 years, 38 girls of age 20-25 years which account for 24.8% and 9.5% of total population as well as 46 women of age 36 years and above which account for 11.5% shows their denies to buy lingerie from e commerce websites

| Employment * Which is the most preferred place to buy lingerie? (Online) Crosstabulation | | | Which is the most preferred place to buy lingerie? (Online) | | | | | | |
|---|----------------------|------------|--|----------|---------|-------|----------------|-------|--|
| | | | Strongly disagree | Disagree | Neutral | Agree | Strongly agree | Total | |
| Employment | Student | Count | 1 | 18 | 2 | 4 | 17 | 42 | |
| | | % of Total | 0.3% | 4.5% | 0.5% | 1.0% | 4.3% | 10.5% | |
| | Full time employment | Count | 4 | 71 | 2 | 17 | 72 | 166 | |
| | | % of Total | 1.0% | 17.8% | 0.5% | 4.3% | 18.0% | 41.5% | |
| | Self employed | Count | 3 | 8 | 1 | 0 | 18 | 30 | |
| | | % of Total | 0.8% | 2.0% | 0.3% | 0.0% | 4.5% | 10.6% | |

| | | | | | | | | |
|-------|------------|------------|------|-------|------|------|-------|--------|
| | | % of Total | 0.8% | 2.0% | 0.3% | 0.0% | 4.5% | 7.5% |
| | House wife | Count | 2 | 100 | 1 | 3 | 6 | 112 |
| | | % of Total | 0.5% | 25.0% | 0.3% | 0.8% | 1.5% | 28.0% |
| | Unemployed | Count | 0 | 44 | 2 | 2 | 2 | 50 |
| | | % of Total | 0.0% | 11.0% | 0.5% | 0.5% | 0.5% | 12.5% |
| Total | | Count | 10 | 251 | 8 | 26 | 105 | 400 |
| | | % of Total | 2.5% | 60.3% | 2.0% | 6.5% | 28.8% | 100.0% |

From the calculation of above table, it has been calculated 89 women of Full time employment which contribute 22.3% of total population followed by 21 girls as a student which contribute 5.3% of total population, also 18 self-employed women which contribute only 4.5% and least 9 house wives which contribute 2.3% of total population followed by 4 unemployed women which contribute 1% of total population agreeing and strongly agreeing that online shopping of lingerie is more convenient than offline shopping. As against these 102 respondents which contribute 25.5% of total population of housewives, followed by 75 women of full-time employment which contribute 18.8% of total population, 44 unemployed women which contribute 11.0% of total population and 19 girls which contribute 4.8% of total population as a student don't prefer to do online shopping for their lingerie. 2% of respondents were unsure whether they prefer or not to do purchasing of their lingerie through online websites.

5. CONCLUSION

From the above age and occupation wise analysis on consumer perception and behavior of online shopping of lingerie Despite of having lots of awkward situation towards buying of lingerie product majority of female consumers prefer to buy their lingerie products through off-line source. One of the major concerns of buying lingerie on line is size issue, as well as feel trouble while return and receive the refund.

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TECHNICAL SESSION III
ADVANCEMENTS IN APPAREL MANUFACTURING

Visual Techniques as a Tool for Advancement in Apparel Factory Management

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ABSTRACT

The more complicated a process, the exchange of information across the process is going to be more critical. Visual factory is a technique which help in information in a more accurate and efficient manner. The implementation of Visual Factory requires two steps – identifying the correct information for communication and method to achieve and accomplish the same.

The visual factory process starts from the determination of information which need to be communicated. The current state mapping is done with futuristic company goals to find out what information is more important and accordingly the information selected is delivered. The desired result will decide the methodology of the communication of information. The parameter of location and method of communication is considered to find out a more relevant information. Generally, this information includes A. Parameter of process B. instruction for the job C. General information of facility

1. INTRODUCTION

A organization could remain competitive with its competitors across the world if it focus upon its technology upgradation, optimizing cost of manufacturing, continually improving the product quality , improving the delivery precises and speed , provide best facility to its manpower and develop a framework which utilize input from the domestic. Hence, upon considering the above-mentioned parameters, the garment industries across the world decided to counter these challenges by improving, restructuring and redefining their manufacturing process. The garment industry is looking upon other manufacturing industry including mining, automobiles etc to find out the best manufacturing systems in India and across the globe. Lean manufacturing is comparatively a new term that had been coined by Eomack, Jones and Roos in the book titled as, The Machine that changed the world [1991]. The authors in this book have explained the best techniques used Toyota Production System in their manufacturing facility. The elimination of waste in a systematic manner is called as Lean manufacturing. The core objective of any organization is customer delight and the same is being achieved by the company through various techniques and Lean manufacturing is one of them. The wide acceptability of Lean manufacturing is yet to be under scanner of various experts in aspects to apparel

manufacturing industry. The concept of lean manufacturing is required to be modified in accordance to suitability of apparel manufacturing techniques. The reason for this modification is that the reference point from another industry for lean implantation are sometimes tough and misleading. The core characteristics of Toyota in terms of its cultural value, economic aspects, social background is completely away from the intrinsic value of Apparel Industry. Considering these intrinsic differences, this paper will focus upon which lean practices should be picked and implemented in the garment industry according to its suitability for the relevant industry. In its first objective, the paper will try to address a review of literature in aspects to lean manufacturing on the parameters of its fundamental and methodology described by the previous researcher. Afterwards, the suitability of these parameters in relation to apparel industry dynamics will be described and ways to implement the same will be discussed.

A visual factory can be considered as carbon copy of the smart factory wherein the both techniques try to find out that at a given point of time, what is the position of a person working on the shop floor in respect to his/her efficiency, productivity and quality at a given point of time. But it is not always necessary to be smart to deliver results like a smart factory could. In reality, a manufacturing facility can convert itself into visual

factory by implementing tools like whiteboards, traffic light system, SQDC, Andon systems, or communication boards. The visual representation provided by all these tools would clearly indicate the progress of its manpower and overall, the performance of the plant.

Considering the cost benefits, the organization may focus upon to convert the simpler visual tools which measure the performance of a person manually into semi-automatic or automatic so that the requirement of manually update may be obsoleted from the manufacturing facility, thus making the process simpler and orient the same to more time efficient. This will ultimately lead to achieve significant gains.

visual factory tool is more or less similar to all other tools in the lean way of manufacturing and the prime aim of this tool is also making the process more competitive. These tools have an additional advantage which help the controller to visualize the process in the better manner. If an organization manpower is able to understand the representation of Andon system or SQDC, and able to understand the result from the visualization then it can be clearly make out that the organization is striding towards a visual factory.

As a section under lean way of manufacturing process, a visual factory comprises of signs, infographic, charts, symbol, label and other communication techniques to share data in a user-friendly efficient manner. By visual conveying the information, this tool reduces the time spent in reading, processing, and interpreting text-based instructions. The preliminary step of visual factory implementation may include: -

- Work processes
- Sharing of the information to an employee which is must to finish his tasks
- Represent the general layout of the working area and important access areas like aisles, in-out doors, and walking area, direction symbol which would help the manpower
- The goal which a employer want to accomplish by making his facility as a visual factory

To achieve the above goals, the management might start from the very basic tool of Visual factory which is known as 5S which focus upon eliminating waste, facilitates standardization, and encourages facility-wide cleanliness

and smoothness in work. The prime principal on which 5S is designed is visual order, which makes it a basic and natural tool for developing a visual facility.

Determining what information needs to be conveyed is the starting point of visual factory. The current manufacturing state should be compared to the future manufacturing state aims in order to find out what information is required and accordingly the delivery of information will be made. The information required to get from one state to another is what must be conveyed. The modus operands of disseminating the information will depend on the desired result. The relevance of the information delivery will depend on the point of location and method. Generally, this information will include:

- Process metrics
- Job instructions
- Information of General plant

Process metrics are generally displayed at the manufacturing site like machine etc. The more the real time this information is delivered, more the effective results will be achieved. The process will be improved highly if the immediate feedback is provided. The techniques by which information is delivered by using light is called as Andon. Andon's are most of the time, at the center-stage of the visual factory due to importance of real time information which is delivered.

Work/Job specification are typically displayed all over the production areas. Visual instructions with high resolution photographs animation and graphics will reduce production mistakes. The communication delivery is directly proportional to visual display.

General plant information is a type of information which is for one and all working in the facility and displayed at a central location. Lean manufacturing concept largely depends on the two-way information sharing in all the department of organization. In a visual factory environment information is delivered to inform, alert and motivate. A few benefits of a Visual Factory are :

- Better productivity and output
- Clear, simplified instructions in complex environments
- Safer workplace (given the clear, intentional visual communication)
- Higher profits (due to more efficient processes)

- Fewer errors and less guesswork throughout a work process
- The next step is method of delivering the information. This may be obtained by way of a series of visual clues and systems and the specific systems that makes a workplace easier. Those may include:
- LED display boards, to disseminate the real time information on the status of efficiency, production within the department and to alerts workers whenever help is required.
- Marking aids and signages, which can help the worker to find out the walkways, gates, exits, directional signages, and other navigating instructions.
- Electric boards that show live inventory status, storage, tools, and other important resources

A visual factory cannot be stated as a visual factory until and unless it utilize the lean tools, methodology and resources that are must for minimizing waste by the way of lean manufacturing. 5s, process standardization, Andon systems, LED , whiteboards, and Kanban boards are the techniques that one facility can use to make a visual factory. Here , it may noted that the name of the techniques mentioned here are not the only ones and there are other tools too.

Visual management is a method behind the successful implementation of 5S. The aim of the visual controlling is to maintain the condition clear, simple just by having a glance on it in such short time as much as its possible. Visual control techniques are also very much close to “going to Gemba, ” or “the real place “which are another lean management tools.

John Shook, Senior Management personal at the Lean Enterprise Institute, elaborates the importance of visual management by writing that , “If I can see it, I can fix it.” The reciprocal of the same should also be true that is – it’s hard to fix if you can’t see it.”

5s is a *visual* way to figure out where your tools go and how processes stay organized. Essentially, it’s a method implemented to make a designated place for every item in the facility and also maintaining the cleaning standards, in other hand.

2. VISUAL MANAGEMENT TOOLS:

Visual Management methodology enable facility employees to be well updated about production methods,

current status of production and other important relevant information for the concern to finish their assigned tasks more efficiently and effectively. In comparison to written reports, instruction and guidelines the big size visual displays are found as more effective techniques of disseminating communication/ information to co- workers in the factory and therefore they should be used displayed at the floor of manufacturing as much as possible. Even in case of better compliance and understanding for a process, visual techniques helps the workers to understand the complicated task in a easier way by displaying right sequence of events, the correct method to do a task , the internal and external customer linked to that process and other parameter which are making that process easier and delivering a better quality product. These visual tools may comprise the below:

1. **Visual Displays** - Charts, metrics, method and activity documentation which are the basic referred information for production worker to do a task. For example, chart showing the trend of gained performance, percentage variation of a product from a quality standard, quantity produced status hourly, daily, weekly or monthly etc.
2. **Visual Controls** – Indicators which are implanted and aimed to control or signal actions to team members. This may include production status information, quality tracking information, etc. For example, traffic light system using color coded panel for showing the activity of a worker is in accordance to the desired steps or not. Kanban cards are another example of visual controls.
3. **Visual process indicators** – These indicators display the correct production techniques, flow chart of a process or material flow movement. For example, this would include the demarcation of area for fabric storage using paint for non-defective fabric, defective fabric and fabric yet to be inspected. Similarly the bin system of green or red color storing the defective and non-defective garment would also serves as a visual process indicator.

3. LIST OF TOOLS CAN BE USED TO VISUALIZE GARMENTS FACTORY:

1. Visual control boards : It might be SDQC or pull signal visual control board (Kanban)
2. Digital computerized board

- | | |
|---|------------------------------------|
| 3. Visual workstation | 10. Mascots, |
| 4. Signs, labels, name tags and direction | 11. Sketches |
| 5. Borders, lines; level scales | 12. Drawings |
| 6. Board, Shadow board, shadows, color codes and displays (i.e. Colour and shape) | 13. Models |
| 7. Graphs, info graph charts, | 14. Sticky |
| 8. Photos, films, | 15. Decision |
| 9. Posters | 16. Trees, |
| | 17. Kanban systems (cards, lights) |

4. IMPLEMENTATION OF THE VISUAL TECHNIQUES

1. *Display of SOPs and Manual*



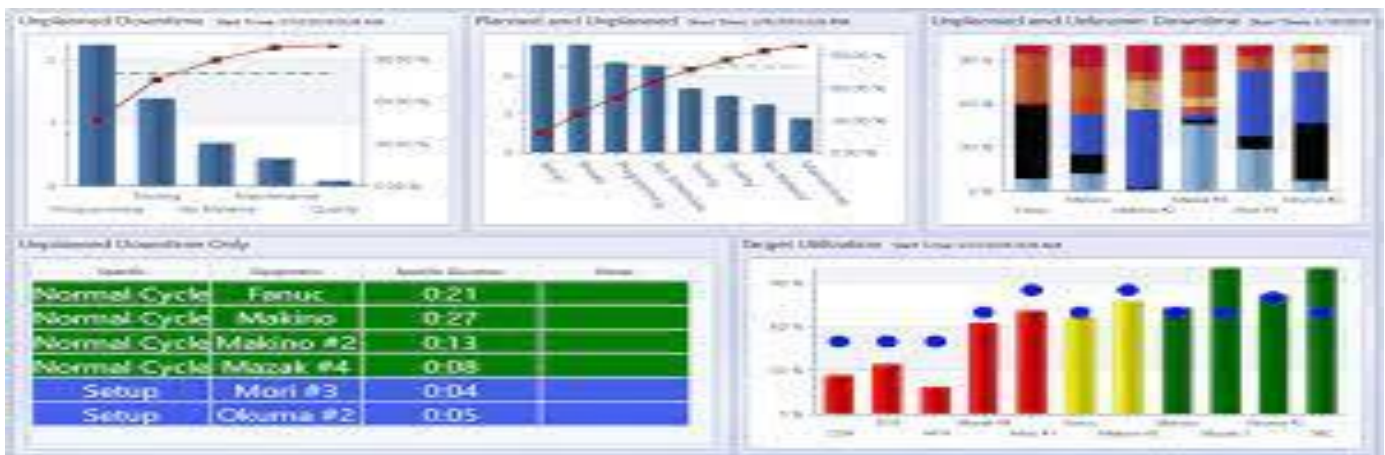
2. *Display of Supervisor rating*



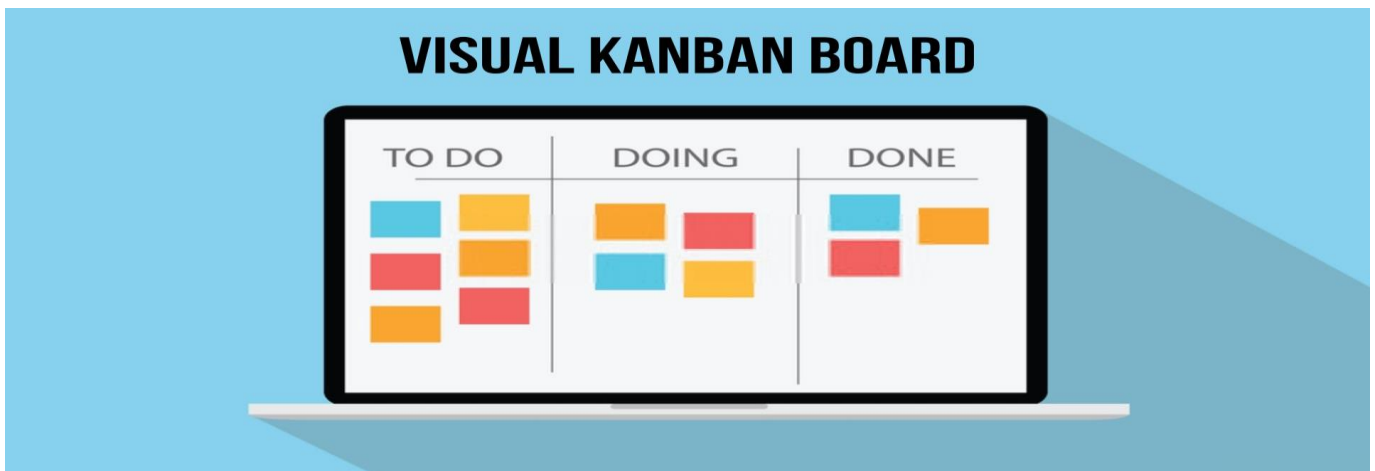
3. SQDC board



4. Defect Library



5. Kanban Board



5. CONCLUSION

A pictorial display of a situation is worth equal to thousand words explanation. In other words, a single picture might be able to clear a situation in a better manner in comparisons to one trying to explain a situation in words to the listeners. The advantage of the visual communication is endless and if we go back to history, we may find that even in the pre-historic period the pictorial techniques were used, which is considered as the earliest method of communication used by humans and also highly relevant in today's times.

Visual communication, for which a basis is the use of elements of visual which may be drawing, graphic representation or image using electronic display has made everything easy to understand and explain the information which is important for one's job or task.

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A Study on Preferences amongst Women and Trans Women in Relation to Brand Choices

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ABSTRACT

A trans woman is somebody who was tagged male at birth but has a feminine sexual category and individuality, and consequently converted to be alive as a woman and referred to as the third gender. The present research study aimed to study the impact of gender i.e. women and trans women on the brand preferences for the shopping for apparel. To conduct this study, the related literature on clothing practices, social aspects of clothing, trans women status and consumer buying behavior was reviewed. The survey method was adopted for Data collection. Purposive random sampling method in conjunction with snowball technique is used to select the samples for the study. A total number of 200 samples were selected among which 100 were women and 100 were trans women. The age group of the subjects selected for the study was 22 to 50 years. Factorial research design was used to see the impact of gender on the brand preferences for clothing. Data was analyzed using frequency method, percentage method and chi-square. The results shows that there was a significant association between gender and responses pertaining to the pre tested question. This paper projects the relation between women and trans women on clothing preferences in relation to brand choices.

Keywords: Gender, Trans women, Social Aspects, Clothing Preferences, Brand Choices

1. INTRODUCTION

Gender identity reflects a deeply felt and intimate sense of one's own gender. everybody incorporates a identity, that is an element of their overall identity. A person's identity is usually aligned with the sex assigned to them at birth. Transgender (sometimes shortened to "trans") is associate degree umbrella term accustomed describe individuals with a good vary of identities – as well as transsexual individuals, cross-dressers (sometimes mentioned as "transvestites"), people that determine as third gender, et al. whose look and characteristics square measure seen as gender atypical and whose sense of their own gender is totally different to the sex that they were assigned at birth.

Trans women determine as women however were classified as males when they were born. The search for bringing their bodily characteristics and sex language into superior harmony with their strapping gender identities so that their identities as women in conclusion turn out to be undoubtedly noticeable to their associates, families and colleagues. Though, some may be limited by their individual or societal conditions in their capability to attain this. Trans women habitually experience noteworthy affecting distress, frequently referred to as

gender dysphoria, if not capable to live wholly as women. The extensive and hard procedure which trans women go from side to side in order to attain this is called **transitioning** and typically engrosses undergoing noteworthy medical support in the form of hormones and at times a variety of surgical processes. When these women complete their conversions, they may habitually no longer look upon themselves as being under the transgender sunshade. They might think having been transsexual to just be a feature of their medical past which has now been determined and so is no longer an issue in their life.

A variety of brands are available in the market for clothing. It includes a huge range not only in terms of price but also covers all other aspects of clothing. When consumers purchase outfits, they get ample of choices as per their interest and taste, budget and other backgrounds. It's not essential to be a keen fashionista, nor a style week habitual, to be aware of how essential our clothing sense is to our reputé in the surrounding community. The outfits which are dressed in propel influential indications to the peers and outsiders, representing the self image that was supposed to demonstrate.

2. SIGNIFICANCE OF THE STUDY

In the present research study, social clothing buying preference on the basis of brands were being studied in relation to Women and Trans women. The impact of gender was seen through a question. This study is productive for the society as it put forth different characteristic features of this particular gender which in turn will be resulting to establish some new facts and knowledge. This investigative research study will provide a preliminary speculative contribution to the field of fashion and branding.

3. OBJECTIVE

1. To study the impact of gender i.e. women and trans women on the brand preferences.

4. HYPOTHESES

1. There will be a significant association between the gender and responses related to the brand preferences.

8. RESULTS

- I. Findings related to brand preferences

5. SUBJECTS

Purposive random sampling technique in conjunction with snowball technique is used to select the samples for the present study. A total number of 200 samples were selected among which 100 were women and 100 were trans women. The age group of the subjects selected for the study was 22 to 50 years and belongs to middle income level group.

6. METHODS

Factorial research design was used to see the impact of gender on the social clothing preference i.e. brand preferences.

7. STATISTICAL ANALYSIS

To study the impact of gender i.e. women and trans women on the brand preferences frequency method, percentage method and chi-square was used.

The level of significance was set at 0.5 level of significance.

TABLE 5

Results showing association between gender and responses in relation to the response of “Do you always prefer branded clothes while shopping”?

| | | | Responses | | | | Total |
|--------|--------------------|--------------------|-----------|-----------|---------|-------|--------|
| | | | Always | Sometimes | Usually | Never | |
| Gender | Women | Observed Frequency | 20 | 32 | 44 | 4 | 100 |
| | | Expected Frequency | 18 | 28 | 38 | 16 | 100.0 |
| | | % within Gender | 20% | 32.0% | 44.0% | 4.0% | 100.0% |
| | | % of Total | 10% | 16% | 22% | 2% | 50% |
| | Trans Women | Observed Frequency | 16 | 24 | 33 | 27 | 100 |
| | | Expected Frequency | 18 | 28 | 38 | 16 | 100 |
| | | % within Gender | 16% | 24% | 33% | 27% | 100% |
| | | % of Total | 8% | 12% | 16% | 14% | 50% |
| Total | Observed Frequency | 36 | 56 | 77 | 31 | 200 | |
| | Expected Frequency | 36 | 56 | 76 | 32 | 200 | |
| | % within Gender | 18% | 28% | 38% | 16% | 100% | |
| | % of Total | 18% | 28% | 38% | 16% | 100% | |

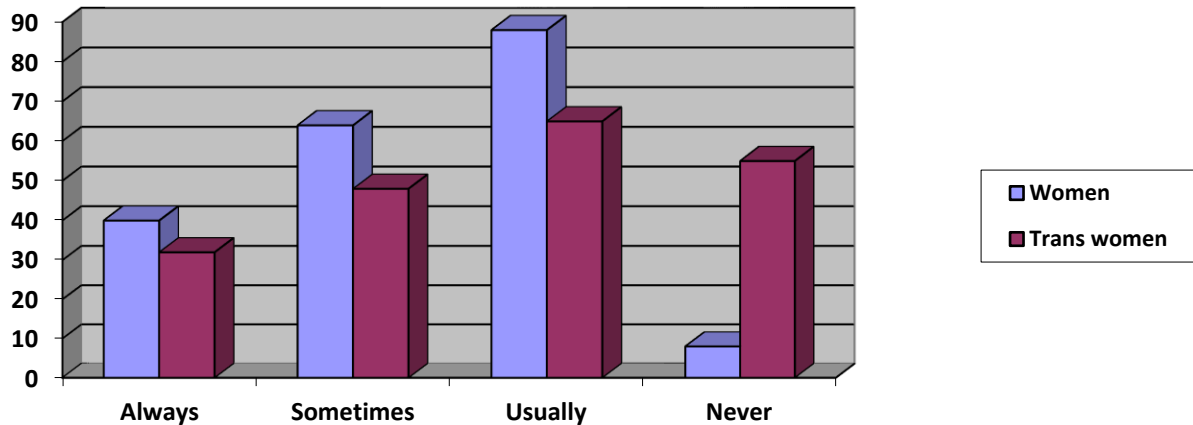


Fig. 3
Graphical representation of association between gender and responses

Table - 5 and Figure-3 shows association between gender and responses in relation to the response of “Do you always prefer branded clothes while shopping”? In relation to women, the observed frequency has been found 20, 32, 44 and 4 respectively for Always, Usually, Sometimes and Never. Percentage within gender has been found 20%, 32%, 44% and 4% respectively for Always, Usually, Sometimes and Never.

In relation to Trans women, the observed frequency has been found 16, 24, 33, and 27 respectively for Always, Usually, Sometimes and Never. Percentage within gender has been found 16%, 24%, 33% and 27% respectively for Always, Usually, Sometimes and Never.

In case of total the observed frequency has been found 36, 56, 77, and 31 respectively for Always, Usually, Sometimes and Never.

TABLE 6
Chi-Square Results related to the Association between Gender and Responses

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 42.630 ^a | 3 | .000 |
| Likelihood Ratio | 47.149 | 3 | .000 |
| Linear-by-Linear Association | 17.364 | 1 | .000 |
| N of Valid Cases | 401 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 31.92.

Table – 6 shows the chi-square results related to association between gender and responses. The observed chi-square value of 42.630 at 3 degree of freedom is found significant at 0.05 level of significance. This proves that there is a significant association between gender and responses related to the response of brand preference.

9. DISCUSSION

The present research study proved that the gender i.e. women and trans women affects the clothing buying

behaviour in relation to brand choices. A significant association resulted between gender and the brand preference.

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Integration of Masks with the Garment as an Essential Accessory

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ABSTRACT

Face masks have become an essential accessory to fight against the spread of Covid 19. This has led to the design of mask, where the user matches it with the garment, resulting into the transformation of medical accessory to fashion accessory. From bearing a clinical appearance, the face masks have come to become an essential part of everyday fashion. The face masks is a stand-alone piece and is not an integrated part of the garment. Therefore, this paper presents a new perspective on the way masks are produced and worn using partial and integral knitting done on a computerised fully fashion flat knitting machine.

The template released by leading computerised knitting manufactures gives the direction for production of shaped masks using both seamless and computerised flat knitting machines (Fibre2Fashion, 2020). These masks utilise the stretch of the knitted fabric to fit itself on the face of the wearer. But, limited study is available on a knitted mask with contouring to take the shape of the face. The design language development for the integration of masks into a knitted garments using computerised fully fashion flat knitting machines, also remains largely unexplored. Therefore this paper focuses on the development of the design language to integrate masks with the knitted garment. The research methodology for developing designs is experimental in nature. This research is hinged on the discipline of both theory and praxis; the technology gives the theoretical dimensions and the practical experiments gives the applicable approach, enabling the designer to innovate with technology. The knitting technique is explored to produce a mask, which is integrated to a knitted garment while creating a new design vocabulary for the accessory. The outcome of the project is realized through the development of masks as an extension of the attire. The knitting adds value to the end-product and solves the fashion dilemma of choosing the matching mask for the garment.

Keywords: knitted masks; accessories; contouring of knit fabrics; computerised knitting; integrated mask.

1. INTRODUCTION

Innovations are guided by the material and technology development in the textile industry. The new normal; living with Corona Virus (Covid 19), has propelled many innovations in the textile and fashion industry. One of the most explored area is in the way of making masks. Mask has redefined its status from purely a medical accessory to the fashion symbol of sorts. Every human being have to wear a mask, when they get out of their home. The design of masks have also undergone massive changes during this pandemic. This research explore the possibly of making a contoured mask, which fits well on the face of the wearer and to integrate it to the neck of a garment, using the computerised flat knitting machine with fully fashion capability. Partial and integral knitting techniques are the basis for seamless garment technology (Choi & Powell, 2005). Partial knitting can help in creating three-dimensional structures, as well as contoured fabrics with the help of knitted-in-darts. Integral knitting can join two or more parts of a single garment within the knitting

machine. Partial and integral knitting is possible in the current generation of computerized fully fashion machines used in India.

Scope of the topic

Limited literature is reported on the attempt to integrate a contoured masks into a knitted garments using computerised fully fashion flat knitting machines. Attempt to develop a contoured mask which integrate into a garment, while knitting adds value to the end product and solves the fashion dilemma of wearing of masks. Since the mask is already integrated into the garment, the feel of having an additional piece of cloth on the face is also removed. This research proposes to use the partial knitting method to create a contoured mask and integrate it along the neck rib of a knitted garment.

Research Objectives

1. To develop a knitted mask with contoured surface which fits on to human face

2. To identify methods of integrating the mask onto the neck rib of a knitted garment.

2. LITERATURE REVIEW



Fig. 1. Integrated masks available in the market (amazon, ubuy, 2021)

Knitting is a method of turning yarn to fabric by inter looping of yarn. To knit a fabric either warp yarns or weft yarns can be used. Hence, the knitting is classified into warp knitting and weft knitting (D. J. Spencer, 2001). A flat knitting machine being very flexible allows complex stitch designs, shaped knitting and precise width adjustment. The computerised fully fashion flat knitting machines have the unique capability of individual needle selection for knitting complex structures. The two largest manufacturers of computerised flat knitting machines are Shima Seiki of Japan and Stoll of Germany (Underwood, 2009). The computerised fully fashion flat knitting machines are also capable of shaping panels by adjusting the knitting width and by transferring loops from one needle to another to reduce or increase the width of the fabrics while knitting automatically. Takedown mechanisms in these machines have evolved from a simple system of comb and weights to a more sophisticated complex system of electronically controlled combs, sub-rollers and main rollers for varied takedown. Shima Seiki has developed automatic set up combs, moveable sinkers and stitch pressers for enhanced control over knitting complex structures (Taylor, 2015). The major elements of a computerised fully fashion flat knitting machines are the needle and needle bed, individual needle selection system, racking mechanism, the carriage and cam system, yarn carriers, takedown mechanism with sub and main rollers, yarn tensioners, movables sinkers and stitch pressers (Underwood, 2009).

A survey in the market revealed the existence of integrated masks with knitted garments that are not contoured but a mere extension of the neck, leaving undesired folds, bulks and therefore being cumbersome in appearance as seen in the figure 1.

Partial knitting is achieved when courses are knitted on a part of the needle bed selected for knitting. These repeated knitting over a part of the needle bed creates asymmetrical fabric formation on the width of the fabric (Hu et al., 2011) Partial knitting is also known as wedge knitting (Penciu et al., 2010) Since partial knitting adds extra loops on a selected area of an otherwise two-dimensional fabric, a contoured three-dimensional fabric can be produced with this method. The challenge of partial knitting is that the knitting has to be carried out by switching of conventional takedown method with the main rollers. In such case, the sub rollers, stitch pressers and sinkers can be activated to achieve the takedown tension (Underwood, 2009)

Partial knitting can also produce various garment parts such as placket, pocket, buttonhole etc.

Fabrics are generally two dimensional and are difficult to fit on a three-dimensional human body. Contouring is done with the help of darts to achieve the right fit. Although knit garments can achieve some level of fit due to inherent stretch of Knitted fabrics, problems such as wrinkles and excess fabric folds still influence fit and comfort (Haffenden & Smith, 2015). To fit the body and enhance aesthetics, the shaped knit garment cannot be made just in a simple tubular shape. By using Partial knitting methods, a better fitting, contoured garment can be made without adding darts or pleats.

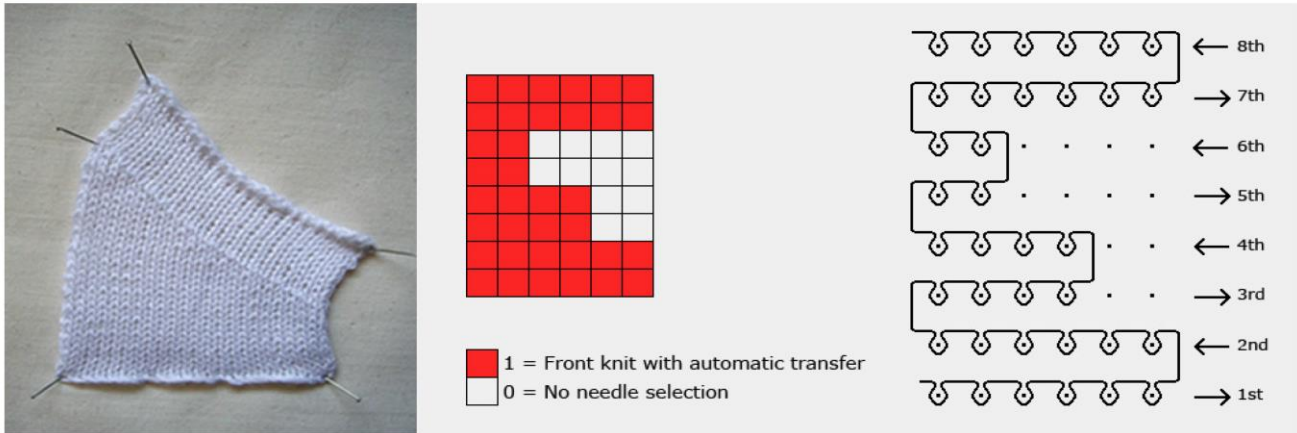


Fig. 2. Partial Knitting (Underwood, 2009)

3. RESEARCH FRAMEWORK

The researcher's design practice is informed by experimentation and reflective practice. Design skills and knowledge of creation in knitting is acquired through the act of making and development on machine. Working with more progressively automated and industrialized environment pushes one to understand the creative process as well as the machine capability. The researcher has used the partial knitting process informed by computerized fully fashion knitting technology for creation of contoured masks. The research methodology follows the frame work of practice based research, reflection on action and the field of artifact led enquiry

Practice based research:

The practice-based research is carried out by creative knowledge generators such as musicians, artists and designers. This kind of research leads to generation of new knowledge. In this process, the practice-based enquiry enables the designer to innovate with technology and techniques to come up with panels and objects for increasingly expanding areas of application.

Technical designer: Reflection on Action

The role of a designer in the knitwear industry is widely informed by the capabilities of the knitting technologies. The design decisions are informed by collaboration of the boundaries of the machine and the limitless possibilities of imagination. The new is not only about imagination but it is also about the innovative possibilities of machine production capabilities. Therefore, the technical ability of

the designer to understand the possibility of machine to create artifacts stays the key on which the new designs are created. The field of artifact led enquiry (Ramsgaard Thomesen and Tamke, 2009) provides the basis of this research. The developed artifact serves three key functions: the technology enquiry, the technique analysis, and the demonstrator.

3.1 Machine and Material Selection

One of the objective of this research is to devise a construction process for a contoured fabric using computerised fully fashion flat knitting machine technology. Contouring the fabric can only be done by adding contouring darts or pleats. Though the knit structures are known to accommodate fullness and follow contours of the body by stretching itself, the uneven pressure exerted by the stretch of the fabric creates undesirable drape, leading to an unflattering silhouette. This is avoided by giving additional darts to accommodate the face shape.

Knitting technology, over a period, has been employing CAD-CAM knitting system extensively with design conceptualisation. This research hinges on using the CAD-CAM knitting technology, which allows ease of translation of complex pattern into panels and feasibility of the replicability of the same. The computerised fully fashion flat knitting machine, which is extensively used in India are equipped with stitch pressers and movable sinkers. These facilitate such machines to perform partial knitting. The most popular makers of such machines are Shima Seiki and Stoll. Leading fashion institutes having courses related to knitting such as NIFT, UK universities

such as NTU, De Mont Fort and GSA also use Shima Seiki computerised flat knitting machine for academic and research purposes.

Shima Seiki's SDS-One KnitPaint software with Shima Seiki's 12 gauge computerised flat knitting machine with fully fashion capability is selected for the research. The most popular rib structure for the neck of a high neck or high neck sweater is 2x2 rib. A 2x2 rib is created with knitting done on two needles on front bed followed by two miss stitches. The same pattern is followed on back bed with a diamond repeat. 2x2 rib also give excellent stretch recovery, which is suitable for neck rib. Acrylic yarn is selected for the experiments based on availability.

3.2 Shrinkage control and stitch density study

As mask is worn over from the chin to nose area, a garment The swatches are washed as per IWS 07 standards to attain full shrinkage. After knitting, the swatch samples are prepared for washing as per the American Association of Textile Chemists and Colorists (AATCC) standards. The shrinkage calculation is carried out and based on which the numbers of wales and courses are identified for the program.

3.3 Garment identification and pattern development

As mask is worn over from the chin to nose area, a garment style is selected based on the neck rib height,

which touches the chin. This helps in integrating the mask with the top end of the rib. Therefore, a high neck sweater is identified for the study. Since the design intervention is focused on the neck rib, only a high neck rib is knitted for the experiment. A neck rib and a mask pattern are developed separately. The mask pattern is modified to get integrated with the neck rib as shown in the figure.

3.4 Program development

As mask is worn over from the chin to nose area, a garment Knit plan with details of the number of courses and wales and the positions of darts for partial knitting are plotted. Data received from the stitch density calculation is used on the pattern to determine the number of courses and wales to be knitted for the pattern dimension. Calculation is done for the number of needles to be used at every course and the total number of courses to be knitted between any changes in wale numbers. Accordingly, a program is developed to execute the knit plan prepared for knitting.

3.4 Knitting and construction of neck rib with integrated contoured mask

One front panel and one back panel are knitted in the computerised flat knitting machine with the same parameters used for individual swatches for the testing of swatch shrinkage control.



Fig. 3. The developed program and the contoured and integrated mask

4. RESULTS

Through this research, taking an experimental approach using partial knitting technology in fully fashioned computerised knitting machine, the possibility of the development of a contoured mask was explored and fully realised as it can be observed in figure 3. This mask developed using the above method is already integrated to the neck part of the garment, which can be attached to the garment. This allows the mask to be merged with the garment giving a higher fashion-ability quotient. The perception study conducted on users employing the semantic differential scale supported the above statement.

5. CONCLUSION

The market study strongly suggests that there is a need to have a matching masks to the garments with contouring. As it can be observed in figure 1, the existing integrated masks have undesired folds, bulks and cumbersome in appearance. The masks developed through partial knitting technique allows contouring of the mask following the profile of the chin and neck area. This clearly results in sleek, fitted and matching masks to the wearer having higher fashion quotient.

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Impact of Pandemic on E-commerce Fashion Industry

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ABSTRACT

In December 2019, the world was embarked on a challenge of Covid-19, which was very unpredictable for all of us. In India, the pandemic led to a shock for the people as our honourable Prime Minister Shri Narendra Modi after seeing its adverse effects worldwide took desperate measures of nationwide lockdown in Mid-March 2020. Due to which everything was on standstill all over the country. These inevitable conditions caused the fashion industry to stalemate which led to a lot of chaos, misfortune, and the catastrophic situation in the country. As all the people were at home they started spending more on their time on online platforms for their entertainment and even to fulfil their daily requirements of fruits, vegetables, and medicine.

During this time E-commerce Industry was at a boom as took advantage of the epidemic. "As lockdowns became the new normal, businesses and consumers increasingly went digital, providing and purchasing more goods and services online, raising e-commerce's share of global retail trade from 14% in 2019 to about 17% in 2020" by UNCTAD. The Fashion industry also saw the change and started shifting to more online platforms to cater to the need of the hour. All these accessible stages were very pertinent for the consumers as they mitigate and bring comfort in the public's life.

In this paper, the analysis has been shown by the questioner tool which has been focused mostly on utilisation of E-Commerce in the fashion Industry during pre and post Covid-19. Customers have subsequently changeover towards online platforms as it gives them easy access & delivery and luxury of home at the same time.

Keywords: E-commerce, Epidemic, Covid-19, Convenience, Technology, Online Platform, Customer service

1. INTRODUCTION

In 2020 when the lockdown was declared worldwide all the businesses had to be shut down temporarily. This told us that the future is always uncertain as of now also when the countries are giving relaxations to open the retail stores still there is a restriction which people have to follow. During the peak of crises, people were bound to stay at home due to the fear of limited resources and guidelines of the government which gave them plenty of time in their hands. This caused people to start going more on online platforms and as every individual love to buy new fashion products they started visiting e-commerce fashion websites which created a boom in this industry.

Post pandemic also the public has continued to have a positive impact on e-commerce as they have developed new shopping behaviour while staying at home as it gives them comfort, we know the fear and trauma of Covid won't go so easily and customers are browsing and ordering fashion & apparel products from one hand these days. According to the 'E-commerce Trends Report 2020'

by Unicommerce, retail networked technology platform, e-commerce not only recovered but observed an order-volume growth of 17 per cent as of June 2020.

In the months of 2020, the beginning of COVID19 all kind of industry was set to halt. Which has a worst impact on fashion's production units. With fashion shows were canceled, stores closed, and a growing share of the trending industry tumbled into economic distress. But still it has been proper coping for the public this electronic technology was then only medium which was a survival for every individuals to keep their stylish life up. Mobile E-Commerce was become a cheap source with lots of coupon benefits for the all. Gadgets like phone and laptop were sold more in this pandemic storm as everything is done by this modes.

2. PURPOSE OF THIS STUDY

The main objectives of the study are as follows:

- To understand the trends of e-commerce fashion & apparel industry pre and post epidemic

- To study the customer shift towards online platforms

3. METHODOLOGY

This research is based on both primary and secondary information which has been collected from various sources like articles, books, journals, published papers and the internet. For the collection of primary information, a questionnaire had been formed which was filled by 100 respondents. This study is qualitative and unique in its nature.

4. FINDINGS & CONCLUSION

Fashion is something that has a different definition for all human beings. It is self-expression as it allows people to express themselves, their thoughts with the help of clothes and accessories and even how they dress up. Fashion is never constant is keeps one changing. That's why the fashion industry is always in buzz as it is a part of a very large social and cultural prodigy. The Fashion Community has a dynamic and very complex nature as it has to cater to every person around the globe.

As per our research, we got to know that in the Pre Covid scenario fashion industry was one of the booming industries via e-commerce technology. Whether it has been used by youth, adult and senior adults. As you can see in figure 1 that before the spread of novel coronavirus all the individuals were using online platforms for buying trendy fashion goods. But you can also see that these online technologies were more in trend among the 15 -20 years age group 90% fashion consumers, 21-30 yrs 80%, 31-40 yrs 70% of consumers were purchasing by websites and apps. In this figure, you can see a drastic decline in fashion buyers as in the age group of 41-50 years we had 25%, 51-60 yrs 20% and above 60 yrs only 10% fashion shoppers on online technology. However, the main reasons why the age group of 40 - 60 above were not on online platforms were because they felt more comfortable in buying fashion goods in retail outlets as they felt it was a much safer option to buy clothes as they can touch and feel the fabric & material of the product which gives them the confidence to buy the same. Senior citizens prefer easy shopping which they have been doing for years by going to brick & mortar locations and they are also not able to trust online payment methods and processes that is why the percentage was so less pre covid.

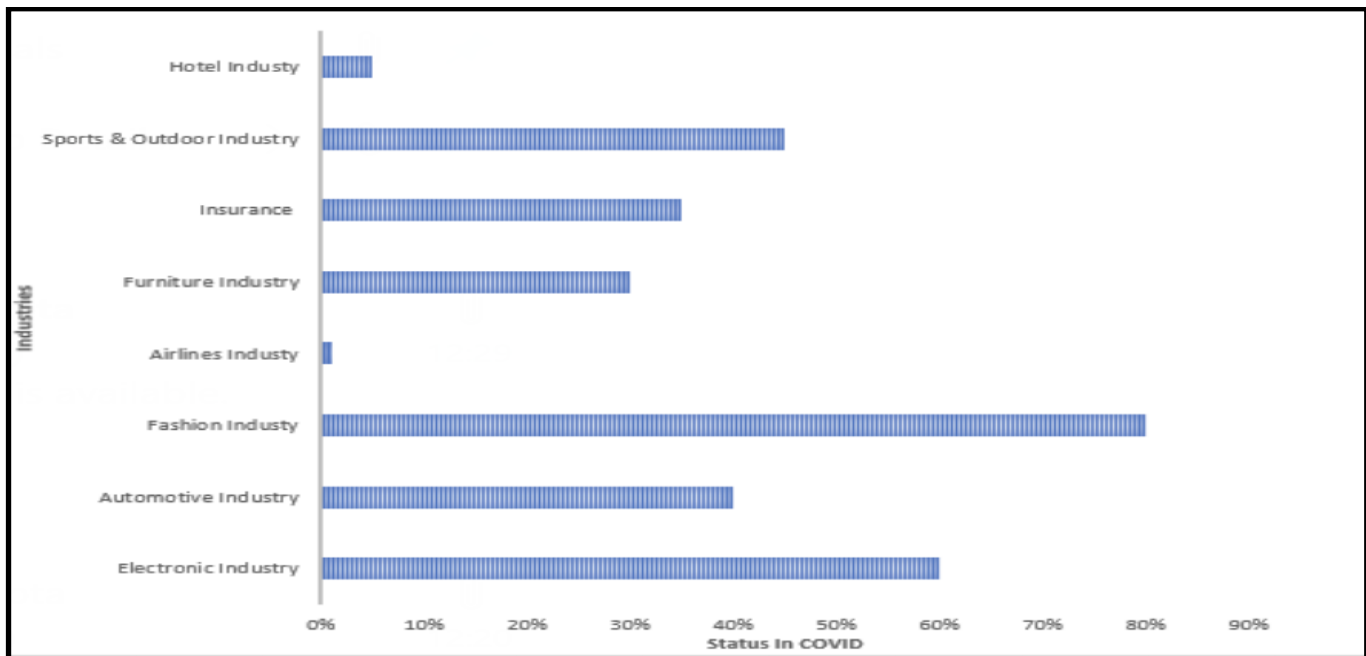


Fig. 1.

The world faced terrifying events in the past 2 years but now the seen is changing as governments are modifying the rules for the public by opening the workplace, markets

and travel. As you can see in figure 2 that after the widespread of the virus all the public have been using online apps for purchasing fashion goods. Through the

graph, you can see that this online mechanisation was more in demand among the 15-20 years age group 90% fashion buyers, 21-30 yrs 80%, 31-40 yrs 60% of shoppers were purchasing through e-commerce. But you can see a sudden change in fashion purchaser as in the age group of 41-50 yrs we had 50%, 51-60 yrs 30% and above 60 yrs only 20% fashion shoppers on online technology. The result is that the age group of 40 - 60 yrs above are known on online platforms as they were accessing everything from home for last 2 years they have become more comfortable in the usage of the online buying process. As travel has been restricted due to the safety precautions people around the world were buying all the things including items of clothing and accessories by the app technologies. This technology has given access to senior citizens also post-outbreak. Adults and senior citizens have developed a trust and would continue to prefer purchasing from online websites and apps.

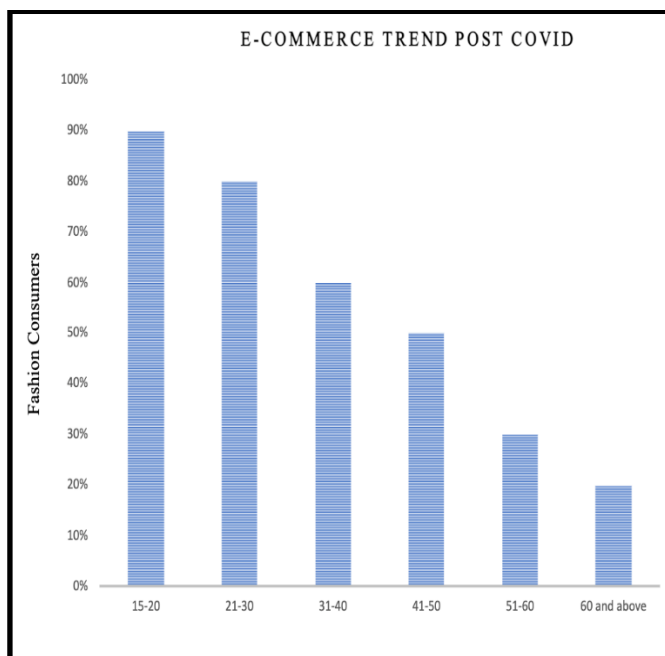


Fig. 2.

After the detailed analysis the conclusion is that e-commerce in fashion industry was growing pre epidemic but when the covid hit the world it caused a serious set back for all the productions including fashion. But during the ongoing pandemic, when the whole world was online fashion brand caught the change at right time and tried to become a part of the same. So all the brands and companies established themselves online were people can see & buy variety of apparel's & bags etc. just by clicking. Thus, post influenza you can see a shift in customers of all age groups including buyers who were initially not keen of these technologies were attracted and trusted online models to buy products. So we suggest fashion companies & brands to become online and provide a simple yet interactive applications for the consumers if they want to increase their sales. Individuals who are still not friendly with online apps should certainly start using them as it would be very much beneficial for them.

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Occupational Health Hazards in Small Scale Garment Manufacturing Units

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ABSTRACT

The introduction of hazardous technologies ever since the industrial revolution has resulted in high accident rates, occupational diseases, and unhealthy working environments. The given study investigates the occupational health hazards faced by the workers to provide an outlook towards the health hazards prevailing in the small-scale garment enterprises in Delhi and NCR-based units. The workers from small-scale garment manufacturing units were interviewed and the results indicated that in the fabric department respiratory problems and chest pain were most prevalent due to the excessive presence of dust and lint. Chest pain among respiratory problems was frequently reported while watering of eyes was the most shared issue among the eye problems. Moreover, in the computer-aided design department, eye problems were most common due to long working hours in front of computer screens. The research examines these concerns to develop an understanding of the issues that hamper the life of the workers and productivity in the garment manufacturing industry.

Keywords: Apparel, Garment Manufacturing, Occupational Health Hazards, Safety Measures, Small Scale Industry, Textile Industry.

1. INTRODUCTION

In primitive times, clothing served only as a basic necessity, to cover the whole body and to protect from climatic changes. However, with time, according to the increasing needs, man started thinking of modernization, engineering tools, and techniques for increasing productivity and utility (Babu, 2012). Today, the textile and clothing industry functions as the first step to the 'industrialization ladder' in underdeveloped and developing countries. As apparel manufacturing is labor-intensive and can be instituted with little investment, more countries are now attempting to use this industry as a stepping stone (Bheda, 2003).

The apparel industry is the typical 'starter' industry for countries engaged in export-orientated industrialization (Gereffi, 2002). Factors like the rapid expansion of electronic media and socio-economic changes lead to the development of ready-to-wear garments and resulted in the growth of the garment industry. As a result, the industry requires trained staff and professionals to carry out the manufacturing process more scientifically (Babu,

2012). Garment production for exports in India is mostly based on a number of production hubs scattered all across the country; each cluster specializing in a particular product and having a distinctive social composition of labor (Mezzadri, 2014). NCR has a composite and intricate industrial cluster, formed by a combination of industrial, formal and informal, factory-based and non-factory-based, workshop and home-based units.

Occupational Hazards refer to the risks, unpleasant experiences, or accidents that take place in a workplace. In the garment manufacturing industry, the introduction of hazardous technologies has resulted in high accident rates, occupational diseases, and an unhealthy work environment. Most of the workforce is not equipped to cope with the hazards posed by manufacturing and industrial processes (Malik et al., 2010). The workers are not literate enough and there is an insufficiency of knowledge regarding the protective measures that should be adopted to safeguard themselves. In accordance with occupational health and safety, the six primary hazard classifications are Physical, Chemical, Biological, Ergonomical, Behavioural and Radiological Hazards.

Some of the dominant causes of accidents in the garment industry are poor housekeeping, heavy manual lifting, and inadequate use of Personal Protection Equipment (PPE) (Chaturvedi, 2015).

2. RESULTS AND DISCUSSIONS

1. Eye problems

A Study reported that health problems of women working in a textile unit Coimbatore revealed that working for long hours cause eye strain, and 45% of the workers reported eye problem (Thomas, 2011). Thus, the major reason for eye problems is the long working hours near the computer screens in the Computer Aided Department. Other than that, washing department has chances of eye related injuries due to chemicals while all the other departments like stitching, finishing, etc. may face problems due to lack of light sources that causes strain in the eyes.

The survey results reported the occurrence of a number of eye problems in the garment unit. The problems like vision changes, pain, swelling, watering, itchiness and redness, etc. are common among the workers. Fig. 1 shows that watering of eyes (29%) was the most common eye problem in the units. Vision changes (22%) and itching

(20%) were also reported by the workers. The least occurring eye problem in the garment manufacturing units was swelling in eyes (4%).

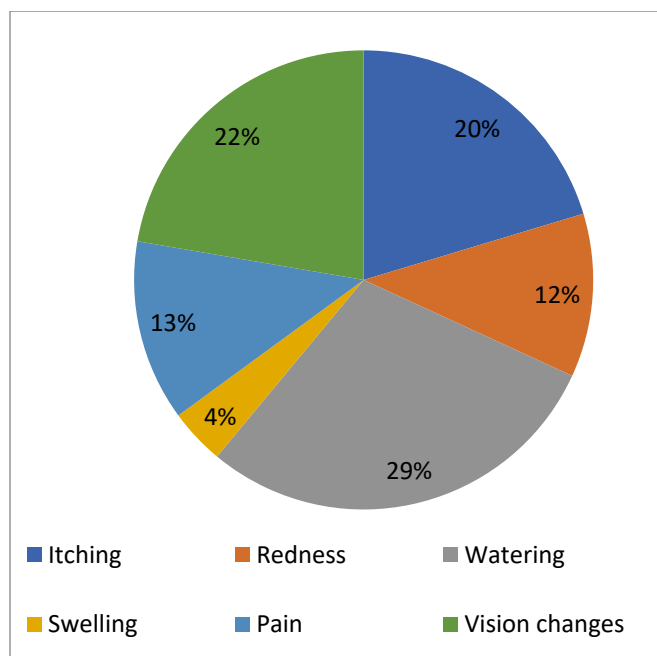


Fig. 1. Eye problems faced by the workers

TABLE 1

| S. No | Eye Problem | Fabric Deptt. % | CAD Deptt. % | Cutting Deptt. % | Stitching Deptt. % | Finishing Deptt % | Packaging Deptt. % | P VALUE |
|-------|----------------|-----------------|--------------|------------------|--------------------|-------------------|--------------------|--------------------|
| 1 | Itching | 76 | 60 | 24 | 44 | 26 | 4 | 0.003952492 |
| 2 | Redness | 36 | 36 | 18 | 18 | 6 | 16 | 0.593745585 |
| 3 | Watering | 60 | 88 | 62 | 64 | 30 | 8 | 2.28515E-05 |
| 4 | Swelling | 0 | 12 | 0 | 10 | 16 | 0 | 0.001008145 |
| 5 | Pain | 8 | 44 | 14 | 4 | 40 | 20 | 8.41628E-05 |
| 6 | Vision changes | 12 | 64 | 36 | 78 | 24 | 6 | 8.01996E-11 |

1.1 Eye related problems among workers fabric department

Eyes are very sensitive and the fabric department contains a lot of fine fibers, dust, etc. which can cause sore watery eyes. The results had shown 76% workers having itching

followed by watering which was reported as a problem by 60% of the respondents. None of the workers reported suffering from any kind of swelling, and a few had reported vision change (12%) and pain (8%). 36% of the employees mentioned about redness in the eyes, as depicted in Fig 1.1.

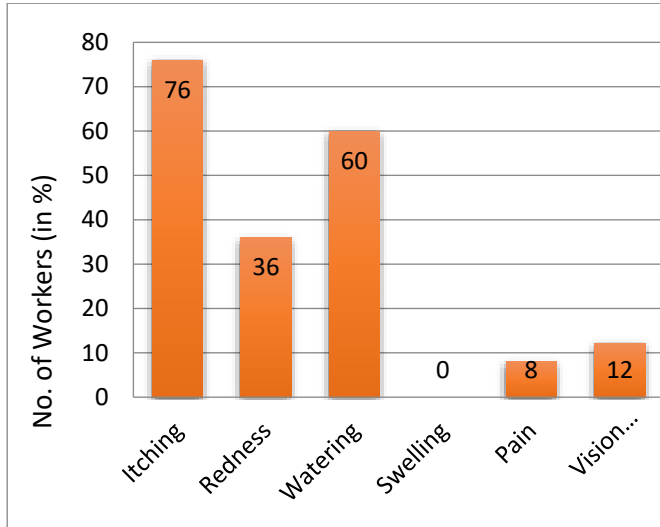


Fig. 1.1 Eye problems faced by workers of fabric department

1.2 Eye related problems among workers computer aided designing department

All the eye problems were found in the computer aided designing department due to long hours of sitting in front of the computer monitors. The maximum number of respondents (Fig.1.2) reported having watery eyes (88%). Vision changes and itchy eyes were reported by 64% and 60% workers respectively, which may be due to not maintaining proper screen distance and long work hours. Swelling (12%) was the least reported problem while redness (36%) and pain (44%) was quite evident in computer aided design department.

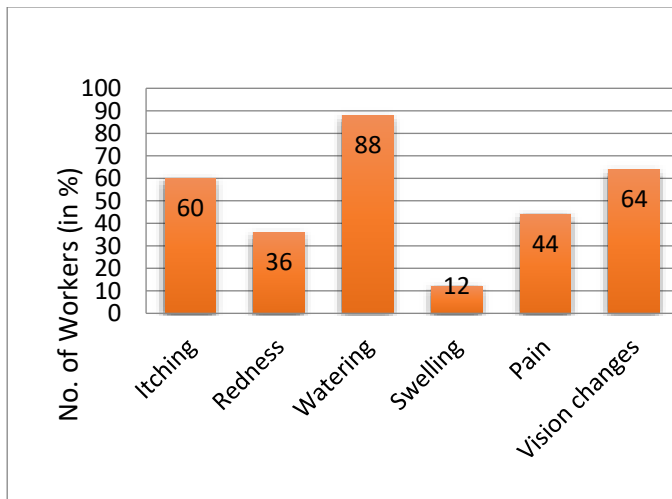


Fig. 1.2 Eye problems faced by the workers of computer aided designing department

1.3 Eye related problems among workers cutting department

As shown in Fig.1.3, watery eyes (62%) were reported as the most evident eye problem in the cutting department due to continuous eye straining task. 36% respondents reported having vision changes while only 24% and 18% people faced itching and redness respectively. Pain in the eyes was only reported by 14% respondents.

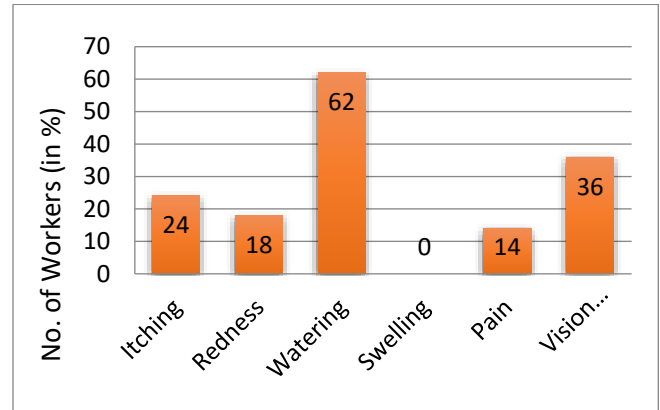


Fig. 1.3 Eye problems faced by the workers of cutting department

Eye related problems among workers stitching department

In the stitching department, 78% workers reported loss of vision due to long working hours and repeated activity. Watery eyes (64%) and itching (44%) were major problems faced by the workers in stitching department redness (18%), swelling (10%) and pain (4%) were least reported problems (Fig.1.4).

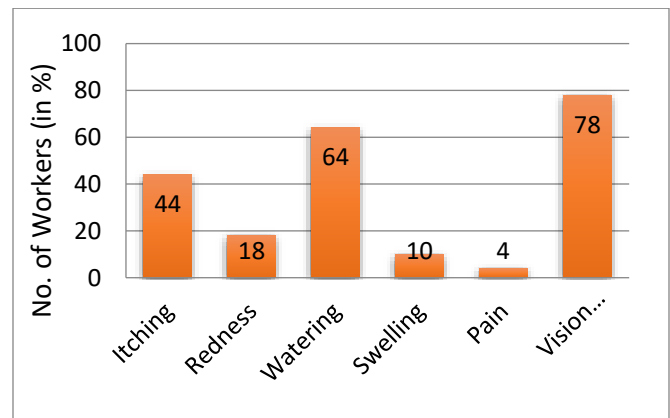


Fig. 1.4. Eye problems faced by the workers of stitching department

1.5 Eye related problems among workers finishing department

A number of chemicals are used in the finishing department and their fumes largely affect the eyes of the employees of the department. As shown in Fig.1.5, a maximum number of 40% respondents reported pain in the eyes as a result of their job followed by 30% who faced watery eyes. Itching (26%) and vision change (24%) was also reported by the workers as a significant problem. The vision changes might be due to stress on eyes and repetitive work. Swelling (16%) number of and redness (6%) were least reported eye problems. Overall, statistical analysis indicated that difference was significant in itching and swelling, as tested by chi-square.

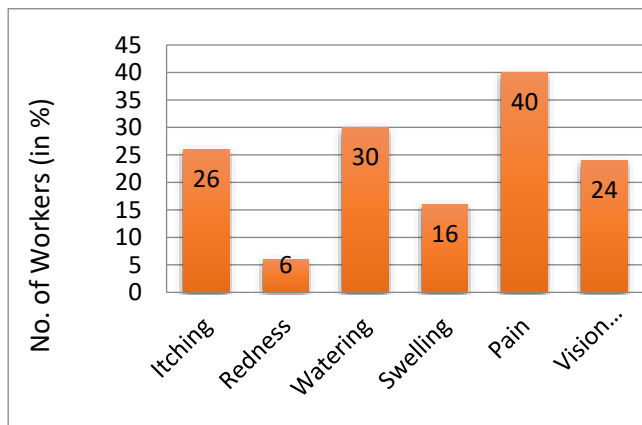


Fig. 1.5. Eye problems faced by the workers of finishing department

1.6 Eye related problems among workers packaging department

In the packaging department, 20% respondents reported having pain in the eyes while no worker reported swelling

in eyes. Redness was experienced by 16% of the employees. Watery, itching and vision change least prevalent with 4%, 8% and 6% people suffering from them respectively (Fig. 1.6).

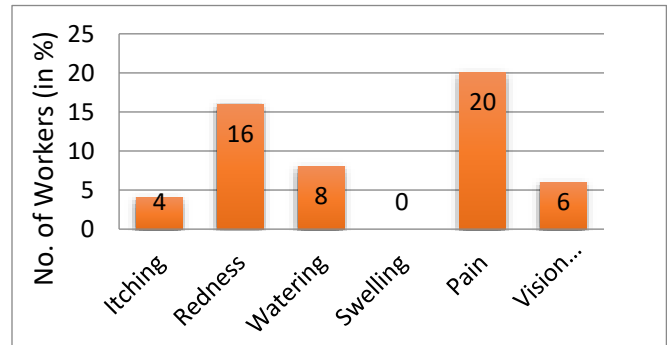


Fig. 1.6. Eye problems faced by the workers of packaging department

3. RESPIRATORY PROBLEMS

Industries serves as the major reason for the generation of gases, fumes, dust and other harmful substances, highly affecting the respiratory tract. A study done in a garment unit, Coimbatore, reported that the high dust level present in the factory caused by cotton has given rise to asthma and respiratory problems (Lillipet et al., 2017). Health status among the female workers conducted in Bangladesh reported that 46% of the respondent had respiratory problems (Joseph et al., 2011). A study conducted in Bangalore revealed that both respiratory illnesses (rhinitis, respiratory infections, bronchitis, and bronchial asthma) and thyroid related illnesses increased by 2.14% (Chandra et al., 2014). Thus, it is quite understood that the workers of garment manufacturing units are susceptible to many respiratory health hazards.

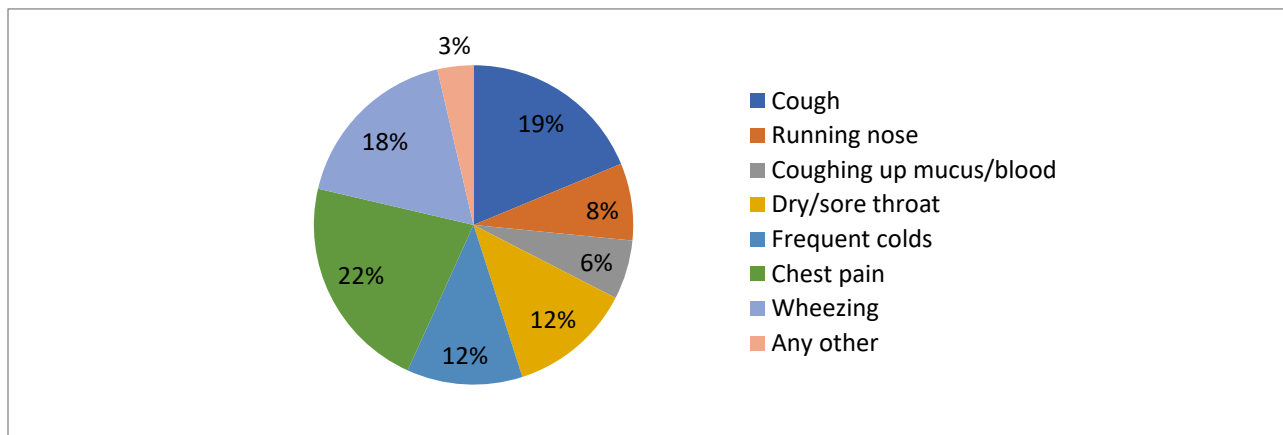


Fig. 2. Respiratory problems faced by workers in garment units

Minor respiratory problems were found among workers like cough, chest pain, wheezing, etc. which may lead to major issues like tuberculosis, asthma, etc. Fig. 3.1 shows the combined result of respiratory problems in the various departments of garment manufacturing units. According

to the study, chest pain (22%) was highly common among the respondents followed by regular coughing (19%) and wheezing (18%). Further, sore throat (12%) and frequent cold (12%) were also reported by the respondents.

TABLE 2

| S. no. | Respiratory Problem | Fabric Department % | CAD Department % | Cutting Department % | Stitching Department % | Finishing Department % | Packaging Department % | P VALUE |
|--------|-------------------------|---------------------|------------------|----------------------|------------------------|------------------------|------------------------|-----------------|
| 1 | Cough | 64 | 20 | 50 | 32 | 10 | 10 | 2.31876E-05 |
| 2 | Running nose | 36 | 12 | 22 | 0 | 14 | 0 | 0.000524 |
| 3 | Coughing up mucus/blood | 24 | 0 | 14 | 10 | 0 | 0 | 0.002217 |
| 4 | Dry/sore throat | 76 | 8 | 24 | 20 | 4 | 6 | 1.65172E-05 |
| 5 | Frequent colds | 32 | 32 | 16 | 14 | 18 | 10 | 0.938324 |
| 6 | Chest pain | 80 | 16 | 44 | 38 | 30 | 8 | 0.000298 |
| 7 | Wheezing | 72 | 0 | 26 | 26 | 6 | 42 | 1.3427E-05 |
| 8 | Any other | 8 | 0 | 0 | 0 | 14 | 10 | 0.001415 |

2.1 Respiratory problems among workers of computer aided designing department

In the computer aided designing department, about 32% respondents were having problems with frequent cold. While wheezing and coughing blood was not at all reported by the respondents. Fig. 2.1 clearly depicts the problem of cough (20%) and chest pain (16%) as well. Since, the working condition of these respondents was different from other departments, like the presence of air conditioning. Therefore, the chances of respiratory illness found negligible.

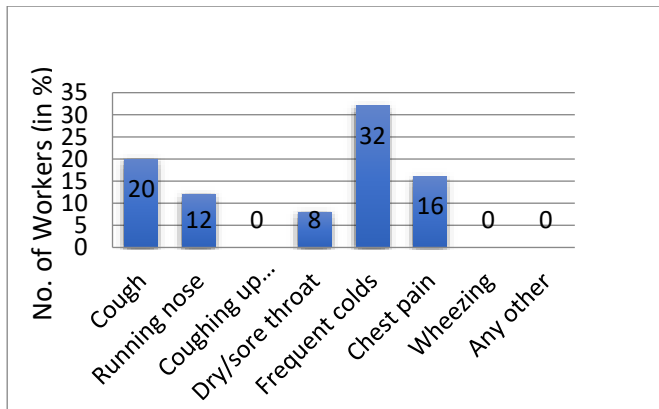


Fig. 2.1 Respiratory problems among workers of computer aided designing department

2.2 Respiratory problems among workers of fabric department

In the present study, it was found that the majority of workers were affected by chest pain (80%). Wheezing (72%) and sore throat (76%) were also reported in a large amount. Coughing was also a major problem in this department contributing 64% in the overall results as seen in Fig. 2.2. The reason may be due to increased amount of dust while storage of fabrics and presence of fabric lint all around. Further, cold or running nose were comparatively low in percentage.

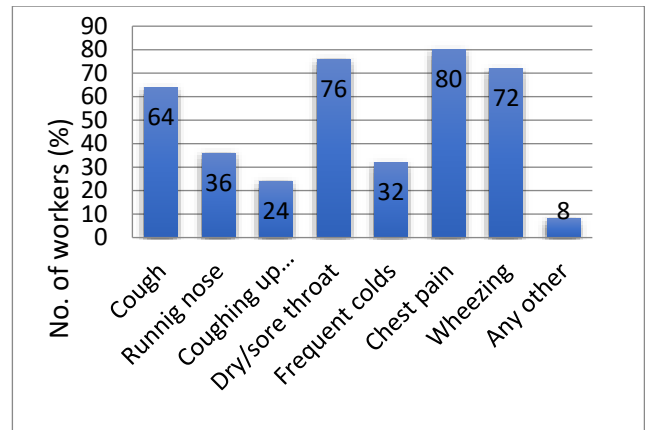


Fig. 2.2 Respiratory problems among workers of fabric department

2.3 Respiratory problems among workers of cutting department

In the cutting department (Fig. 2.3), 50% of the respondents were suffering from frequent cough which may be due to continuous fabric dust and lint that gets generated while cutting the pile of the fabrics. 44% workers reported chest pain as a common symptom of deteriorating health. Frequent cold (16%) and coughing blood/mucus (14%) is least common among workers of the cutting department. Therefore, it is advisable to wear face masks which reduces the chances of catching respiratory problems.

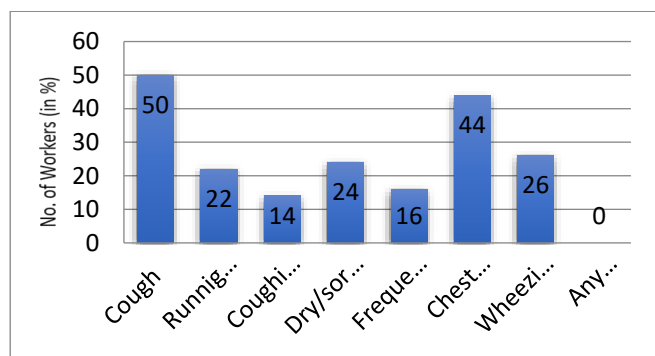


Fig. 2.3 Respiratory problems among workers of cutting department

2.4 Respiratory problems among workers of stitching department

The workers of the stitching department have less respiratory problems as per the result (Fig. 2.4). The maximum respondents (38%) had a complaint of mild chest pain while working, which may be due to repetitive work and fabric dust. Coughing (32%) was also one of the most frequent problems faced by the workers. Other problems like cold, dry throat, etc. were found comparatively less among the workers.

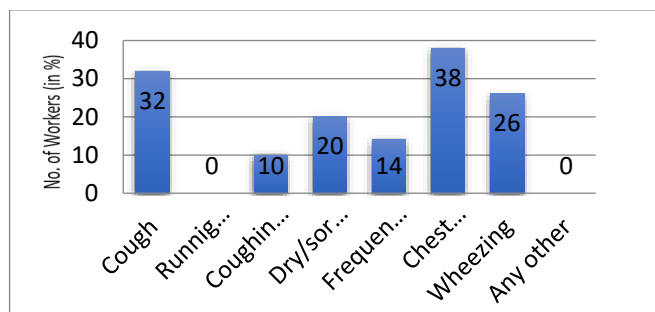


Fig. 2.4 Respiratory problems among workers of Stitching Department

2.5 Respiratory problems among workers of finishing department

In the finishing department, chest pain (30%) among workers was quite noticeable as shown in Fig. 2.5. It may be due to the fabric lint, the chemicals used, steam generated in ironing, etc. Problems like cold and running nose were reported 18% and 14% respectively. Other problems like wheezing, cough and running nose were found negligible.

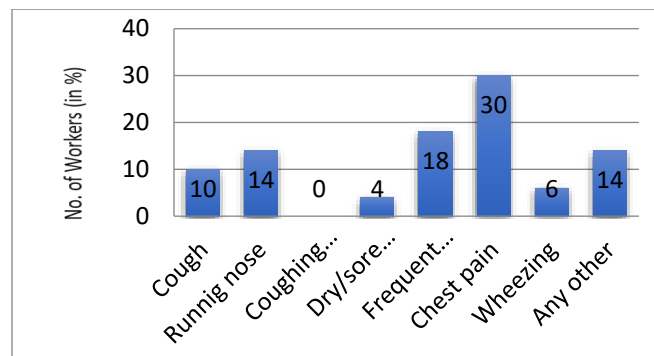


Fig. 2.5 Respiratory problems among workers of Finishing Department

2.6 Respiratory problems among the workers of packaging department

In the packaging department, a considerable respiratory problem was wheezing (42%), as shown in Fig. 2.6. In the packaging department, workers carry cartons and materials which results in various kinds of body pain, resulting in heavy breathing and health related issues. Except wheezing, all the other health problems regarding respiration were rarely mentioned by the respondents.

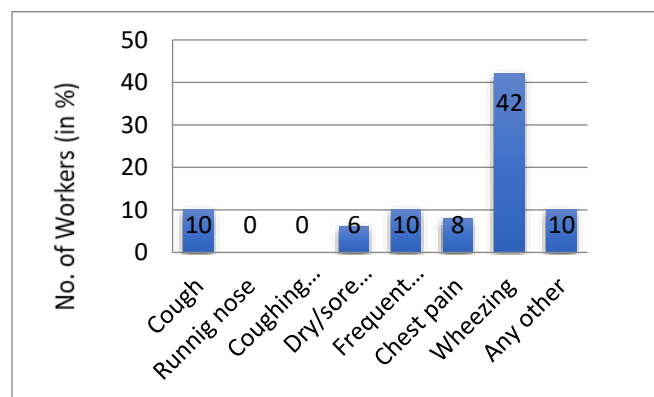


Fig. 2.6 Respiratory problems among workers of Packaging Department

The workers also mentioned a specific problem like generation of fumes and harmful effects of adhesives during packaging. Overall, Respiratory problems among the fabric department workers were quite high and needed a lot of attention. Further, significant difference was found to be in problems like running nose, coughing up and chest pain, when tested by applying chi-square test.

4. CONCLUSION

In the present research, the results were statistically analysed using chi-square test, difference was found to be significant in respiratory problems like running nose, coughing and chest pain. Among eye problems, difference was significant in the problems like itching and swelling of eyes. It was concluded that there are a number of health hazards prevalent in the small-scale garment manufacturing units. Overall, chest pain among respiratory problems and watering of eyes was found to be the most common eye problem among the workers. All these problems hamper the lives of the workers and thus their productivity level decreases. After finding out what problems were prevalent in which department and establishing the relationship between them, the major concern is to spread awareness about these problems. It aims at minimising the frequency of the occurrence of these hazards and to provide better norms and facilities to enhance the living conditions of the workers.

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Skill Development - A Paradigm for Multidimensional Growth of Textile & Fashion Industry

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ABSTRACT

Textile and fashion industry dominates the lion's share of Indian market impacting the livelihood and survival of millions of country's workforces. The richness and diversity of Indian Textile Industry plays a pivotal role in exploring the potential of one of the most promising and growing industry not just PAN India but transcending borders as well. The industry enjoys the stature of being the second largest industry in global arena, with agriculture marking the top-notch position. The major strength of the Indian Textile Industry recognized and acknowledged world-wide is the exclusive traditional textiles and natural fibres, with the industry being the world's largest cotton producer and exporter. Furthermore, the industry is critical to the country's growth story with direct impact on the livelihood of 45 million citizens by offering massive employment opportunities to skilled workforce, artisans, designers, textile and fashion graduates. The textile supply chain flaunts of a gamut of end products with export orientation ranging from traditional handloom and handicrafts to smart and medical textiles. Consequently, the industry has emerged as a world leader owing to product diversification and adaptation of innovative approaches as per changing times with production focused from exquisite and invaluable hand-crafted traditional textiles to the state of art personal protective equipment and masks.

However, certain key areas such as skill development need to be addressed holistically to further harness the growth and full potential of the industry. The role of Indian Government as far as skill development is concerned is commendable. The Indian Government has launched several programmes and schemes for incorporation of innovative skill development approaches in textile supply chain. Nevertheless, the role of industry stakeholders in encouraging the workforce to enhance their skills cannot be undermined. Skill development is regarded as an instrument for improvement and effectiveness of workforce which in turn can lead to enhanced efficiency and overall production. Furthermore, skill development plays a vital role in empowering the individuals and improving their social acceptance and employment opportunities.

The strategy for skill development can be carved out by keen understanding of the existing structure and assessing the possible pitfalls in the system. A comprehensive market research to understand existing workforce, their skillsets and willingness of fresh textile and fashion graduates to enhance their skillset and work in collaboration with artisans so as to bridge the demand-supply. Having understood the existing structure and gaps in the system next step ahead would be focusing on the action plan to ensue awareness among entrepreneurs and stakeholders regarding the necessity of skill development programs. Moreover, a thorough understanding of the level of skill development enables the stakeholders to fulfill the export vision. The identification and adoption of latest technologies is mandatory to strive in highly competitive global arena. Accordingly, the export vision can be manifested by generating skilled labors trained with international skills and standards. The paper will discuss the various approaches adopted by Indian Government and stake holders towards realizing the significance and innovations in skill development in the context of textile industries.

Keywords: Skill, Innovation, Textile, Supply Chain, Workforce, Handicrafts, Schemes.

1. ROLE OF MINISTRY OF TEXTILES IN IMPARTING SKILLS AMONG YOUTH

The Ministry of Textiles in the pursuit of capacity building, imparting skill and enhancing employment opportunities among youth has implemented several training programmes and lucrative schemes like of Samarth-Scheme.

As an initiative in Samarth Scheme, training target of 3.6 lakh beneficiaries has been allocated to 18 state governments for development of training modules and thus organising training programmes in various textile sectors¹. Figure 1 highlights the key achievements and initiatives for skill development and establishment of incubation centres by of Ministry of textiles.



Fig. 1. Initiatives by Ministry of textiles for Promoting Skill Across Nation

Figure 2 shows the major textile & clothing sectors thus indicating the huge potential for skill development avenues and employment opportunities in gamut of sectors like spinning, weaving, knitting processing, handloom, home textiles, technical textiles etc.

Initiatives & Support by Government for Skill Development in Textile supply chain

The Government of India has been instrumental in promoting indigenous textile hand products raising the slogan “Vocal for local” and playing a pivotal role for skill development in Textile Supply Chain.

Integrated skill development scheme for the textiles and apparel sector (isds)

This scheme enables creation of specific skill set to fulfil the requirement of apparel and other textile segments. The institutions/textile research associations under Ministry of Textiles, state government agencies and private bodies in Public Private Partnership (PPP) would serve as nodal centres for implementation of scheme.

Integrated Processing Development Scheme (ipds)

This scheme aims at meeting the environmental aspects in textile processing sector by incorporation of innovative technologies.

Project SU.RE

Project SU.RE is introduced for adoption of sustainability and eco-friendly approaches in textile supply chain.

National Technical Textile Mission

The mission has been introduced for promotion of technical textiles that encompasses sportswear, automotive and medical textiles etc.

Undoubtedly, the mission will provide an impetus for skill development for technical textiles among young undergraduates and postgraduates.

Impending Government Initiatives

- ***New Textile Policy 2020***

The Ministry of Textiles has formulated this policy with a vision for development of modern, sustainable and competitive textile sector with special focus on garment manufacturing, and various other promising textile segments^{2,3}.

- ***National Handicraft Development Programme for promotion & development of Handicrafts***

Handicrafts constitute an integral component of unorganized sector in India's economy that involves

utilization of manual skills, simple tools and representation of Indian tradition. The sector is a source of livelihood for lakhs of artisans in India

Less capital and infrastructure intensive indigenous industries like handicrafts are popular for exquisite end articles are flourishing in India and provides one of the crucial sources of employment to skilled workforce, revenue generation and international presence for country through exports.

However, the artisans face several challenges in perusing their age old, pristine art forms and passing their legacy to generations in the wake of globalization, urbanization, suffer from availability of resources and lack of technological skills. Consequently, a large number of artisans have been forced to switch over to other menial, unsatisfactory paying odd jobs in urban areas³⁻⁵.

The challenges in handicraft sector can be addressed for the holistic development of this indigenous textile sector through the government schemes.

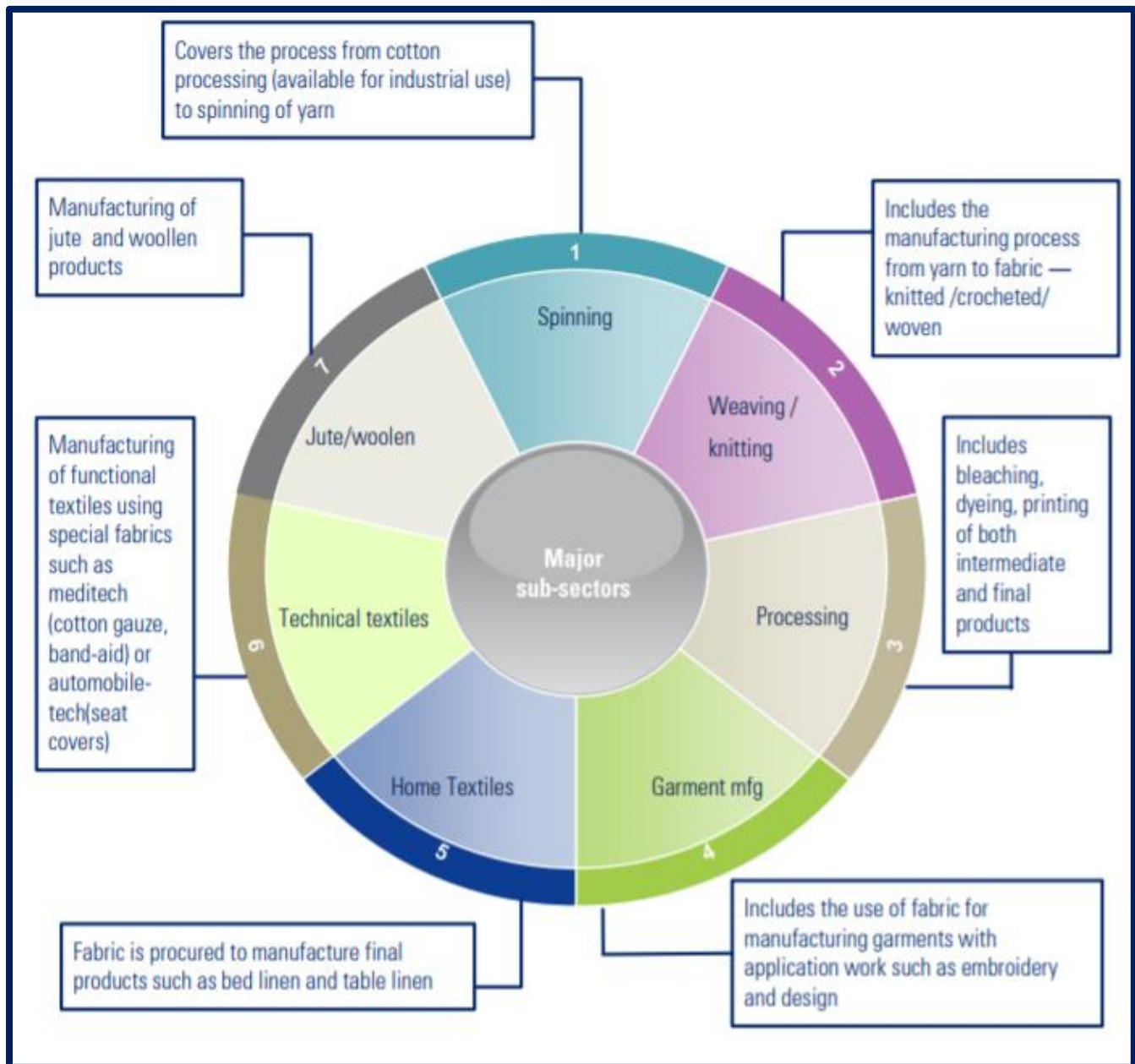


Fig. 2: Major Textile & Clothing Sectors

The following section summarizes various schemes introduced by Government for development of rich Indian traditional textiles and handicrafts .

Empowerment of Indian handicrafts and artisans through introduction of Government Schemes

- ***Ambedkar Hastshilp Vikas Yojna***

The scheme encourages mobilization of artisans into self-reliant clusters thereby leading to community empowerment. The proposals related to the interventions in the cluster will be presented by implementing agency by preparation of diagnostic study report (DSR).

- ***Design and Technology Upgradation***

The scheme aims at amalgamation of traditional and contemporary styles by exploring and enhancing the manual practices of artisans and introduction of innovative systems and technological intervention for increased productivity via regular workshops for artisans and workforce.

- ***Mega cluster scheme***

The scheme under the aegis of **Handicrafts Mega Cluster Mission (HMCM)** has been introduced with an objective to generate employment avenues and enhancing living standards for artisans. The mega cluster-based approach provides improvised infrastructure and production protocols at handicraft centres that have not witnessed much modernization and development owing to its unorganized characteristics.

Scheme for global exposure to artisans

The programme offers global exposure to artisans by training them about innovative and technological

advancements in the field of crafts, rendering financial support to organize, participate and showcase their exclusive craftsmanship in marketing events in India and abroad. Furthermore, craft exposure and cultural exchange programmes are organized to keep the artisans updated and catering to their social and economic needs and aspirations. An integrated and inclusive development of Indian handicrafts and hence linkage between local artisans and major buyers can be established via domestic buyer-seller meets, workshops, seminars, trade fairs, exhibitions and all such platforms where artisans can showcase their work, can directly interact with designers and can get their work acknowledged and reviewed by renowned brands and designers to be included in design collection⁴⁻⁶.

Collaborative efforts of government and designers to promote the artisanal skills

The Uttar Pradesh government is working in close association with elite fashion designers including Ritu Beri, Rina Dhaka, Manish Malhotra and J J Valaya for promotion and revival of state's indigenous handicrafts and industries such as embroidered textiles reviving pristine , traditional look like Chikankari, handloom fabrics, home textiles and hand curated end products. Capacity building in various textile verticals is expected as the renowned designers join hands with artisans and work on collaborative projects through hand-holding and training exercises (Figure 3). Accordingly, one district one product (ODOP) scheme has been introduced by the state government to promote the indigenous industries and crafts and engaging in alliances with external organizations and online players for global promotion of handicrafts.





Fig. 3. Designers & Artisans joining hands for promotion of indigenous handicrafts

2. CONCLUSIONS

The textile industry has emerged as a world leader and has proved its mettle over and over again owing to product diversification and adaptation as per changing times with production focused from exquisite and invaluable handcrafted traditional textiles to the state of art personal protective equipment and masks.

However, certain key areas such as skill development need to be addressed holistically to further harness the growth and full potential of the industry. The role of Indian Government as far as skill development is concerned is commendable. The Indian Government has launched several programmes and schemes like Integrated Skill Development Scheme, Powertex India, Integrated Processing Development Scheme (ipds), National Technical Textile Mission Design and Technology Upgradation, Ambedkar Hastshilp Vikas Yojna Mega cluster scheme, one district one product (ODOP) scheme for skill development, capacity building and promotion of indigenous handicrafts. Furthermore, the government and designers are working in collaboration to provide global exposure, promotion, financial assistance and recognition to artisans for their exclusive craftsmanship and artifacts.

The strategy for skill development can be carved out by keen understanding of the existing structure and

assessing the possible pitfalls in the system. A comprehensive market research to understand existing workforce, their skillsets, number of textile education institutes in the region and courses they are offering to have an understanding on demand-supply gap is the need of the hour. Having understood the existing structure and gaps in the system next step ahead would be focusing on the action plan to ensue awareness among entrepreneurs and stakeholders regarding the necessity of skill development programs. Moreover, a thorough understanding of the level of skill development enables the stakeholders to fulfill the export vision. The identification and adoption of latest technologies is mandatory to strive in highly competitive global arena.

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TECHNICAL SESSION IV
INNOVATIONS IN TEXTILE & APPAREL

Evolution of Waterproof and Water Resistant Fabrics for Garments

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ABSTRACT

Waterproof and water resistant garments are protective garments that keeps the wearer dry in wet weather by stopping the water molecules to penetrate inside the garment. The fabric for these garments can be prepared in a variety of ways to meet the waterproof/water resistance criteria. Since the first known attempt, the fabric used for this purpose has changed considerably. In the past sailors utilised linseed oil, animal fat, or wax to make waterproof garments for their voyages. Materials manufactured using previous techniques were unbreathable and hence uncomfortable to wear for long periods of time, necessitating the development of breathable waterproof fabrics. This paper reviews the advancements in the field of waterproof and water resistant fabrics used in garments over time, as well as the obstacles that remain.

Keywords: Coating, Membranes, Protective Clothing, Waterproof Breathable Fabric, Water resistant

1. INTRODUCTION

The basic purpose of a waterproof or water resistant garment is to prevent its wearer from getting wet. Water cannot permeate a waterproof garment, but it can penetrate a water-resistant garment to some level if it is exposed to water for an extended period of time (Porav, 2011). The waterproof characteristics of a fabric can be measured by either simulating rain or by testing hydrostatic pressure at which water penetrate through the fabric surface. If the hydrostatic pressure rating of a fabric is greater than 5000 mm, it means that it can withstand light rain and is resistant to water under low pressure. If the water column rating is between 10, 000 and 15, 000 mm, it can withstand moderate rain under light pressure, and a rating of more than 15, 000 mm indicates that the fabric is completely waterproof and can withstand heavy rain (Williams, 2018).

Waterproof characteristics of fabric can be examined by mimicking rain using a variety of methods, such as a spray test or a rain test. Spray tests can be carried out on fabrics that are permeable to air. In a spray test, the specimen is positioned at a 45o angle and water is sprayed from above using a spray nozzle, after which the wet specimen is evaluated by comparing it to a reference sample. Standard spray test ratings are used to interpret the results (AATCC-22). In rain test the specimen is exposed to the shower for 10 minutes and the wet condition of specimen is assessed by comparing with the reference sample. Equation (1) and

(2) are used to calculate the amount of water absorption and rate of water absorption respectively (AATCC-35).

$$g = M - M_o \quad (1)$$

$$\% = \frac{M - M_o}{M_o} \times 100 \quad (2)$$

Where, g = amount of water absorption; % = rate of water absorption; M_o = mass of specimen before the test; M = mass of specimen after the test.

2. HISTORY

The 15th century saw the first recorded effort to develop water-repellent protective garments. Sailors attempted to infuse their garments with linseed oil, animal fat, or wax during the time (Camotrek, 2020). The South American tribes used rubber in their crude clothes long before it was known in civilised countries. The King of Portugal was given with a waterproof garment in 1759, which was manufactured by pouring rubber over the cloth and leaving it to dry. The first solid rubber pieces were apparently introduced to this nation by South American Indians, and the substance was sold in London in 1770 for erasing pencil markings. Rubber was used to "proof" clothes for the first time between 1790 and 1830; the term "to render cotton, linen, and woollen cloths, etc., waterproof" appears in multiple patents by Peal, Macintosh, Hancock, and others. In the early 1820s, Charles Macintosh established a rubber factory and named a fabric after himself, which is still used in the word

"mackintosh," a waterproofed fabric in which rubber creates an air and water-impermeable flexible coating on a fabric (Blow, 1939). Between two layers of cloth to make it waterproof, Macintosh layered rubber dissolved in naphtha, a material derived from coal tar, which is obtained from the 'cooking' of coal to make coke. Unfortunately, rubber handled in this way retains many of the same characteristics as rubber in its original state: it stiffens when cold and becomes sticky when heated, neither of which are desirable characteristics for a wearable item. It also smelled awful, and the manufacturing process was quite hazardous. It wasn't until around 1843, when Thomas Hancock developed the vulcanisation method in which natural rubber is heated and combined with sulphur under controlled conditions that it became truly practicable to use (Newton, 2015).

3. WATERPROOF BREATHABLE FABRICS

In order to eliminate interstices between fibre and yarn, a closed structure with high density and yarn twist are used to create waterproof fabric structures. Linseed oil, rubber or silicone emulsions coatings are used to prepare waterproof fabrics. These coatings completely block the pores in the fabric, making it unbreathable and difficult to wear. This results in development of waterproof and breathable coatings. Breathability is an important aspect of comfort for the users as good breathable garment transports the sweat away from the body. Water-resistant fabrics, in compared to waterproof fabrics, provide better breathability to users since they are laminated with membranes, which are ultra-thin films with a strong resistance to liquid water penetration while remaining permeable to water vapour (Porav, 2011). During World War II, England manufactured the first true water-resistant or waterproof breathable fabric. In 1943, mass production began (Camotrek, 2020). Breathable waterproof fabrics can be achieved by three methods, using high density fabrics, film – laminated materials and resin – coated materials. Cotton or synthetic microfilament yarns with a compacted weave structure make up the tightly woven waterproof breathable fabrics (Kanjana and Nalankilli, 2018). In 1879 Thomas Burberry invented that waterproofing and water resistance can also be achieved by employing tightly woven materials like gabardine (Newton, 2015). Ventile is one of the most well-known waterproof breathable textiles, and it's made from long staple cotton with few intervals between the threads. Combed yarns are usually woven parallel to each other, with no pores through which water can pass. When water is sprayed on a fabric's surface, the cotton fibre swells

transversely, reducing the size of the fabric's pores and necessitating extremely high pressure to penetrate. Micro-denier synthetic filament yarns can also be used to create densely woven fabrics. Individual filaments in these yarns are fewer than 10 microns in diameter, allowing for the creation of textiles with incredibly small pores (Kanjana and Nalankilli, 2018).

Membranes are applied to textile products to create laminated waterproof breathable fabrics. These are polymeric membranes that are very thin. They have a strong barrier to water penetration while also allowing water vapour to pass through. The membrane's maximum thickness is 10 microns. They are of two types, microporous membranes and hydrophilic membranes. The microporous membrane has microscopic holes on its surface that are smaller than raindrops but bigger than water vapour molecules. In 1969, W. Gore brought a revolutionary change in the field of waterproofing material by developing Gore-tex membrane which is a film of polytetrafluoroethylene (PTFE) also known as Teflon. It provides a breathable waterproof material. PTFE membrane is hydrophobic in nature and has pores 20, 000 times smaller than size of water drop, thus it doesn't allow the water droplets to penetrate inside the fabric but it is 700 times larger than water molecule allowing the water vapour to get out and making it comfortable for the user. It also provides protection from wind penetration and are resistant to extreme temperatures (Porav, 2011). Thin films of chemically treated polyester or polyurethane serve as hydrophilic membranes. The addition of poly to these polymers changes their properties. By producing an amorphous region in the main polymer system, the poly forms the hydrophilic section of the membrane. Due to the obvious solid nature of the membrane, this amorphous region works as intermolecular gaps, allowing water vapour molecules to pass through but preventing liquid water from penetrating (Kanjana and Nalankilli, 2018).

Polymeric material is put to one surface of the cloth to make it waterproof and breathable. The coating is made out of polyurethane. Microporous and hydrophilic coatings are the two types of coatings available. Microporous coatings have very narrow interconnecting channels that are significantly smaller than the molecules of water vapour. Water vapour travels via the permanent air-permeable structure of the microporous coating, whereas the hydrophilic coating transmits vapour through an adsorption-diffusion and desorption mechanism (Kanjana and Nalankilli, 2018).

4. SUMMARY

Waterproof breathable fabrics contain membranes and/or durable water repellent finishes made using chemistries based on polyfluorinated and perfluorinated compounds, which are known to be detrimental to human health and the environment. As a result, manufacturers have been under a lot of pressure to produce safer alternatives without sacrificing performance (Businesswire, 2020). It is important to build environmentally sustainable durable water repellent coatings using bio-based ingredients and designing ecologically sustainable technologies (Businesswire, 2020).

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Cosmetotextiles: A Futuristic Technical Textile

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ABSTRACT

Technical textiles are high technology textile materials developed to meet specific end use functional criterion. It is an upcoming segment in the field of textiles and has high potential to establish India at the focal point, globally. As technical textiles are futuristic in nature, they have a stupendous range of applications. One such very promising application of technical textiles is: Cosmetotextiles. Cosmetotextiles are functional fabrics impregnated with various cosmetic ingredients that are released in a specified manner to provide the user multiple cosmetic benefits like moisturization, odor control and correction, improving the firmness and elasticity of skin or reducing the appearance of fine lines and wrinkles, UV rays protection etc. Thus Cosmetotextiles are a desired and planned combination of cosmetics and textiles. They can be used as clothing or in other ways like bed linens, hand towels, bath towels, body shapers, napkins etc Cosmetotextiles are classified on the basis of end product specifications and purpose, the ingredients used and the fabric used. Both natural (various types of essential oils, fruit extract, flower extracts, plant extracts and animal extracts) and synthetic materials (iron oxide, zinc oxide, ethane diol and zinc nanoparticles etc) can be used as substrate in Cosmetotextiles With advancements in the field we now have several techniques for creating Cosmetotextiles like microencapsulation, grafting, doping and coating technique with the basic principle that allows the gradual transfer of substrate to the skin by movement, pressure or natural warmth. Cosmetotextiles represents a fast emerging market both in India and at global level and India can explore its technical, economical and environmental benefits on large scale in near future.

Keywords: *Technical textiles, cosmetotextiles, innovative textile materials microencapsulation.*

1. INTRODUCTION

Technical textiles are futuristic textile materials developed with help of advance technology and with specified objectives to meet specialized functional end use. The growing consciousness of consumers towards health and beauty attracted interest of contemporary scientists into development of Cosmetotextiles or wearable skincare. And now, it is a sprightly blooming segment in the field of textiles and has a high potential to establish India at the focal point, globally. As technical textiles have a stupendous range of innovative applications in the contemporary world and also to the world of coming times. One such very promising application of technical textiles is: Cosmetotextiles. Cosmetotextiles are functional fabrics impregnated with specific cosmetic ingredients.

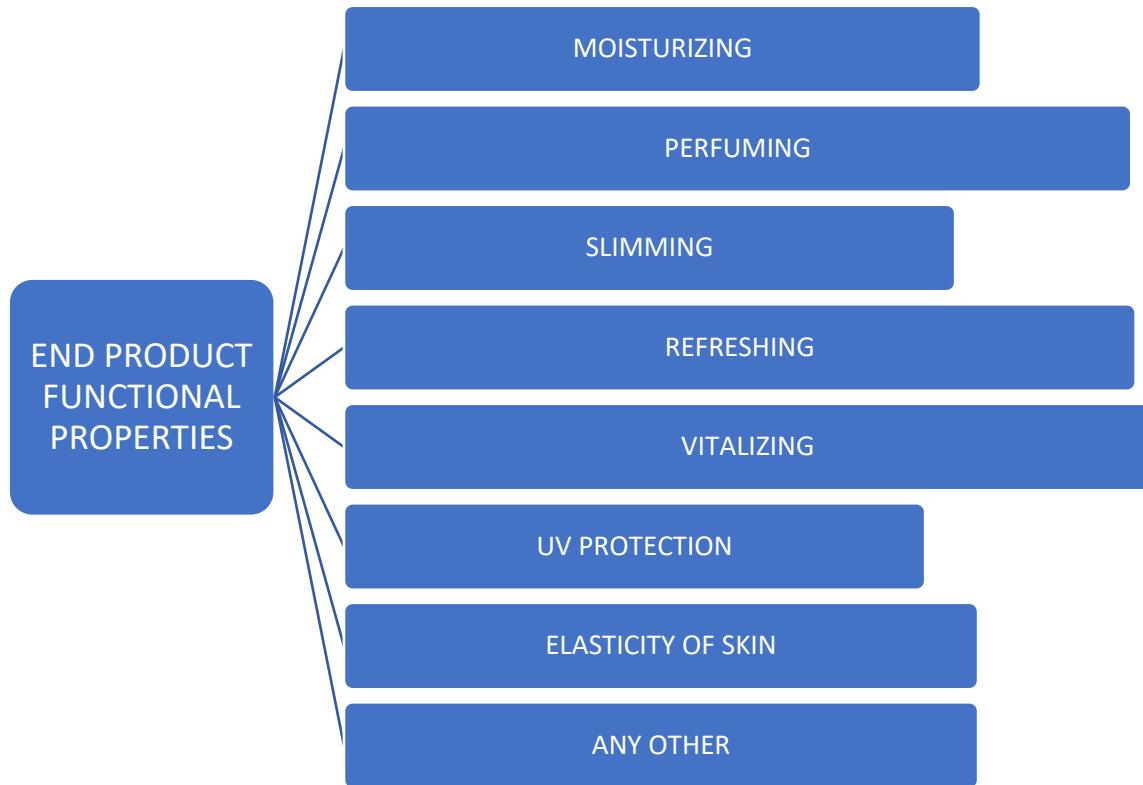
During the usage, these ingredients are released in a specified manner to provide cosmetic benefits to the user such as moisturization, odor control and correction, improving the firmness and elasticity of skin or reducing the appearance of fine lines and wrinkles, UV rays protection etc. Thus Cosmetotextiles are objectively desired and designed combination of cosmetics and textiles. They can be used as clothing or in other ways like

bed linens, hand towels, bath towels, body shapers, napkins etc.

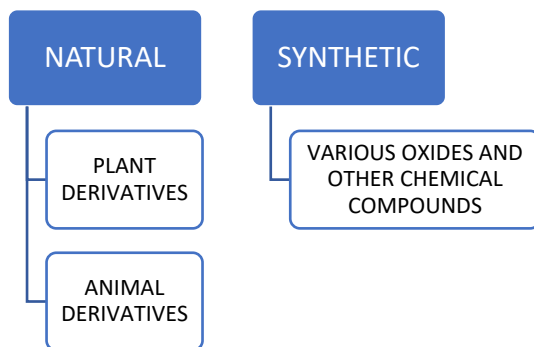
Definition: According to European Cosmetic directive “Any textile article containing a substance or preparation that is released over time on different superficial parts of the human body, notably on human skin, and containing special functionalities such as cleansing, perfuming changing appearance, protection, keeping in good condition or the correction of the body odors is called Cosmetotextiles.” Therefore Cosmetotextiles are a combination of textile materials with some active substances carrying cosmetic properties.. The cosmetic substance is fixed to the fabric of the article and when the article comes in contact with human body and skin the active substance is transferred from the textile onto the skin of the human for positive cosmetic purposes. In Indian culture, the concept of textiles being used for delivering cosmetic and healing effect is an ancient knowledge. Indian heritage literatures mention Ayurveda which were prepared by using natural fibers and dyeing with extracts of natural herbs to obtain diverse beneficial effects on skin [Bhargava].

The basic principle of Cosmetotextiles calls for answers of following four questions:

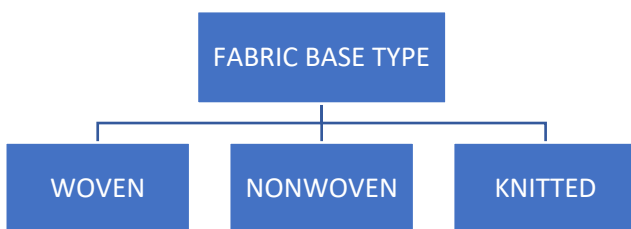
1) What are the functional properties desired for the end product?



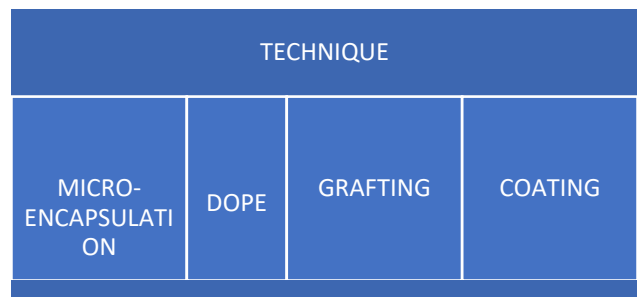
2) What shall be the type of ingredient?



3) What shall be the fabric base?

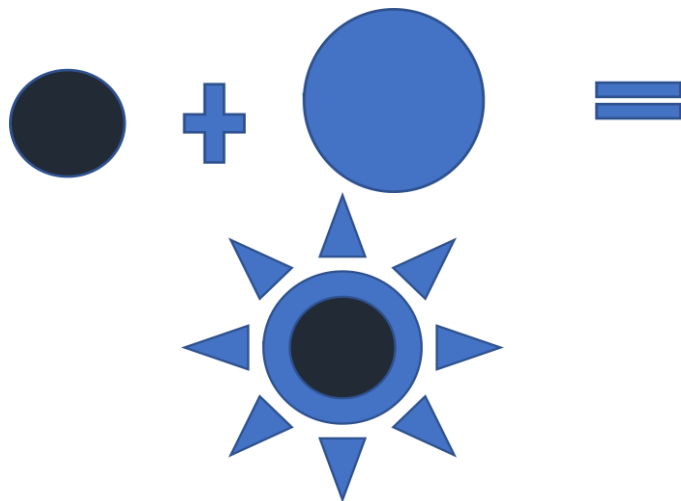


4) What technique shall be used?



The selection of technique depends on various factors and may vary situation to situation. Still, in general Microencapsulation is the most commonly used technique. In this technique, Cosmetotextiles are impregnated with a finish composed of solid microcapsules, each holding a specific amount of cosmetic substance meant to be released totally and instantly on the human body. The release pattern of the microcapsules on cosmetotextiles is triggered by an impact, most likely friction or pressure between the body

and fabric, breaking the capsules into fragments and liberating the cosmetic properties (WIKIPEDIA).



There is a wide range of special properties like cleaning, perfuming, protecting, keeping in good condition, control of body odor and even change in appearance. Because cosmetic preparations are usually in liquid form they need to be encapsulated before applying on textiles [Kisilak, et al., 2011] Here we must understand that the cosmetic ingredients on the textiles have to be transferred to the wearer's skin without any negative effect and so efficiently and in enough measure to ensure that cosmetic benefits are exploited to potential. Shi and Xin (retrived on 16 June 2015) states that the active cosmetic textiles are a novel concept of releasing cosmetic active substances to the human skin. The released substances from the clothing are then directly absorbed by the skin. Bed linen can be made more comfortable and healthier using fibres coated by microcapsules with essential oils or antibacterial or anti-dust agents as well as antimite chemicals.

There are some other methods also such as insertion of dope additives into the fibre. In this method, active agents are added to the fibre forming material at the time of dope preparation before fibre extrusion. The manufacturing of inherently conductive, UV absorbing, and de-lusturing fibres can be possible by using carbon nanotube, Zn nanoparticles and TiO₂, respectively, as dope additive. (Wang, et al., 2005). In grafting layers method, various cosmetic ingredients are grafted onto fibre, yarn and fabric surfaces to achieve cosmetic effects. A common example of such an ingredient is Cyclodextrins (CDs), which is a cyclic oligomer of glucose. In direct coating method, some active agents are coated on fibre, yarn or a fabric surface

according to the suitability of the facility and the desired end uses of the product. For example β -cyclodextrin complex of omethoxycinnamaldehyde has been coated on shoe soles to inhibit microbial growth.

Applications of Cosmetotextiles are as vivid as imagination. Cosmetotextiles are very commonly used for moisturizing human skin. Squalane is able to add a layer of oil on the human skin to suppress water loss from the skin in order to keep it soft and supple. We now a-days have textile structures that work to offer a slimming effect by means of yarn properties, fabric structure and finishes. We now also have compressional garments that along with slimming effect, work well on reduction in muscle damage and a maintaining muscle function. Retinol and caffeine extracts are generally added to these textiles to fight cellulite. (Gupta, et al., 2011). Some of the textile articles are also used to lift the energy level of a human being. They have high application in sports wear sector. Various essential oils like clove, jasmine, lavender, sandalwood, rose etc are used to achieve a perfuming effect in cosmetotextiles. Vitalizing cosmetotextiles are suitable for bathrobes and other similar purposes. Likewise Cosmetotextiles for UV Protection protect skin from damage, such as sunburn, premature skin ageing and even skin cancer due to prolonged exposure to sun rays.. Zn nanoparticles, iron oxide, zinc oxide, titanium oxide are used to improve the UV protection factor (UPF) of textiles. (Singh, 2005).

Challenges: Cosmeotextiles is a very interesting idea and contemporary market is coming up with new products on these lines after every few days. The new generation consumers is also eager to explore these products. Still this field is struggling with some challenges like dosage optimization, long term effect of ingredients, shelf life of the products, maintenance of efficiency, trying new ingredients and their optimization, long term impact on environment and improving general acceptance of these products.

2. CONCLUSION

Cosmetotextiles have a bright future. They have application not only in textiles industry but also in other related industries like cosmetics industry, herbal industry, pharmaceutical industry, sports products industry, automobile industry and many more. But there is still scope for a lot of research and development work in this field. Optimization and quality control in these products can be beneficial for consumer as well as the market.

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Green Technology in Textile Industry

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ABSTRACT

Green is an all-purpose term used to designate sustainability, recycling, cleaner production, and Eco-friendliness and business ethics. Textiles has been known as one of the most polluting and unsafe industry especially cotton cultivation and dyeing-printing industry. The eco-friendly textile is strongly accompanied via respect of lifecycle materials, from raw material through the design, production and logistics up to discarding in order to point out important points and parameters for greening the industry. The everyday growing demand, changing of trends, and the rising obsession on sustainability has led the textile industry to invent technologies that keep the environment green and use methods that will leave little or no footprints. This study also disclosed that due to the facility in the green textile industry, its production costs are less, although price of clothing for both industries is the same and green textile industry can ensure environmental sustainability. This paper provides information related to recent research work on green technology and the available methods in textile industries.

Keywords- Green technology, Eco- friendly, Green textiles, Sustainability, Textile industry

1. INTRODUCTION

With increase in the global pollution, the awareness level of the consumers is also increasing which is prompting them to seek healthier living choices. Due to being health conscious, buyers are supporting eco-friendly living styles. The upcoming success of markets is dependent on the modification of green technologies. Textiles are not only the need of an person but also generate a huge amount of profits for the corporation all over the world. The green system involves the selection of investments in companies with sustainable and environmentally friendly practices and services. This automation is able to induce innovation and change in daily life without affecting the green and sustainable environment.

The major strategies and methods involve:

- **Origin depletion-** This can be attained by changing production and consumption patterns help reducing pollution and waste.
- **Sustainability-** This consists of methods that can continue to be used into the future indefinitely without depleting or damaging natural resources.
- **Innovation-** The focus is on evolving another types of technology that have been dangerous to the surrounding.

- **Cradle-to-cradle design-** This involves the creation of products tha can be re-used or reclaimed, thus ending the use and throw cycle of manufactured products.



Fig. 1.

- **Making masses attentive-** Extending conciousness amongst individuals, and moreover educating the working people involved in the manufacturing process is a prominent way to reduce wastage.
- **Greening of textile industries-** High amount of water is consumed for textile dyeing industries which are a major problem to the ground or natural water sources resulting in exhaustion of ground water. The toxic dyes and other toxic chemicals including sodium sulphate, sodium chloride,

sodium hydroxide, etc. gets mixed with water which is later generated in the environment after dyeing and washing processes of the finished product. Reusing of the waste water regularly during the dyeing process can help these industries gain much advantage.



Fig. 2

- **Increases of textile recycling-** The importance of recycling textiles is increasingly being recognized. Textile recycling is a prominent challenge to be conveyed as we strive to move closer to a zero-landfill society. Once in landfills, natural fibres take a few weeks to decompose whereas the synthetic ones do not decompose. Textile recycling can offer many environmental benefits which include decreased landfills space, reduced consumption of energy and water and pollution avoidance. The recycling process adds up following steps:

1. The unused or discarded material is sorted and categorized in terms of material and colour.
2. The material is further pulled into fibres or shredded; sometimes addition of other fibres into the yarn is done.
3. Other fibres may be added, depending on the final use of yarn.
4. The yarn is then washed and mingled through a carding process.
5. Then the yarn is re-spun and ready for subsequent use in weaving or knitting.
6. Some fibres are not spun into yards, however. Some are squashed for textile fillings.



Fig. 3

In the case of polyester-based textiles, garments are shredded and then granulated for processing into polyester chips. To create new fibres, these chips are melted and then used in new polyester fabrics. Our new obsession with "fast fashion" is provoking the entire situation. Textile recycling adds the method of material regaining and reuse of discarded fabric from clothes or upholsteries. It is then reprocessed to form useful products. 90% of worned textiles are recyclable. Results in 20 % in energy and water savings and less pollution as new fibres do not have to be purchased or transported. Bringing down the need for landfill space. Decreases environmental load and greenhouse gas emissions through the well planned use of resources. Lessens supply for dyes. Less amount of harmful chemicals are used, so it is better for the whole environment.

THE MARTEX FIBER 360° RECYCLING PROCESS

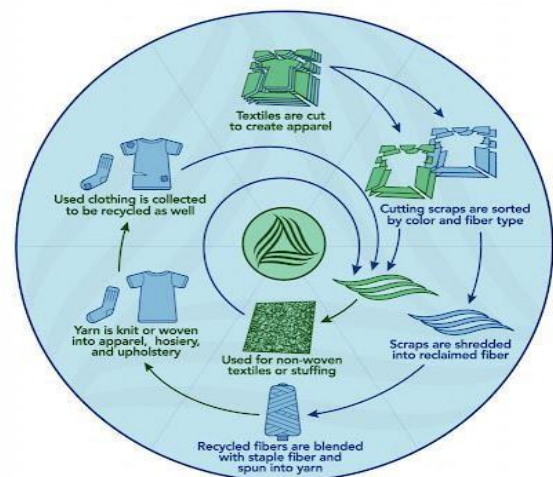


Fig. 4

2. SOME PRODUCTS MADE FROM RECYCLE PROCESS

1. *Winter jackets*

The polyester lining in coats can be created from old plastic bottles, which means it can utilise upto 150 trash bottles which are thrown everyday in dustbins.

2. *Playground equipment*

Tough plastic material which are found in milk jugs can be used to make slides, swings and other recreational equipment.

3. *Sleeping bags*

Recycled plastics or fiber material can be used to make sleeping bags. Thrown out shells of coconut can be used for warmth.

4. *Cans*

Many construction materials, bike and car parts contain recycled material which can be used to make cans. It even requires less energy than to manufacture a new one from scratch.

5. *Stadium seats*

Sustainable businesses can have major impact by reusing existing materials. In large stadiums, chairs are made from scrap iron or recycled material, while older chairs can be donated to teams in smaller federations.

3. CONCLUSION

The aim of the study was to analyse the streaming situations of the textile and apparel industries. The

increased competition in the market and the increased demand of “Fast Fashion” forced the industries to redesign their existing structures. In this study different methods of implementing the green technology and sustainable methods were described, which will help protect the environment without affecting the industries. A well- structured supply chain is of key importance in achieving efficient operations among the suppliers, producers and retailers. Manufacturers are increasingly committed to tapping innovation potential and promoting sustainable development. Sustainability policy starts from sustainable designs and making the use of innovative materials and processes to the increment of resource consumption and recycling. In this task, it is shown that how waste products can be used in textile industry to increase production without harming the environment. Lastly, it was added that green technology in textile industry can save the eco-friendly and sustainable parts of the environment.

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Need to Develop Reuseable Cotton Fabric Diapers: A Sustainable Approach

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ABSTRACT

In recent years due to technological advancements and fast life-style, the usage of disposable diapers has increased due to which the environmental implications like landfill problem & global warming is on the rise. These issues not only affect people but also ecosystems. Human beings have become conscious about the harm that has been done to the environment for fulfillment of their needs. Disposable diapers contribute to this menace as after single use they are dumped and this increases the burden on landfill sites. This paper is based on study of baby diapers their types and construction as well as their impact on the environment and consumers. A comparison has been drawn between various materials for diapers and the how the choice of diapers can affect the environment by looking at the different key areas that diapers affect. Moreover, this study will also provide an insight into the different methods that can be used for application of finishes on cloth for making an eco-friendly cloth diaper.

Keyword: Global warming, Disposable diapers, Landfill, Ecofriendly

1. INTRODUCTION

In the era of modernization and technological advancements, human beings have become conscious about the harm that has been done to the environment for fulfilment of their needs. The demand for eco-friendly products is increasing by the day with the outbreak of problem of heaping toxic landfills. Disposable diapers contribute to this menace as after single use they are dumped and this increases the burden on landfill sites. Disposable diapers take more than 500yrs to decompose forming a breeding ground for a wide variety of viruses and bacteria because they are dumped into landfills and are not exposed directly to sunlight and air (Lee 2014).



Fig. 1. Showing Landfill Problem due to Disposable Diapers (Image- Modern Natural Baby)

Moreover, the residual waste from the disposable diaper manufacturing units is more harmful as compared to cotton manufacturing units. Due to lengthy decomposition process of disposable diapers when they are disposed along with faecal matter into garbage they add to the tons of waste and lack of treatment to human faecal matter results in growth of bacteria and virus which leach into the groundwater supply further contaminating it. Since large numbers of disposable diapers are required for a baby in his life, this increases the burden on landfill sites and involves a good amount of money not only to manufacture them but also to dispose them. Disposable diapers contribute to 30% of non-biodegradable waste and are the 3rd largest consumer item in landfills. According to reports of Environment Protection Agency, US, 20 billion disposable diapers are dumped in landfills each year contributing to more than 3.5million tons of waste leading to depletion of environment. It is estimated in US that a baby uses one ton of disposable diaper before toilet training. [Carl .et.al. (1991), Morawski (2003)]

Another problem associated with disposable diapers is Nappy Rash because the baby is in continual contact with faecal matter and urine which can irritate the skin and cause painful redness. The diaper area remains warm and moist over a long period of time giving a suitable environment for growth of bacteria and fungus leading to rash and foul smell. This occurs because of continuous

exposure of baby's skin to chemicals such as sodium polyacrylate (SAP) which is present in diapers (Richardson 2014). As the chemical possesses the super-absorbent qualities so it facilitates less changing of diapers leading to rashes because of reduced air circulation, accumulation of urine and removal of natural baby's moisture leading to skin irritation. [Abou-Taleb (2013)]

The basic components of disposable diaper are the outer lining made of polythene film, inner lining made of polypropylene, the absorbent core consisting of wood pulp containing Dioxin and Sodium Polyacrylate in powder form that can absorb up to 30 times its weight in water or 30 ml of water per gram.

(www.thenaturalbaby.com, www.coolscience.com)

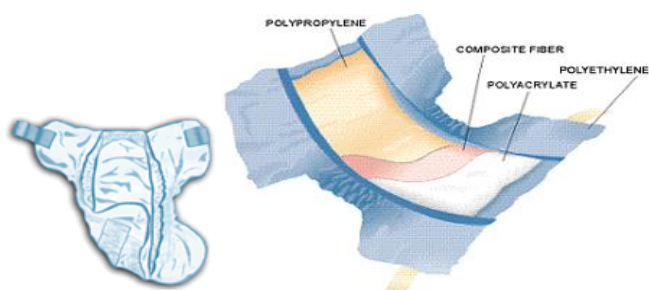


Fig. 2. Structure of Disposable Diapers
(http://www.technicaltextile.net/articles/medical-textiles/detail.aspx?article_id=3372&pageno=7)

Other important feature of these diapers are adhesive or mechanical tapes with elasticized fabric single and double gussets i.e. they have double layer of elastic at the end of the diaper for allowing better fit around leg and waist areas. Some diaper includes wetness indicators in which a chemical included in the diaper changes color in presence of moisture giving indication that the diaper is wet.

Cloth diapers can be used instead of disposable diapers as they are economical when compared to disposables diapers. Today's cloth diapers are easy to use as they are fitted with Velcro, snaps and are available in cute colorful prints.

Common Styles of Cloth Diapers
(<http://www.thenaturalbabyco.com/guides/cd-guide/five-major-styles.html>, <https://babycared.com/types-of-cloth-diapers/>)

There are five types of cloth diapers available in market according to their ease and comfort. They are- prefold

cloth diapers, fitted cloth diapers, pocket diapers, all in one cloth diapers and hybrid cloth diapers.

- Prefold cloth diaper-** These diapers are rectangular in shape and flat used by our mothers and grandmothers though economical yet may be not as convenient as some of the other diaper choices.
- Fitted cloth diaper-** These diapers consist of multiple layers of absorbent materials with leg and back elastic that fasten on baby with snaps or hook and loop closures. easy to fasten on baby but are expensive than prefolds.
- Pocket diapers-** These diapers consist of a waterproof cover that has a "stay dry" polyester lining that act as a pocket between the lining and the cover. In this pocket an absorbent pad or prefold is inserted which absorbs moisture.
- All in one cloth diapers-** They are one-piece diapers with absorbency layers sewn inside the outer waterproof cover..
- Hybrid cloth diapers-** These diapers are also known as All In Two (or AI2) cloth diapers. It consists of a shell (or diaper cover) into which absorbency layers are inserted made of either cotton or disposables. They are complicated but are flexible for usage of cloth or disposables as inserts according to need of customer.



Prefold diaper Fitted cloth diaper Pocket diaper



Hybrid cloth diaper All in one cloth diaper

Fig. 3: Showing different types of cloth diapers (Source: The Five major styles of cloth diapers)

(www.thenaturalbabyco.com/guides/ed-guides/five-major-styles.html)

2. COMMON MATERIALS USED IN CLOTH DIAPERS

(<http://www.thenaturalbabyco.com/guides/cd-guide/commonmaterials.html>,
https://www.grovia.com/pages/grovia_cd_basics_common_materials)

The materials used in cloth diapers are waterproof layers and absorbency layers. Waterproof layers are made up of materials such as PUL (polyurethane laminate) and TPU (thermoplastic polyurethane) and are used as an outer covering of absorbency layers.

Another important aspect of cloth diapers is the material used that should be absorbent, non-irritating and eco-friendly. Most commonly used materials for cloth diapers are bamboo, cotton, hemp, modal, polyester, fleece, stay-dry fabrics and wool which forms the absorbency layers covered by waterproof layers. They are-

- a) **Cotton-** It is one of the softest fabric available on earth which is obtained from plant. Its high absorbency and softness make it useful for cloth diapers.
- b) **Hemp** – It is a natural fiber which is super absorbent and is anti-microbial. Hemp fiber is soft and is non-irritating to baby's skin. With continuous usage its softness and absorbency increase making it fit for cloth diapers.
- c) **Bamboo-** It is one of the softest fabrics available in the market that can be used for making cloth diapers and is good for baby's sensitive skin. Its property of high absorbency and natural resistance to bacteria makes it suitable for cloth diapers.
- d) **Charcoal Bamboo-** Its rayon made from bamboo by adding nanoparticles of charcoal. In this process bamboo is heated to make charcoal and then it's grounded into small particles (nano) that are being added to the processing of rayon from bamboo. The fabric is charcoal grey in colour.
- e) **Microfiber (Polyester)** - It is made of polyester blend and is extremely absorbent by wicking moisture away from baby's skin. The microscopic structure of these fibers is so small that it makes

the fiber highly absorbent but with continuous usage they lose the ability to absorb moisture.

The Cloth diapers available in the market, mostly uses polyester as 'insert' to form a stay dry layer in the interior of the diaper. These diapers are better than disposables but they aren't sustainable in their approach.

So, Reusable eco- friendly herbal extracts treated cloth diapers are a solution to the existing problem of disposable diapers as they are non-toxic, sustainable and economical when compared to disposables diapers. With the awareness among parents and growing concern of the health of their children demand for reusable cloth diaper is increasing. Cost and Environment conscious parents are moving back towards cloth diapers. Textile products, especially made from natural fibers, have a serious problem of microorganism growth, due to their surface area and ability to retain moisture. [Sumithra M, (2012)]

Scientist and researchers are finding novel ways to solve this problem. As fabric is the most receptive surface for microbial growth and is in continuous contact with human skin so efforts are being done to make them bacteria and odor free. Some of the micro-organisms causing diseases are Gram positive (*Staphylococcus aureus*), Gram negative (*E-coli*), Spore bearing or non- bearing type. Some types of bacteria are pathogenic and cause cross infection. A type of fabric can be made by applying different finishes that can prevent the growth of micro-organisms like Bacteria, Fungi, Algae and viruses responsible for various types of skin infections in human beings. Microbes are present everywhere in the air we breathe, in the soil, in our skin and bodies but they are not visible with naked eyes. The ideal conditions for microbial growth are warm temperature, moisture, humidity and receptive surfaces like skin & fabrics. A specialized fabric that does not allow growth of micro-organisms is useful for baby's clothing as their skin is sensitive and more prone to bacterial infections. [Morais .et.al. (2016)]. [Dorugade and Bhagyashri, (2010)]

Some of the finishes applied to textiles are:-

- **Anti-Microbial:-** Function of this finish is to inhibit or control the growth of micro-organisms.
- **Anti-Odor:-** These finishes suppress odor perception by controlling the metabolic by products of bacteria. This finish not only imparts medicinal properties but

also relieves mental stress in humans by simulating sense organs.

- **Mosquito Repellent-:** These finishes when applied on textiles drive away mosquitoes preventing human beings from mosquito carried diseases.

3. SOME OF THE NATURAL AGENTS USED TO APPLY FINISHES ON FABRICS AND FOUND IN INDIA ARE-:

- I. **β - Cyclodextrin-** Cyclodextrins are non-reducing cyclic oligosaccharides having 6-8 D glucose units and are formed during the enzymatic breakdown of starch. They act as releasing agents and are used in textile finishes because of its ability to hold the essential oils in oleophilic cavity.
- II. **Chitosan-** It is a deacetylated derivative of chitin, a natural polymer and is the second most abundant organic resource on earth next to cellulose. Chitin is the precursor of chitosan is a nitrogen containing polysaccharide and is the second most abundant organic resource on earth next to cellulose. It has good antimicrobial property.
- III. **Terminalia Chebula** - It is an important medicinal plant in Indian traditional medicine and it is most frequently used herb in Ayurveda. It possesses anti-bacterial properties and can be used effectively in textiles.

Various agents of oils and gums from natural sources mentioned above can be applied to the fabric in the following ways-: [West & Hitchcock, (2014)]

- **Dip method-** For finishing the fabric by dip method, the de-sized sterile samples are cut and put in the extracted solvent in a beaker. The finished samples are sterilized by UV rays in the laminar air flow chamber to avoid microbial growth on the surface of the fabric.
- **Pad-Dry-Cure-**For finishing the fabric by Pad-Dry-Cure method, the fabric is dipped into the compounded solution using a roller and then the fabric is sent through a padding mangle to squeeze the dipped chemicals out of the bath at the ratio of the pick-up rate. The finish gets interlaced inside the fabric, filling the spaces in between the fibers with an ultrathin film of polymer creating a permanent barrier that is breathable, yet impermeable to both water and air.

- **Exhaustion method-** It involves placing the fabric or yarn to be treated in a chamber containing water and an anti-microbial product. The chamber is then sealed and the treatment solution is heated, which results in the anti-microbial product transitioning from the water to the fabric or yarn. (www.kenencoregroup.com)
- **Microencapsulation-**Microencapsulation is a process by which individual particles or droplets of solid or liquid material (the core) are surrounded or coated with a continuous film of polymeric material (the shell) to produce capsules in the micrometer to millimeter range, known as microcapsules. Microcapsules are minute containers that are normally spherical if they enclosed a liquid or Gas and roughly the shape of the enclosed particles if they contain a solid. They generally are applied as a final finish to the fabric by padding or spraying because of their minute size 3-8 microns they become interlaced into the fabric.
- **Nano-encapsulation-** It is a microencapsulation technique. The use of modern technologies enables the coating of particles of 100 nm or less in diameter. These coated particles are known as nano- capsules, and the process of their manufacturing is called nano-encapsulation.

4. CONCLUSION

Keeping the above in mind there is a dire need to manufacture a cloth diaper which is eco-friendly and is less expensive for the baby. This study intends to find solution for the existing problem of usage of polyester as microfiber and SAP for better absorption which are otherwise harmful to both environment and baby health.

Herbal extracts can be applied to cotton fabric to achieve the anti-odor and anti-bacterial properties. Cotton and hemp can be used for making inserts and cloth diapers which would be less expensive than polyester microfiber.

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Offering Ornamental Textiles as a Devotional Practice

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ABSTRACT

India is known across the world for the rich legacy of textiles and their decoration. Every region of India is known for a specific style of textile decoration, such as Phulkari from Punjab, Kantha from Bengal and Kashida from Kashmir etc. Along with apparel many types of decorations may be observed on the religious textiles offered in various Holy places. It has been a tradition of covering the religious books in a cloth that is often ornamented. Wrapping religious books or even ornamenting idols and sculptures has been quite prevalent in nearly every faith. Different types of textiles are offered by people to their deities in order to show their respect and devotion, for example red coloured embellished Chunri to Hindu Goddesses, green or blue chaddar to Dargah or Peer, Rumala Sahib offered in Gurdwaras and altars cloths in Churches. The present study is undertaken to investigate types of textiles offered as a devotional practice. It further explores various surface ornamentation techniques, motifs and designs used on religious textiles and their symbolic importance.

Keywords: Ornamentation, devotion, textiles

Embroidery is the art or a craft of ornamenting fabric or other materials with needle and thread or yarn. Different types of materials like feathers, horns, tassels, beads, coins, buttons, shells, metal and mirrors are used to ornament the fabrics. Besides decorating the fabric, embroidery plays a symbolic role also for example, embroideries are hung outside the houses of a marriageable girl in Romania, embroidery done by a Turkey girl announces her talent as a prospective daughter in law and at the time of birth of a child, forty days are marked with protective embroidery for mother and baby (Paine and Paine, 2010). Elaborately ornamented clothing, religious objects, and household items have been a mark of wealth and status in many cultures including ancient Persia, India, China, Japan, Byzantium, and medieval and Baroque Europe. Embroidery and most other ornamentation techniques by needlework are believed to originate in the Orient and Middle East. India has been very famous around the world for its rich heritage of textiles and their ornamentation. Gold and silver embroidery is practiced in many parts of India but Delhi, Agra, Lucknow, Ajmer, Bhopal, madras and Hyderabad are the main centres. Bhopal is famous for making purses or small bags, Surat for *karchobi Work*, Delhi for *chappals* and shoes and Lucknow for both *Zardozi* and *Kamdani* work. Metal work is used on saris, cholis and many other articles these days. Punjab has not been an exception and its hard-working & creative women have been practicing this art since long. In fact, embroidery has been an

essential qualification of a well brought up Panjabi girl. The great Guru Nanak sayeth in the Holy Granth Sahib:

Kadh Kasida Pehreh Choli, Ta Tum Janoh Nari

Phulkari embroidery has brought up the glory and worldwide appreciation to the embroidery of Punjab (Hitkari, 1980). The finest work known as white embroidery or chikan flourished in Lucknow and still is considered as an important product. Decorated quilted covers- kantha of Bengal were also famous all over the world. Chamba, a little town of Himachal Pradesh is best known for its embroidered thin muslin *rumal* known as Chamba Raumal. This was always used as wrapping whenever gifts were exchanged between the families of a bride and groom and offerings were made to temple Gods. Weavers from Assam were well known for the beautiful and intricate patterns of the woven cloth. Mahatma Gandhi once commented 'Assamese women are born weavers; they can weave fairy- tales in their cloth.' An Assamese girl was not considered marriageable until she had proved herself as a proficient weaver (Gillow. and Barnard., 2008).

1. ORNAMENTAL TEXTILES AS WORSHIP CLOTH OR COVERING

The oldest religion of the world is reported as Hinduism tracing back over 5000 years ago and *Rig-Veda*- produced during the Vedic period is considered as the oldest surviving text of Hinduism. According to Swami

DharamTheertha, “the caste, the temple and philosophy are the pillars which support huge system of Brahmin Imperialism called Hinduism” (Teertha, 1946). People at that time, had believe in power of nature. The power of nature was to be worshipped; certain symbols were given to each power and were regarded as God or Goddess. This was the time when statues were made of different Gods and people were made to worship them. The famous temple in Jerusalem was reported as centre of religious rites, ceremonies and sacrifices. The Christians had followed the footsteps of the Jews in spite of strong opposition by Christ (Gill, 1975).

Textiles are used in the worship by all religions –Hindus, Muslims, Buddhists and Christians. Some of them use the textiles as hangings to decorate their sacred spaces, some as wrappings for their holy Books and some offers to idols of their deities. The red and yellow pooja saris of South India have some symbolism associated with them. They are worn to protect a loved one, to fulfill a vow or ensure a bright future (Rao, 2010).

In Chamba- a state of Himachal Pardesh, Rumals (known as Chamba *Rumals*) were also used in temples and homes as a backdrop to, or canopy for, a deity. Square shaped *rumals* were also used as a covering of gifts. When an offering was made to temple Gods, or gifts were exchanged between the families of a bride and groom, an embroidered *rumal* was always used as wrapping (Gillow. and Barnard., 2008). The most common subjects used as inspirations for the embroidery were wedding scenes. The *rumal* was an essential part of the bride’s dowry and she

was expected to have learnt this craft at a very tender age. Chamba *Rumal* also involved depiction of Lord Shiva’s great exploits:annihilation of the elephant demon widely known as Gajantaka which means ‘end of Gaja’ or elephant. The embroidered *rumals* of eighteenth and nineteenth centuries depicts different scenes from Hindu epics, especially from the legends of Krishna. These *rumals* were used to cover gifts at weddings and offerings to the deities (Paine and Paine, 2010). Orissa was very popular for its embroidered banners, canopies and umbrellas made for religious processions. Applique work of Bihar was famous for its use in canopies (*shamianas*), wall enclosures (*kanats*), and tents for ceremonial purposes. *Sujanis* -quilts made by women folk of Bihar were also very popular which was used as a wrap or cover but was also used to cover books or musical instruments sometimes.

In each religion, the tradition of wrapping the holy books or even ornamentation of idols and statues has been very common. People often offer different types of textiles to their deities to show their devotion and respect towards them, certain examples of which are- offering of Red *chunri* to Goddesses, *chaddar* to *Gargah* or *Peer* by Muslims and *Rumala Sahib* to Gurdwaras by Sikhs etc. According to the Mana-sara Shilpashastra the features of the image are determined by the relation between the worshipper and the object of his worship, they are embellished with the devotional zeal of the worshipper and given true life and form lovingly by the devotees (Singh 2006).



Figure. 1&2 Idols of Goddess and Lord Ganesh wearing ornamented textiles



Fig. 3. Ornamental chaddar offered on a Dargah

Buddhist's lotus is woven into textiles to decorate the temples. Among Buddhists it was a common practice to cover their Dieties with fabric or canopies. The main priest was also covered by an umbrella to protect him from heat during the religious ceremonies. At that time umbrella became the symbol of Shakyamuni, the Buddha himself. That is why the Buddhists always use a canopy made of wood, metal or studded with pearls over the statue of Buddha. During early Joseon dynasty (1392-1910) Bojagi –a traditional Korean wrapping cloth was used as a tablecloth or coverings for sutras, in Buddhist context. It was used as wrappings of gifts, in marriages and in Buddhist's rites. Earlier Bojagis were made up of silk, ramie or hemp. 'Keeping something wrapped protected good luck' was believed by Traditional Korean Folk religions. In many religions a cloth is used to cover Altars known as Altar cloth. It is used as a sign of respect for the altar along with protecting the surface of altar because many of them are made of wood and are generally unique and highly decorated. In churches altars cloths are used during celebrations and are generally used to cover the surface when not in use. Formally precious stones studded altar cloths were used but at present linen or hemp material is used because of its whiteness, cleanliness and firmness. Altar covers are usually finished with laces and embroidered with applique or some other techniques. Linen cloth and canvas work furnishings in Christian Church during the sixteenth and seventeenth centuries are evident of Secular embroidery. The main motif used in their embroidered textile was a cross along with others like scenes depicting priests officiating at an altar. Birds and dancing figures were also used (Paine and Paine, 2010).



Fig. 4. Alar cloth with sign of cross

Mochis from Kutch were known for Ari work on *ghaghra*, *cholis*, *sari* borders, children's caps, and *torans* (pennated doorway friezes). Mochis also embroidered Pichhavai hangings (devotional pictures on cloth) for temples illustrating the Lord Krishna (Gillow. and Barnard., 2008). Among the Muslims, it is common to spread a small carpet (*sajjada*) at the time of Prayer, because they believe that the place of prayer should be ritually pure or free from any polluting substances (Katz, n.d.). The common symbols found in weaving of these carpets are the prayer niche, a recess in the wall indicating the direction of Mecca; also, a lamp, which is a reference to God; as well as flowers and trees that symbolize the abundance of nature in God's paradise. People from Islam were used to wrap their *Mohr*- a praying stone with the

small cloth made by the Shiite Hazara of Afghanistan. This cloth was considered as a Holy object and was not used for any other purpose. A wandering caste people Vaghri from Gujarat were famous for their hand painted and block printed shrine cloths, which are known as ‘*mata- ni-pachedi*’ or ‘*mata- no- chandarvo*’. The shrine cloths always have an image of the ‘*mata*’ – the mother goddess in her fearsome aspect- sitting on her throne, or on an animal, brandishing in her hands the weapons needed to kill demons ((Gillow. and Barnard., 2008). A small village *Pipli* on the main road between Puri and Bhubaneswar is very famous for its bright colored appliqué work articles used for the rites performed in Jagannath Temple. Pilgrims who come to Puri usually stop at *Pipli* and buy banners as offerings to the Temple Gods, and even while going back to their homes they purchase souvenir bags or small canopies for their domestic deities and for festivals.

Thanjavur, a place in Tamil Nadu is known for its appliqué hangings, banners and decorations for Temple carts. Articles are made in felt, cotton, and velvet with central motifs of Ganesh, Lakshmi or other deities surrounded by floral motifs. Swastika represents good fortune, dorge or thunderbolts depicts stability and Enis knot shows compassion in Ladakhi textiles. In Ladakh, the *khataq* — a ceremonial scarf usually white in colour and woven from cotton or silk is used as a sacred symbol shared by both Buddhist and Muslim communities. They are offered to deities and the clergy, to the bride and her groom, to newborn babies, to visiting officials and respected elders (Rao, 2010). Jains of Rajasthan were indulged in embroidering of different articles to offer in Jain *Mandir* like door carves, *torans*, hangings, canopies and panels etc.

The Holy Book of Sikhs is also always draped in white cotton sheet and then by colourfull embroidered Coverlets known as ‘Rumala Sahib. Earlier simple, neat pieces of fabric were used to wrap the Holy Book but with the passage of time people started offering heavy embroidered Rumala Sahib. These days, Rumala sahib are available in a huge variety of fabrics (cotton, silk, velvet, net, chiffon, crepe, brocade and many more) embellished with different techniques (*Gotta*, beads, sequins, *zardosi*, Ari work, hand painting, *dori* work etc).As the Guru Granth Sahib is respected as Living Guru by the Sikh people, fabric of Rumala sahib are even selected as per the season like in winter, usually heavy velvet or Blanket Rumala sahibs are used and cotton, net or light material is selected for summers. Guru Granth Sahib draped in Rumala Sahib always lies beneath a canopy known as Chandoa Sahib. A

small Chandoa sahib of silk or velvet is always placed over the Guru Granth Sahib in the Palki and a large Chandoa Sahib is hung just below the ceiling over the Palki. Elaborate designs are carved on Chandoa Sahib using different surface ornamentation techniques. A Slok from Gurbani is mostly embroidered on front panel of Chandoa Sahib. Frills and tassels attached on it add beauty to this Sacred textile.



Fig. 5. Shri Guru Granth Sahib covered with heavy embroidered Rumala Sahib and Chandoa Sahib

In Hindu’s embroidered pieces, the most widely used motifs were legends of Krishna. The dancing Goddesses are also depicted in the seals of the Indus Valley Civilization. Some other motifs of Hindus are the attributes of Gods; peacock as a vehicle of Saraswati, goddess of arts and wisdom and Shiva. Images of Ganesh are the most used characteristic in folk embroidery of Gujarat. Ganesh is the remover of obstacles to happiness, therefore in the centre of Ganeshtapana (a pentagonal wall hanging) the image of Ganesh is embroidered, often with a bowl of sweets and his companion rat. .

2. CONCLUSION

Textiles in many parts of the world, whether woven, dyed, printed or embellished are valued by communities as cultural, sacred objects and used in ritual or ceremonial occasions. In order to protect the religious books along with attached devotion and sentiments; it has been a tradition of covering them in a neat and clean cloth always. It is evident from the ancient Pagodas, the ornamental gardens, sculptures, images covered with silk found in

many places of worship or temples that cloth is considered as a sacred item, has been used since ages as an offering to the God and is used to adorn them. Although, different religions are practiced in India, the secular and sovereign nature of the country remains intact. After the review and looking into current scenario it is concluded that in each religion and region, various types of ornamental textiles are offered by people as their sentiments, beliefs and rituals are attached to this. Offering of textiles is also a way to express their devotion and respect for their deities.

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Engineering Ideal Stretch Compression Apparel

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Stretch compression apparel market, currently USD 4.24 Billion, is forecast to grow to USD 6.59 Billion by 2028 (source: Fortunes Business Insights).

There are several innovation opportunities to develop highly functional, breathable, and more environment-responsive and sustainable stretch compression products to achieve competitive edge and share in this growing apparel sector.

These fabrics are identified by their high stretch and recovery along with their high initial tensile modulus. These have applications in sportswear, activewear and medical textiles, for example, for health and fitness recovery.

Stretch compression performance garments are commonly used by people involved in various sports and fitness activities as these special products are known to:

- reduce effects of muscle vibration resulting in reduced soreness and improved recovery.
- improve muscle performance, blood circulation, and reduce fatigue.
- enhance thermo-physiological comfort, i.e., moisture management (wicking and breathability) and body temperature regulation.
- increase athletic ability and stamina.
- improve body awareness and give a perception of improved musculoskeletal support and protection, and
- act like a second skin and an ideal base layer for any sport.

These assistive garments, for example tops, lowers and socks, that presently exist in this area are all surface/muscle compression garments and tend to be manufactured from nylon, elastane, polyester and other branded synthetic fibres, e.g., Coolmax™. Wool is well

known for its superior moisture management properties and breathability but is still not yet a popular choice for stretch compression apparel.

Aim is to develop high performance stretch compression fabrics, superior to those currently available in the market, through fibre selection, along with novel and engineered yarn and fabric constructions. These fabrics should provide better thermo-physiological comfort to the wearer, as well as enhancing physical performance and recovery during high-impact sporting activities.

In this paper, properties of sports compression fabrics with a special focus on those characteristics that distinguish these from other conventional apparel fabrics are presented. The tensile and shear testers of the Kawabata Evaluation System for Fabrics, KES-F system, were employed to characterise the stretch-compression behaviour of these fabrics. Subjective assessment of stretch compression ability of these fabrics was carried out. The most relevant KES-F parameters which describe the stretch compression potential are the tensile parameters: extensibility (*EMT*); the tensile energy in extension (*WT*) and recovery (*WT**) modes; and the shear hysteresis (*2HG*). It is observed that the higher the tensile energy in extension and recovery (compression) and the lower the shear hysteresis, the greater the stretch compression power. The parameter, stretch compression power is related to the skin pressure which is often used in grading compression hosiery like stockings. Both these parameters are related to the tensile and shear properties.

The observed relationship between the skin pressure and the fabric tensile-compression properties is explained. The importance of inclusion of wool to improve the physiological comfort (moisture management, breathability etc.) of the stretch compression apparel is highlighted.

Various drivers of textile innovation for engineering ideal stretch compression apparel for specific enduse applications are described.

STRETCH COMPRESSION APPAREL

Stretch compression (SC) performance apparel products
 • usually worn next-to-skin
 • mostly by people involved in various sporting activities.

These special products are claimed to:

- act like a 'second skin' and as an ideal base layer for any sport;
- reduce the effects of **muscle vibration** resulting in reduced soreness and improved recovery after exercise;
- improve **body awareness** and give a perception of improved **musculoskeletal support and protection**;
- improve **muscle performance**, and **reduce fatigue**;
- should enhance **thermo-physiological comfort**, i.e. moisture management (wicking and breathability) and body temperature regulation;
- increase **athletic ability and stamina**.



SUBJECTIVE RANKING OF FABRICS FOR STRETCH COMPRESSION POWER (SCP)

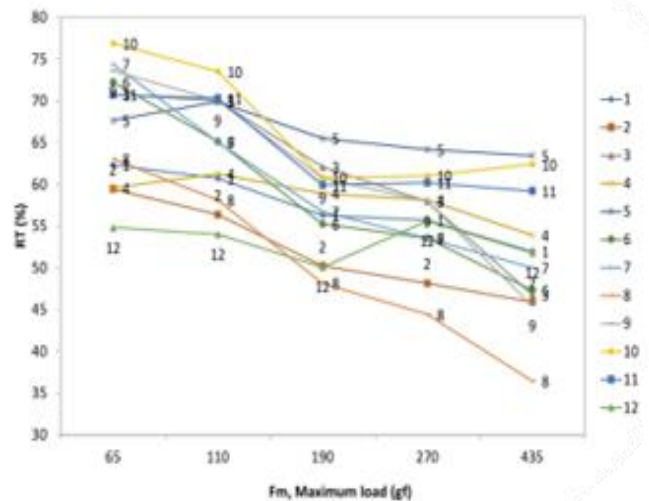
Nine judges with varying expertise in textiles were chosen to rank twelve fabrics in the order of lowest (minimum) SCP to highest (maximum) SCP.

Rank correlation analyses were carried out to relate the SCP ranking with the most appropriate tensile and shear parameters.

STRETCH COMPRESSION APPAREL



RESILIENCE OF SC FABRICS



STRETCH COMPRESSION APPAREL

Mainly manufactured from nylon, elastane, polyester and branded polyester (e.g. Coolmax™).
 These have poor thermo-physiological comfort. Not very breathable. Poor moisture management



KES-F TESTING

Twelve knitted fabrics were tested for cyclic tensile and shear behaviour on the KES-F tensile and shear tester, with the maximum load and shearing angle increasing after each cycle.

Tensile: The maximum loads used in the tensile test were 65, 110, 190, 270 and 435 gf

Shearing: The maximum shearing angles were 2, 4, 6 and 8 degrees

CHARACTERISING SC FABRICS

What are the characteristics of SC fabrics that distinguish these from traditional fabrics?

We focus on tensile and shear properties.

Hypothesis:

The higher the tensile energy in extension and recovery (compression) → the greater the stretch compression ability or power.

REQUIREMENTS OF SC APPAREL

Fashionable, attractive

Lightweight

High stretch and recovery (4-way or 360 deg)

Total Easy Care – machine washable, tumble dry.

Comfort – soft, non-prickly, breathable

Moisture management, cool/warm

Anti-odour

Anti-static

Attractive colours

Good appearance retention, good colour fastness

Seamless

Second skin



CONSTRUCTION OF IDEAL STRETCH COMPRESSION APPAREL

Determine specific enduse application – Activity.

Determine stretch compression power (pressure) - Level

SELECT:

Elastane content, Fabric weight (gsm)

Raw material: Wool (micron), elastane, other fibres (nylon, polyester etc.)

Yarn type: structure, count, twist

Fabric construction: Knitted – warp or weft knit

Single layer or bilayer. Knitted structure. Gauge, tightness factor.

Fabric dyeing and finishing

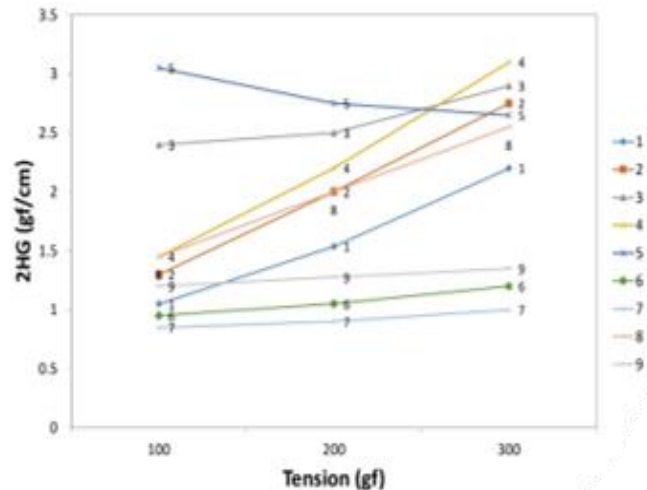
Garment type: Seamless. Whole Garment System. Cut and sew.

Garment sizing: Undersizing. Body measurement vs Garment measurements.

Fabric and garment performance testing



SHEAR HYSTERESIS OF SC FABRICS



CONSTRUCTION OF IDEAL STRETCH COMPRESSION APPAREL

Determine specific enduse application – Activity.

Determine stretch compression power (pressure) - Level

SELECT:

Elastane content, Fabric weight (gsm)

Raw material: Wool (micron), elastane, other fibres (nylon, polyester etc.)

Yarn type: structure, count, twist

Fabric construction: Knitted – warp or weft knit

Single layer or bilayer. Knitted structure. Gauge, tightness factor.

Fabric dyeing and finishing

Garment type: Seamless. Whole Garment System. Cut and sew.

Garment sizing: Undersizing. Body measurement vs Garment measurements.

Fabric and garment performance testing



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CONCLUSIONS

•Liu's work on skin pressure has relevance to our work on stretch-compression potential we reported in 2009.

•**Stretch-Compression Power (SCP) correlates negatively with skin pressure.**

•"The tensile energy (WT), with the highest correlation coefficient, and tensile strain (EM) have strong significant negative correlations with skin pressure magnitudes, meaning that CH (Compression Hosiery) fabrics with less extensibility under tensile forces would exert greater skin pressure. Shear stiffness (G) and bending rigidity (B) have a significant positive relationship with skin pressure magnitudes, indicating that fabrics with higher resistance to shearing and bending deformation would perform stronger pressure functions."

•**High pressure compression stockings (eg, 40mm Hg) tend to be thick and heavy, and more resistant to extension, bending and shearing. This means, when we put this stocking on, a small stretch in stocking results in high pressure on skin.**

Stretch compression apparel market, currently USD 4.24 Billion, is forecast to grow to USD 6.59 Billion by 2028 (source: Fortunes Business Insights).

Weaving the Recycled Fabric (Cigarette Butts) with Traditional Art (Hase Chittara) to Create Contemporary Dress

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ABSTRACT

The planet we live on has been in existence in perfect harmony from times immemorial. Humans exploding needs and the aspirations for luxuries that has resulted into exploitation of resources for comfort and profitability has brought ecological imbalance signaling death and destruction due to climatic changes. Smokers around the world smoke roughly a trillion cigarettes each year. While most cigarette filters also known as butts or ends are leftover, only recent percentage make into the trash. The rest are casually flung into the street, drains, then into water bodies, and to the rivers, and tons of them get collected into the ocean. These cigarette butts contain toxic substances which are very harmful to the environment, for living organisms (including humans) and fiber material present in it takes long time to decompose. Cigarette Butts which contain paper and the polymer filter inside are collected together, separated manually, and processed separately. The filters are pre-treated for a period of 24 to 36 hours, without any machinery, and the chemicals used are bio-degradable and human-friendly. Then it goes through a washing and drying process. The soft fibers are then turned into yarn and the further fabric is created. This fabric is then used in the construction of the contemporary dress which is embellished with Hase chitra which is the native art of Karnataka. This paper is an exploratory research that focuses on the Weaving of recycled fabric which is polluting the environment (Cigarette Butts) with the submerged traditional art of India (Hase Chittara) to create a contemporary dress.

Keywords: Cigarette butts; Recycling solutions; Sustainability; Hase Chitra;

1. INTRODUCTION

The buzzwords and actions relating to Sustainability, reduce, recycling, reuse and upcycling though applicable to every aspect of our living, their association and application with fashion industry is the need of the hour. Unsustainable manufacturing, exploitation of resources, material wastage and unethical ways to treat laborers are some of the undesirable practices followed by the garment/fashion industry. However, now it is the need of the hour to create awareness among the people about the environmental and social damages caused by overexploitation of resources by the fashion industry.

Cigarette Butts are the most littered waste on the planet earth, where smokers buy trillions of cigarettes globally every year. In India millions of cigarettes in India and it's gradually increasing every year. Trillions of cigarette filters, which are also known as butts or end are left over, only an estimated third of which make it into the trash. The rest are casually flung into the street or out of a window. Many countries like India have banned smoking in public places, but it is very evident that cigarette butts are commonly found in streets of India.

Convenience though ignorance is causing a major impact on the environment, where Cigarette butts which contain cellulose acetate that require at least 12 years to decompose partially. Recycling has been practiced from ancient times and now it has become the need of the hour. Various organizations, companies, NGO with support of Governments and people are very much indulging in the process of recycling different materials that are impacting the environment. The major issue is small pieces like cigarette butts are carcinogenic and can contaminate drinking water, if disposed of in our water bodies. It is more disastrous when cigarette butts are consumed by birds, fish and animals. The smaller particles contribute to soil and water pollution due to the presence of high concentrations of toxic compounds such as nicotine, tar, arsenic, lead, copper, chromium, cadmium, and polyaromatic hydrocarbons.

India is known for its rich arts and crafts from ancient times, it's indigenous in roots of our culture. but through time and globalization many arts and crafts are vanishing. Cultural diversity, racial characters, traditional tribal and folk arts & crafts are getting affected and revival of them is very important. In the Southern part of India, Karnataka

is always recognized for its culture, traditional tribal and folk art & craft and performing folk arts such as Hase Chittara, Mysore painting, Sandalwood carving, Dollu Kunitha, Lavani, Bhootharadhane, Karaga, Yakshagana, Bayalaata, Kamsaale, etc. However many people are not really aware of 'Hase Chittara' from Karnataka. Chittara is an art form that is practiced in a tribal community called Deewaru. Exquisite art of Hase chittara is owned by Deewaru community and this art includes a set of auspicious geometric motifs and figures celebrating life. Deewaru is an agrarian community that worships nature. This tribal community is native to Shimoga district of Karnataka living in the enchanted tropical forest of Western Ghats and found around the taluk of Sagara predominantly in the villages like Hasunvanthe, Honnemaradu and Majina Kaanu etc.

The Deewaru community mainly cultivate rice, sugar cane and areca nut. In ancient Kannada, this Deewaru word has been derived from a Sanskrit word Dweep which means island. Deewaru are also known with different names as Namadhari, Billava, Idigas, Namadhari Naik, Thiyya etc in other coastal belts of Karnataka. Hase Chittara symbolizes the unity of the community who help each other and come together to decorate unique wall paintings. Hase chittara is traditionally practiced by tribal women of the Deewaru community. This art embodies the essence of being united and one where all members of the community come together to decorate their spaces. It's not only for the explanation behind doing it, they do as it genuinely mirrors their way of life, which is around emphatically identified with different parts like music, art, and so forth. Perhaps it is a way to deal with the bluntness and exhaustion of the day of effort, which is more a fundamental and strong vitality.

2. OBJECTIVE

1. To understand the feasibility of using recycled cigarette butts.
2. To create a desire for a traditional dying art form of India.
3. To conceptualize the garment that is viable in the market.

3. METHODOLOGY

The nature of this research paper is an exploratory method, where we are exploring the phase from ideation to concept

development. In this study the research is conducted based on aspects of each individual objective, where we have approached different methods of data collection and analysis.

1. To understand the feasibility of using recycled cigarette butts : We have collected:-

Primary data, data collected through interviewing the experts in the field of recycling, textile and textile testing through direct conversation.

Secondary data, data collected through analysis of newspaper articles, internet journals and websites.

The Interviews were conducted based on analysis of the secondary data, identifying and reviewing the key aspects of research: Collections of Cigarette butts, Recycling process, testing parameters of the fibre, Process of conversion of fibre to fabric.

2. To create a desire for a traditional dying art form of India, We have collected experimental data through interviewing the people in the field Traditional art - Hase Chittara
3. To conceptualize the garment that is viable in the market, we have used a qualitative ethnography approach based on the authors' observation, reviewing the reports of fashion trends and analysis of the existing market scenario.

Design conceptualization of the garment is planned based on the insights obtained by the feasibility analysis of recycling of cigarette butt to fabric, desirability of traditional art - Hase Chittara.

4. SCOPE OF THE RESEARCH

Processing of recycled fabric using the cigarette butts. Further implementation of several natural dyes to make new garments with the revival art form - Hase Chittara onto the garments via embroidery or printing methods.

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A Short Note of Importance of Grain in Fabric and Sewing Pattern

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ABSTRACT

In both fabric and pattern, grain is quite essential. Grain lines refer to the way in which a pattern is cut out when it is set out on fabric and are discussed by fashion designers and pattern makers. Fabric is woven from thread that runs in two directions, and it's sometimes easiest to remember that fabric is made up of tiny squares of thread that criss-cross each other. The three forms of grain, on grain, off grain, and bias grain, have an impact on the fit and appearance of garments. Make sure you grasp the significance of the grain line before cutting out any pattern pieces. Cutting without taking into account the grain line may result in fabric waste. Cutting without taking into account the grain line may result in fabric waste as well as less-than-desirable outcomes after the job is finished. The grain line, sewing pattern, and fabric are all discussed in this paper.

Keywords: Grain , Pattern, Fabric, Line, Cutting etc.

1. INTRODUCTION

The grain of the cloth refers to the path taken by the strands in a woven fabric. Grain strains are often disregarded unless they're employed poorly and produce a match problem, or they're used in novel ways to milder the cloth to the frame. They can also be used to project a print onto a unique angle for a visually exciting effect. The terms grain line and grainline are commonly interchanged. Grain is divided into three types: lengthwise grain, crosswise grain, and bias grain. When manufacturing textiles, grain is crucial because it dictates how a garment will hang, match, and look. A grain or route runs through all yarn-based materials. The term grain is most commonly used with woven fabric, whereas the phrase route is more commonly used with knit fabric. After knitting and weaving, every fabric made from yarn is 'grain perfect.' Fabric is assembled in a grain-perfect manner by looms and knitting machines. However, throughout the finishing process (dyeing, printing, eternal finishing, and/or packaging, winding onto a bolt), a fabric might become off-grain. Patterns are mainly designed with grain in thoughts in order that the frame can take gain of the quantity of stretch or loss of supply withinside the cloth.

2. OBJECTIVE

- To study the meaning of grainline.

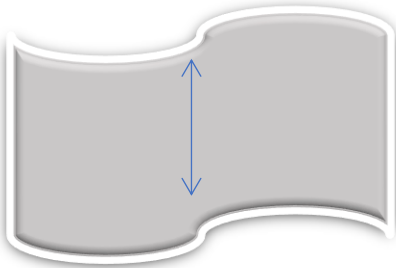
- To explore the various grain in fabric.
- To study the impact of grain in garment.

3. WOVEN FABRIC

Grain refers to the direction of the weft and misshapes strings in woven fabrics. Direct grain, go grain, and injustice grain are the three called grains. In sewing, a sample piece can be cut from cloth in any orientation, and the grain or orientation chosen will affect the way the cloth hangs and stretches, and hence the fit of the garment. A bit is said to be reduced on a certain grain when the longest part of the sample or the principal seams of the finished piece are aligned with that grain. Nonwoven materials such as felt, interfacing, and leather-based materials no longer have a grain.

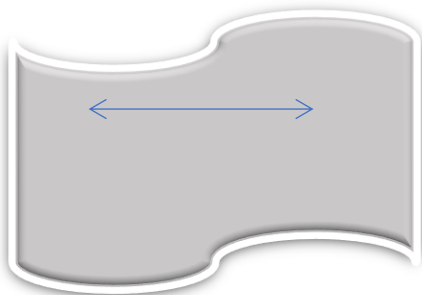
1. **Lengthwise Grain-** The term 'warp' or 'on-grain' refers to the lengthwise grain. Those are referred to as 'warp threads' in technical terms. The cloth's longitudinal grain runs parallel to the selvage fringe on both sides. The warp is often referred to as the selvage. Selvage edges are closely braided. It moves in a vertical direction. Because twist strings are pushed tighter than the weft throughout weaving, the straight grain has less flexibility than the go grain. The majority of garments are reduced at the warp since the cloth no longer stretches on this path, ensuring that the garment's

grasp is correct. The directly grain typically runs up the centre the front and centre lower back of clothes and up thru the centre of sleeves and pant legs. In situations where a garment is cut slightly off grain, the sleeves or pant legs may curl across the body.



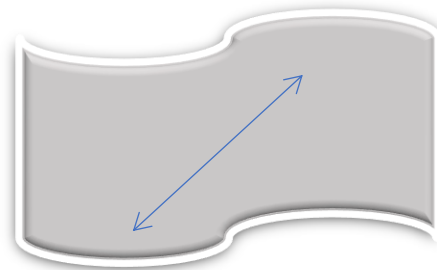
Lengthwise Grain

2. **Crosswise Grain-** Weft or 'off-grain' are terms used to describe crosswise grain. Weft threads is the technical term for them. The pass grain runs parallel to the weft threads and perpendicular to the selvedge. It moves in a horizontal fashion. Because weft threads are often looser than warp threads during weaving, the pass grain has more stretch than the directly grain. When the wearer is standing, most articles of clothing (such as pants or shirts) are reduced at the straight grain with the pass grain corresponding to the ground. This allows for more stretch over the garment's width, which is ideal for a pants leg that requires more circumferential than vertical stretch. Garments are occasionally cut on the pass grain, usually because the pieces are too large to shape on the straight grain.



Crosswise Grain

3. **Bias Grain-** The bias grain of woven fabric, often known as "the prejudice, " is any grain that is between the instant and move grains. It is far expressed as "certified inclination" when the grain is at 45 degrees to its twist and weft strings. Every woven fabric has predispositions that are diametrically opposed to one another. When the warp and weft threads of woven fabric are on one of the bias grains, the garment is said to be "decrease on the prejudice." In comparison to the instantaneously and move grains, woven cloth is more elastic and fluid within the bias direction. This property allows garments and garment information that demand more elasticity, drapability, or flexibility, such as bias-reduce skirts or traditional flared skirts from the 1950s, dresses, neckties, piping trims and embellishments, certain seams, and so on. The bias grain of woven fabric, often known as "the prejudice, " is any grain that is between the instant and move grains. It is far expressed as "certified inclination" when the grain is at 45 degrees to its twist and weft strings. Every woven fabric has predispositions that are diametrically opposed to one another. When the warp and weft threads of woven fabric are on one of the bias grains, the garment is said to be "decrease on the prejudice." In comparison to the instantaneously and move grains, woven cloth is more elastic and fluid within the bias direction. This property allows garments and garment information that demand more elasticity, drapability, or flexibility, such as bias-reduce skirts or traditional flared skirts from the 1950s, dresses, neckties, piping trims and embellishments, certain seams, and so on. The antique spelling turned into byas, or (much less common) byes.



Bias Grain

4. KNIT FABRIC

The grain is present in knit material, but it is distinct - it is known as 'route' in knits. Knitted fabric has a chain of loops. Knowing the grain or route of a knit cloth is just as important as knowing the grain or route of a woven cloth. The position of loops within the material is referred to as the route in knit. They are positioned in lengthwise (courses) and crosswise (wales) directions, with the best stretch being found (mainly) within the crosswise loop route, with them positioned perpendicular to one other, just like woven fabrics. A simple stretch test of the fabric will assist you in deciding how to stretch knits.

1. Ribs are formed by the lengthwise loops in a knit fabric (every so often known as wales). They form rows of loops and may be seen on the right side of the material. On this road, there is usually a lot less stretch.
2. Courses refer to the across loops. They create a row of loops that run the length of the fabric. In a knit fabric, the best stretch is usually found inside the crosswise direction. However, prior to purchasing a knit, it is always critical to examine or test the stretch.

5. IMPORTANCE OF GRAIN IN FABRIC

- For one thing, a material's lengthwise yarns are more powerful than its crosswise yarns. After they cave in the body, they fall and drape higher. The transversely stretched yarns stretch less than the long way yarns.
- Bias grain stretches greater than both of those grains, with the real bias grain having the maximum stretch. This allows in higher becoming in step with the form of the body. So it's far vital which you realize the grain of the cloth earlier than you narrow the cloth.
- The bias grain stretches more than the other two grains, with the genuine bias grain stretching the most. This allows for a greater alignment with the body's form. As a result, understanding the grain of the cloth before narrowing it is critical.
- A bias grain has a higher health and drape than both of the opposite grain directions, but it requires more cloth. As a result, you may want to set aside some extra funds for the work of making a bias grain reduction garment. If you're thinking about getting a

handbag, you already know whether you should go for it or not.

- Another important point to remember is that the lengthwise yarn shrinks more than the transverse yarn.
- Your cloth grain might be a little wrong, but it won't affect your task. However, if you use too much, your pattern will no longer line up while you're attempting to match panels, and your seams will bunch or stretch because they're sewed too close to the bias.
- When it comes to correctly positioning and lowering sample sections at the grain, this is something that should be considered when starting off in order to produce the most satisfying look and exact grip of the garment.
- On our sample parts, you'll notice a double arrow indicating the grain's path, which should be parallel to the selvedge (except in any other case stated).

6. IMPORTANCE OF GRAINLINE IN SEWING PATTERN

Grainline refers to the traces marked on the sample to give you advice on how to area it on the cloth in a stitching sample. Generally, it suggests that the material be reduced to the point where the longwise yarns are close to the centre of the front and back, down the focal point of the arm, down the centre of the front of the pant leg, and so on. Depending on the design, bias grain and across grain are also used. The stitching sample is stored on the cloth with the grain line mark parallel to the cloth's selvedge. This is how the cloth is reduced so that the grainline matches the sample.

7. CONCLUSION

The direction of grain plays an important role in sewing samples. Because of the way the various grainlines interact, ignoring the course of the woven threads can have an effect on the lay and stretch of the garment. The lengthwise grain is the preferred method for reducing important task areas since the cloth will no longer stretch or become deformed during the stitching process. Make sure you understand the relevance of the grainline before lowering any sample portions. Cutting without considering the grainline should result in material waste as well as less-than-ideal results after stitching the work.

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Resource-Use of Oak Tasar Silk Waste Via Blending with Viscose Fibre to Evolve Resultant Yarns and Knitted Fabrics

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ABSTRACT

Textile and fashion industry has huge range of fibres to use for, but all the fibres may not be ideal for particular end use in one way or another. Hence they exhibit some good, fair and poor characteristics. Therefore the desire to produce ideal fabrics leads to the construction of blended fabrics. In the present study an attempt has been made to scrutinize the Impact of blending oak tasar silk waste fibre with viscose fibre on the performance of resultant yarn and fabric. Oak tasar silk waste and viscose fibre have been blended together in three different ratios, viz. 60% OTW: 40 %V, 50% OTW : 50% V and 40% OTW : 60% V, maintaining yarn count 20 Nm for each blend. The blending and spinning was carried out on worsted spinning system. Generally the yarn produced by blending is converted into fabric by the process of weaving. Very few attempts have been made to knit the blended yarns especially silk and viscose, therefore in the current work, efforts were undertaken to construct a fabric using knitting technique. Knitted fabric samples were prepared on circular knitting machine. Physical and mechanical properties of resultant yarns and knitted fabrics were evaluated. Results revealed that 40%OTW: 60%V blended fabric improved physical and mechanical properties as compared to 60% OTW: 40%V. The blending of viscose fibre with oak tasar silk waste improved the yarn evenness, reduced imperfections and yarn hairiness.

Keywords: OTW (oak tasar waste), viscose, Blending, circular knitting, blend ratio, yarn count

1. INTRODUCTION

The idea of product diversification and desire to produce desired fabric has led to the production of blends. Blending is mainly carried out to produce a fabric which has different aesthetic properties, to economize the cost. It produces a material which can be brought into various kind of new end uses, hence to give better performance. Blending is a novel method which combines the desired positive characteristics of each of its component, and minimizes the undesired attributes intentionally (**Gahlot and Pant, 2011**). Silk fibre wastes comprise of entangled uneven length of fibres and uneven diameter, which affects the physical properties of developed yarns. The use of man made fibre improves the physical qualities of mixed yarn by reducing unevenness. (**Malik et al., 2012, Kilic and Okur, 2010**). Being a manmade fibre viscose has even staple length and diameter and is also known for its silk like aesthetics, drape and feel; and retains rich brilliant colour. Viscose is well blended with other fibres to minimise costs, provide lustre, softness, or absorbency, increase affinity for dyes and chemicals, improve comfort, and reduce static electricity accumulation. (**Gahlot and Pant, 2011**). Therefore blending oak tasar silk waste fibre

with viscose would contribute to towards the production of suitable blended yarn.

2. MATERIAL AND METHODS

Viscose fibre selected for the study was procured form the local market of Ludhiana, whereas, Oak tasar waste fibre was purchased from Bihar (Bhagalpur). To carry out blending and spinning of fibres, the gillbox (draw frame) blending method was chosen and the requisite amount of each fibre on weight basis, was combined using worsted spinning system. Blending of Oak tasar silk waste with viscose fibre was carried out in three different ratios, viz. 60 OTW% : 40% V, 50 OTW% : 50 V% and 40 OTW% : 60 V%, maintaining yarn count 20 Nm for each blend and Z twist was incorporated in all the yarns prepared.

All the developed yarns were tested for physical and mechanical properties. After examining the physical and mechanical qualities of blended yarns, two proportions of blended yarns were chosen for continued development of knitted fabrics out of the total developed yarns. These yarns were selected on the basis of yarn strength, yarn evenness and yarn moisture regain. The selected yarns

were knitted using circular knitting technique to develop single jersey fabrics.

3. RESULTS

(1). *BLENDED YARN RESULTS:*

I. Physical and Mechanical properties of blended yarn (20Nm)

TABLE 1 Physical properties of blended yarns

| Physical properties | Blend Ratio | | |
|----------------------|------------------|------------------|------------------|
| | 60 OTW:40viscose | 50 OTW:50viscose | 40 OTW:60viscose |
| Yarn evenness | | | |
| U% | 23.04 (0.359) | 22.42 (0.292) | 19.54 (0.193) |
| Imperfections/Km | | | |
| -Thin places (-50%) | 400.0 (9.950) | 631.0 (7.553) | 89 (0.695) |
| -Thick places (+50%) | 1970 (27.681) | 2342 (15.845) | 1605 (25.893) |
| -Neps (+200%) | 1915 (26.111) | 2652 (46.925) | 1447 (26.357) |
| Hairiness H | 11.28(0.215) | 10.04 (0.115) | 9.98 (0.088) |
| Moisture regain (%) | 9.989 (0.108) | 7.987 (0.188) | 7.501 (0.172) |

OTW – Oak Tasar Waste, Figures in parenthesis indicate coefficient of variation

TABLE 2 Mechanical properties of blended yarns

| Mechanical properties | Blend Ratio | | |
|------------------------------|-----------------|-----------------|-----------------|
| | 60OTW:40viscose | 50OTW:50viscose | 40OTW:60viscose |
| Breaking force (g) | 975.9 (18.841) | 699.9 (15.662) | 665.2 (3.116) |
| Elongation at break % | 7.86 (0.063) | 7.82 (0.159) | 7.38 (0.104) |
| Lea strength | 226.7 (4.601) | 186.5 (1.261) | 186.4 (3.211) |

Figures in parenthesis indicate coefficient of variation

After analyzing the physical and mechanical properties of blended yarns, it was revealed that, 60 OTW:40 viscose and 40 OTW:60 viscose blended yarns were found to be more suitable for further development of knitted fabrics.

(2). *BLENDED FABRIC RESULTS:*

I. Physical properties of blended fabrics

A. Bending length

Stiffness is an important characteristic of a fabric. Stiffness is measured by bending length of the fabric. The length of fabric that will bend to a certain extent under its own weight is known as the bending length. Blending

length determines the draping quality of a fabric. Fiber composition, yarn type, weave compactness, fabric weight, and thickness are all characteristics that determine the stiffness of a textile material. It was observed that, bending length of fabric 2 was high in both the directions. This may be due to the reason that oak tasar silk is delicate and stiff in nature(Wang et al 2006, Yang Cao et al 2009).

B. Crease recovery

Recovery is a process of measuring the crease resistance and can be specified in terms of crease recovery angle. Crease recovery is a fabric property which indicates the ability of fabric to go back to its original position. The crease recovery of blended fabric 1 was found to be superior in both the directions (vertically and horizontally)

as compared to the other blended fabric. This may be due to the fact that wool and silk have a good resistance to creasing whereas; cellulosic materials such as cotton, viscose and linen have poor resistance to creasing.

C. *Drape coefficient*

The highest percent value of drape shows minimum drapability. It is evident from table 4 that, the blended fabric 2 exhibited highest drapability with mean value of 33.35. It is clear from results that, by increasing the proportion of viscose fibres, the drapability got improved

D. *Fabric pilling*

The effect of blending on the pilling tendency of the blended knitted fabrics was studied using rating standard of pilling and the results are reported in table 4.10. Data pertaining to pilling resistance showed that, the blended fabric 2 was most resistant to pilling as compared to fabric 1. The results clearly depict that, as the proportion of viscose fibres increased, the pilling resistance also increased, this is because viscose, as a man-made fibre, offers features such as uniform length and high strength.

E. *Fabric thickness*

It is inferred from results that, fabric thickness of blended fabric 2 was higher. This may be due to the reason that viscose fibre is coarser than oak tasar waste fibre that is why as the percentage of viscose fibre in a blend increase, the resultant thickness of fabric also increased.

F. *Spirality*

In circular plain knitted fabrics, spirality is a dimensional distortion. If the wales of the knitted fabrics are not perpendicular to the courses and skew to the right or left spirality occurs in the fabric. It can be observed from table, 4 that blended fabric 2 exhibited minimum spirality per centage of 17.2%. This may be due to the reason that viscose fibre used for the study was more uniform in its diameter and length.

G *Weight per unit area (GSM)*

GSM means gram par square meter. In knitted fabric it is the main parameter. It is controlled by loop length. If the loop length increases GSM will decrease and vice versa. The blended fabric 2 had the maximum weight per unit area, as shown in table 4. Results clearly depict that GSM

of fabric was affected by blend proportion. As the amount of viscose content increased the GSM also increased.

TABLE 3: Physical properties of blended fabrics

| Physical parameters | Fabric 1 60OTW:40vis cose | Fabric 2 40OTW:60vis cose |
|-------------------------------|---------------------------------|---------------------------------|
| Bending length (cm) | | |
| Vertical | 3.9(0.107) | 4.0 (0.004) |
| Horizontal | 1.7(0.027) | 2.1(0.017) |
| Crease recovery (degree) | | |
| Vertical | 150 (2.904) | 124 (0.567) |
| Horizontal | 128 (4.227) | 105 (2.352) |
| Drape coefficient | 34.89 (0.257) | 33.35 (0.281) |
| Fabric pilling | 4 (0.289) | 3.33 (0.167) |
| Fabric thickness(mm) | 0.55(0.032) | 0.65(0.032) |
| Spirality (%) | 27.97(0.656) | 17.2(0.053) |
| Weight per unit area (GSM) | 124 (0.354) | 175 (3.369) |

Figures in parenthesis indicate coefficient of variation

TABLE 4 Mechanical properties of blended fabric

| Mechanical parameters | Fabric 1 60OTW:40viscos e | Fabric 40OTW:60vis ose |
|-----------------------|---------------------------------|------------------------------|
| Breaking load (N) | | |
| Waleswise | 177.57 (2.994) | 131.71 (4.228) |
| Coursewise | 136.51 (3.227) | 101.37 (2.352) |
| Elongation (%) | | |
| Waleswise | 44.53 (0.357) | 45.73 (0.431) |
| Coursewise | 103.58 (2.253) | 111.89 (2.957) |
| Bursting strength | 4.11(0.0565) | 5.61(0.082) |

Figures in parenthesis indicate coefficient of variation

II. *Mechanical properties of blended fabrics*

A. *Breaking force (N)*

The breaking force of blended fabric 1 was highest in both the directions. The results of the breaking force of fabric

were in accordance with the results of breaking force of blended yarns. Waleswise the breaking force was higher as compared to coursewise direction in both the blended fabrics. **Elongation (%)**

It can be envisaged from the table 5 that, the elongation percent of blended fabric S2 was slightly more than that of blended fabric 1. Coursewise direction showed highest degree of elongation for both the fabrics, this was due to knitted structure of fabrics.

B. Bursting strength

Bursting strength is a method of measuring strength in which the material is stretched in all the directions at the same time, making it more ideal for knitted fabrics, lace, and non-woven materials. Data pertaining to bursting strength, presented in 5, depicts that, the bursting strength of blended fabric 2 was highest with mean value of 5.61. Results clearly reveal that, as the proportion of viscose fibre in the yarn increases, the bursting strength also increase.

4. CONCLUSION

It can be concluded that the addition of viscose fibres with the oak tasar waste improved the properties of the resultant yarn. Blending of oak tasar silk waste with viscose improved the yarn evenness and hairiness index of resultant yarn. Minimum number of thick and thin places, and neps were found in yarn containing maximum ratio of viscose fibre (40 OTW :60 V). Fabrics were successfully knitted after the physical and mechanical examination of blended yarn.. Out of three blended yarns, two blend ratios namely 60% OTW :40%V and 40%OTW : 60%V were used further to develop circular knitted single jersey knitted fabrics. The results of fabric testing revealed that, blending of oak tasar waste with viscose fibre improved the physical and mechanical properties of resultant fabric. Fabric sample 2 (40%OTW : 60%V) showed

enhancement in the properties of bending length, fabric drape, pilling resistance, thickness, spirality, elongation percentage and bursting strength.

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Craft Cluster Implementation in Government Girls Schools- Employment for Girls

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ABSTRACT

The implementation of craft clusters in government girls' schools evaluate the performance in terms of growth value. It is considered an important source to spread the subsequences of the craft. The craft cluster consists of both handicrafts and handlooms which is the backbone for the government schools. The tradition of spinning and weaving is an important part used in implementing craft clusters. The development scheme of cluster creates an important strategy based on the condition of handloom. The formulation of cluster is an approach used in the implementation purpose. The different weavers require suitable functions for designing the craft in the schools. The framework of craft cluster helps in distinguishing the products used for the implementation. In the implementation of craft cluster, there are different challenges faced by the government girls' schools.

Keywords: Craft Cluster, Handicrafts, Handloom, Spinning, and Weaving.

1. INTRODUCTION

Crafts aid in reviving and keeping active the rich heritage and cultural traditions of our country and encourage creativity among students. The craftwork not only provide high employment potential and a flourishing market but also seen as a means of occupation for women, because occupation is one of the primary and central aspects that determine the place of an individual in society.

Craft-making has remained a popular activity over the years as another means of elevating economic growth and has extended to the realm of being viewed as a means of empowerment for women. Women in rural areas take up the craft and embroidery jobs as a means of income which shines a light on the lack of education and freedom for the women, thereby them resorting to craft-making as a means of livelihood. The plight of Indian women as a whole is an imminent reflection of gender-based discrimination. Even in urban India, the condition of women is not better where they are viewed as secondary to the males. Therefore, the incorporation one of the most feasible source of income within the education system and curricula can be understood as a means which aims at developing the condition of women within the economic space. It allows or more like permits the women to have a voice in the aspect of decision making not only in the household but also in the social and economic structure of the society. Participation in leisure activities is proven to have various benefits for the women involved as it teaches them of their

own rights and pushes them to demand what they deserve – equality within the social structure which views them in the same light as that of men. Therefore, the incorporation of craftwork within the schools should be carried out as a regular scheme. This study is used to evaluate the process of craft cluster implementation in government girls' schools. The particular sets of crafts help in designing the process which is suitable for the recognition of products. The influence of different crafts acts as an important source that focuses on the nature of the products. There are different advantages described for implementing craft clusters in a government girls' school. The impact of craft cluster in women empowerment is also discussed in the study. Crafts are implemented to evaluate the design of different products. During the process of craft cluster, there are various problems faced by government girls' school which are also described in the study. In designing the craft cluster products, different techniques used which can be implemented to provide empowerment in government girl's schools. The stages of implementing craft require a suitable function to increase the productivity of the process.

2. ADVANTAGES OF IMPLEMENTING CRAFT CLUSTER IN THE GOVERNMENT GIRLS SCHOOL

In the government girl's schools, the process of craft cluster plays an important role. The different units of products are used to design and implement the process of

craft clusters. According to **Briancon et al. (2019)**, it is a widespread phenomenon used to implement the craft cluster. There are some advantages of implementing craft clusters in government girls' schools. Increasing the growth of products, encourages creativity and provides a source of different crafts.

- **Increasing the growth of the products:**The first advantage of craft cluster implementation is increase in the growth of the products. The process of spinning and weaving helps in providing the raw materials at a cheaper rate. The different variations of products are used in designing the craft cluster (**Nilsson et al. 2019**).
- **Providing a source for implementing different crafts** – The second advantage of craft cluster implementation is it provides a suitable source for implementing the crafts. The different cluster requires some functions for the implementation of products. The government girl's school helps in analyzing the process of craft clusters that are suitable for their employment.
- The tendency of designing the products acts as an important component that helps to encourage the creativity of the craft cluster. The capability of building the process is an important source for the girls in designing craft clusters.

3. IMPACT OF CRAFT CLUSTER IN WOMEN EMPOWERMENT

Women empowerment can be defined as the process which allows women to take decisions of their own, provide fair laws and rights without gender bias, etc. There is no doubt that it can be considered the catalyst of a nation's empowerment and growth. In comparison to the plight of women in the early ages, it has come a long way indeed.

The concept of craft cluster has a bad impact on the strategy of women empowerment. Lack of marketing competencies, lack of management skills, lack of access to resources, lack of financial competencies, and lack of vocational skills (**Wilfley et al. 2020**).

Lack of marketing competencies – There are low marketing skills that are used to enhance the concept of women's empowerment. The different economic resources are used in developing the functions of the craft

cluster. The dimension and the implementation of the craft cluster are important resources that have an impact on the process.

Lack of management skills- The evaluation of the craft cluster helps in reducing the functions in the context of women empowerment. There is a lack of managing skills which is used to affect the development of girls. The approach of women's control reduces the functions of craft clusters in government girls' schools.

Lack of access to resources – The limited usage of resources creates requirements based on the practices of the process. The access use of craft clusters affects the source of women empowerment.

Lack of financial competencies- The financial competencies explore the women empowerment on the virtue of craft cluster. According to **Comunian and England (2018)**, the scenario of different functions is used to enhance the process by encouraging the assumptions of the craft cluster.

Lack of Vocational skills- The concept of vocational skills is used in reducing the functions of the craft cluster technique. The elaboration of the process requires different contexts of management which has a bad impact on women empowerment.

The different impacts of craft cluster on women empowerment are shown in the diagram below

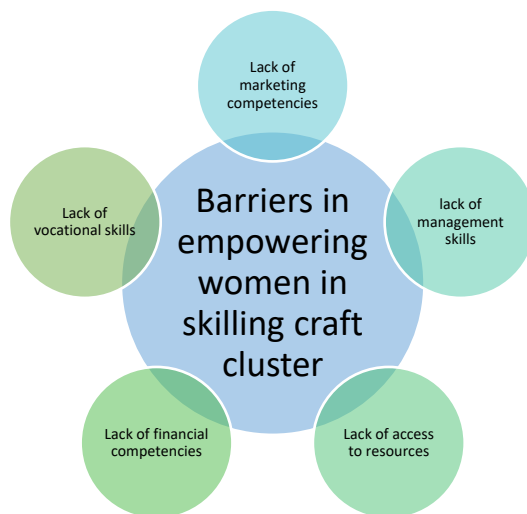


Fig. 1. Impact of craft cluster in women empowerment
(Source: *Fitzsimmons et al. 2018, p. 845*)

4. CHALLENGES FACED BY GOVERNMENT GIRLS DURING CRAFT CLUSTERING

There are different challenges faced by government girls in school during the implementation of craft clusters. Low productivity, Inadequate inputs, Fragmented value chain, and lack of an enabling environment. As per Malema and Naidoo (2017), the given challenges consist of different issues such as Lack of quality raw materials, lack of funding, and design input. The challenges of the craft cluster are also shown in the given diagram.

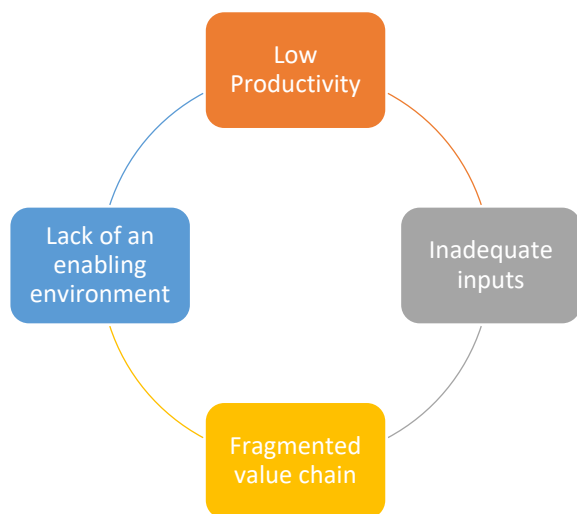


Fig. 2. Different challenges faced by government girls schools in a craft cluster implementation
(Source : Purnamawati and Adnyani 2019, p. 829)

- **Low productivity-** The lower rate of production is the important challenge faced by government girls. The low productivity consists of unorganized production, low education, and outdated methods of production. The capability of production compromises the product quality and the cost efficiency of craft clusters.
- **Inadequate inputs-** The second challenge of the craft cluster is inadequate inputs which consist of three main issues during implementation. Lack of quality raw materials, Lack of funding, and design inputs are the problems faced by government girls schools. The assurance of raw material is easily accessible to utilize the different facilities for finished products. The different globalization of crafts requires suitable products for designing the concept of a cluster.
- **Fragmented value chain-** The third challenge is fragmented value chain used to evaluate different

functions which consist of some issues related to implementation. The lack of different linkages and the lack of aggregation ensure the girls' design craft clusters.

- **Lack of an enabling environment-** the fourth challenge is the lack of an enabling environment that is useful in designing the craft. The increased usage of products leads to integrating the functions for the implementation of the craft cluster (Singha 2020).

5. IMPORTANCE OF CRAFT CLUSTER

A geographic concentration that includes adjacent rural areas, villages, cities, and towns are involved in producing similar products such as embroidery crafting and have the same opportunities and threats. In the cluster crafting group, some communities are involved in producing similar types of products through similar methods of creativity. Artisans from adjacent rural areas, villages, cities, and towns are involved in producing products such as embroidery and other surface embellishments and guidance by them to government girls schools is providing them a great platform for entrepreneurship by exhibiting and selling of the embroidered products and creating a platform for women empowerment.

In cluster crafting, long-established products are prepared through a traditional method that describes the specialty of some specific community. Craft clustering has several advantages such as this type of crafting needs fewer resources to make the products. Embroidery. Cluster crafting is the significance of traditional products and the products of cluster crafting are culturally enriched. According to Choi et al. (2021), the products designed through cluster crafting are value-based and have a long life. Craft cluster helps in promoting the traditional art and craft that is inherited from father to grandfather and from them to their son.

Craft clustering is not only as important as tradition and culture perspective, however, but they are also the important source of income for the various community people. In rural areas, craft clutter is being practiced for a long time and people choose this as an occupation. Handicraft and handloom products are becoming more famous in the urban areas too due to the quality of these products. These products are made by experienced people who have been practicing these crafting and embroidery for a long time therefore the products are more durable and look attractive.

Daskoi Taluka is the cluster that is found in the Ahmedabad district of Gujarat. This cluster has more than 250 artisans and 18 SHGs involved in various ways, crafting and embroidery is one of the most important crafts done by this cluster. In embroidery crafting the people involved in this cluster decorate the fabric with threads and needles. Embroidery is known as decorating clothes by making designs through needles and cloth (Lwelunmor et al. 2020).

Embroidery of Gujarat has versatility in the creation and therefore the Daskroi Taluka cluster has gained more fame. The artisans involved in this cluster decorate the clothes with innovative and creative designs. Other communities of Gujarat have made embroidery a source of economy and they are professional in embroidery crafting. Dholka, Rajkot, Vejalpur, Mirkuva, and many more clusters are present in Gujrat in different areas that have various artisans for crafting. These crafts are based on their tradition and their products are appreciated by the people due to their high qualities. These clusters help in promoting culture as well as tradition. The artisans who are involved in the cluster crafting go to other states and countries to promote their traditions and culture with their products. In cluster crafting, both men and women are artists who work in designing handloom products and embroidery. The participation of women and men is equal in cluster crafting. According to Nolan et al. (2022), cluster crafting is a good way to promote women's empowerment by providing them job opportunities in cluster crafting.

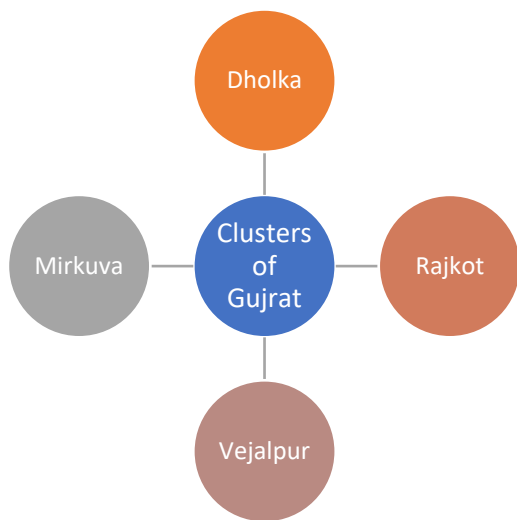


Fig. 3: Craft cluster of Gujrat (Source: Tangonyire 2021, p.980)

6. THE DESIGN PROCESS OF CRAFT CLUSTER IN GOVERNMENT GIRL'S SCHOOL

The girls' students of the government school should be provided opportunities to share their ideas regarding designing of the crafts and the target market as well as customers. All the girls' students share their innovative ideas regarding crafting products and the tradition they follow for designing the products. Both primary and secondary data should be chosen by them.

The girl's students should be aware of the techniques, limitations, and opportunities through a collection of primary and secondary data. After knowing all the techniques, the girl's student should be involved in the collection process. Girl's students should ask the cluster authority regarding the project by showing some samples such as embroidery or handloom products designed by them. Girl's students should start designing their project after the cluster authority's permission and their work should be done based on products and materials provided by the cluster authority (Tangonyie 2021).

In the other case, when cluster authority dismisses the sample and does not allow the girls students to design products for their work then girls students should start work on their collection based on primary and secondary data. During the designing process, the girl's students of the government school should make a theme, mood board, write-up, color board, client profile, and illustration or sketch board. After the designing process, the government should provide money to each group of girls after estimating the total cost of the particulars.

Fabric, dye, print, handwork, attachments, threads, needled. Elastic, buttons, beads are the requirements of particulars needed by the girl's students for the cluster crafting. After the collection of particulars, various processes are involved by the girls' students such as stitching, packaging, pressing, washing, and labeling. In the first step, they start stitching the fabric with needles and thread, and they make some designs with threads on the fabric (Owoo and Lambon 2021).

In the second step, they decorate those things by stitching some beads on them. After completing the fabric by stitching and designing they start packaging those fabrics and press those fabrics to make them more attractive. In the next step, they wash the products and put labels on them to sell this in the market.

7. CONCLUSION

The introduction of craft in education helps in increasing creativity and provides an additional platform for earning income to the students. Design education is the teaching and learning process in which the students are learning to apply practical methods and prior knowledge to resolve emerging problems. In addition to this, the learning of craft work enhance the skills and creativity of students to make products .Craft cluster has major importance in boosting up the country's income. In cluster crafting, both genders have equal opportunities. The government has implemented cluster crafting in the girl's government schools to support the girls by providing them better job opportunities in the future. Today's requirement to empower girls in government school is to implement craft education make it compulsory in Indian Government Girls schools. The application of this research is most useful for solving the unemployment problem of India. Hence need to focus on the implementation of craft cluster along with the studies in Girls Government School.

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POSTER PRESENTATION

A Study on Dominance of Hollywood Styles on Fashion

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ABSTRACT

The 1990s fashion was exceptional as it covered a wide range of subcultures, niche aesthetics and mainstream movements. From the evergreen movies like 'Titanic' to iconic brands, and also celebrity icons and music icons who completely changed the fashion world in the 1990s from Leonardo Di Caprio to Tom Cruise, Johnny Depp. The most influential fashion icons and movements happened during this time. This research revolves around the study of the connection of men's fashion from the 1990s and how it is influencing till date. Hollywood fashion has completely taken the world by storm. The research covers all the impactful trends of the era, evolution of fashion brands and impact it has, worldwide.

Keywords: *Menswear, 1990s, Hollywood fashion, Dominance*

A Qualitative Study on Consumer Behaviour towards Customized Digital Prints which are Self-expressing and Appealing for Urban Millennials

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ABSTRACT

The textile industry has taken a big leap in the customised digital fabric printing sector. One of the most promising developments in the textile industry is digital printing. It has opened the doors for numerous prospects to enhance the quality and maintain the growing demands of consumers and making it more profitable and conveniently available. The aim of the present study is to examine preferences of consumers and identify an opportunity to serve the customer with the right products. Textile Industry of today is better positioned to take up any challenge to satisfy a Customer's choices and preferences; anything can be printed with ease and on fabric using digital printing technology. As the representatives of our precious heritage, the Indian Printed fabric are known the world over for their richness, variety, quality and our unique love for colours and prints is legendary. What gives our fabrics their unique identity is the prints that belong to different regions, inspired by nature, the architecture of temples and forts, rural life and geometric patterns, these prints are rich, vibrant and attractive, speak a thousand words to the beholder. Earlier these traditional prints were done through using different methods, prints like Bandhani, Ajrakh, Baghis, Potla, Warli; now these heritage printing can be done more precisely using customised digital printing in much shorter time. With talented designers pouring out their imagination on cloth, we have hundreds and thousands of prints to choose from. Designers endeavour to produce something new every time they put their thinking caps on and leave a lasting impact on Digital prints that have found much love across the world. The study reflects the attitude and preference of Customers towards customised digital printing on fabrics that has enormous potential to satisfy customer needs and preferences. Further, it also brings out this fact that there is immense potential for enormous business generation by larger publicity and popularisation of customised digital fabric printing.

Keywords: *Customization, Digital Fabric Prints, Technology, Colours, Consumer Behaviour.*

A Study on Role of Sakhi Entrepreneurs in Growth of Rural Area

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ABSTRACT

The study emphasizes on the Udyam Sakhi initiative; a women empowerment and entrepreneurship initiative, launched by the Ministry of Micro, Small and Medium Enterprises, Government of India, in the year 2018. This paper overviews the role of Sakhi Entrepreneurs in the growth of rural parts of India. It also focuses about the Sakhi Entrepreneurs who are the torchbearers of the society and are creating business models revolving around various low-cost products and services to resolve the social inequalities. The goal is to discuss various types of small scale and home-based enterprises created by women and how they are using modern day technology and Digital Platforms to sell their products and services. Also, the intent of this study is to create awareness amongst the rural women and girls in-order to connect them with this initiative and make the self-reliant, financially independent and open the door of opportunities for them so that they can earn, and create more jobs.

Keywords: Business Model, Digital Platform, Ministry of Micro, Rural Area, Small and Medium Enterprises, Sakhi Entrepreneurs, Self-Reliant, Udyam Sakhi.

Study on Consumer Behaviour of Gen-z towards Vibrant, Bold and Artsy Prints in High Fashion Apparel at an Affordable Price

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ABSTRACT

Fashion for Gen-Z is more personal. "Fashion has become a canvas to showcase what they feel, and they look up" with the help of brands as an enabler to express their creativity. They are "value seekers" and "discount hunters". Their decision is not just based on the price but the differentiating factor. Something unique that will reflect their individuality will win their favour. The idea of High fashion for Gen-Z evokes visions of colourful garments. It embodies the nature of the consumer which is energetic, young, and carefree spirit. The adaptation of hip hop, athleisure silhouettes inspired from the Hip-hop culture & the 90's rave movement is a new direction in High Street led by Gen-Z. Giving birth to "Lux Hip-Street" which is defining the fashion of the future. The purpose of this study is to evaluate Gen-Z's lifestyle, psychology & fashion preferences and study their need, acceptance, and response towards affordable High fashion apparel. This research aims to investigate the potential use of vibrant, bold & artsy prints and the impact of colour psychology on Gen-Z's buying decisions. This study intends to give a design direction for developing prints and colour palates. The data is obtained from published research papers in the field of study, youth magazines, brand websites, internet sources, 2 rounds of Consumer surveys, and 3 Expert interviews. The following research conducted is qualitative, descriptive, and exploratory with a sample frame of men and women of Tier 1 cities of age group 18-24 years (i.e. Gen-Z). The findings suggest that Gen-Z are expected to gravitate towards "joyful & expressive" prints with a demand for "feel-good" fashion. There is a shift in Gen-Z's perception by not limiting themselves to stereotyping prints to compliment one's body type, size, complexion, gender, and evolving towards affordable High fashion.

Keywords: Gen-Z consumer behaviour, Consumer perception, Prints, Colour Psychology, Fashion brands, High fashion, Affordability.

Goth : A Strong Sense to Portray Androgynous Fashion for Menswear

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ABSTRACT

Gothic narratives of masculinity reverberate beyond the limits of a particular subculture that emerged. Goth culture is all about enlightenment began to impose new and deeply gendered understandings of heterosexual coupling, reproductive difference and ethical dividedness onto the western experience of modernity. The nature of gender identities within the gothic subculture, a subculture firmly rooted in consumer-based objects of music, clothes and symbols. It argues that the gothic scene is a site of practicing ideas where accepted norms are challenged and alternative sexual politics are established. It explores the emergent themes of gender blurring, playing with gender and privileging the feminine as part of the gothic experience. This paper will explain the strong connection of goth subculture and androgynous fashion. The study will also cover the activities, behaviour, power relations, authority and constituent characteristics and has a long tradition of intense conceptual.

Keywords: *Gothic subculture, Androgyny, Power relations, Sexuality.*

Celebrity Fashion Influence Over Millennial Men

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ABSTRACT

Films, Television and other kinds of entertainment shows have become essential to everyone in the modern era. From the ancient times of Black and white cinema to today's times of Web series, these often influence the population all around the world. Celebrities play a major role in the popularity of these entertainment shows that have always influenced people. It affects the attitude & behaviour of an individual. They have also been the role model & trend setter for common masses. The influence can be positive as well as negative. There are a few fashion theories revolving around celebrity fashion. The purpose of this paper is to study the celebrity's fashion influence over millennial men.

Keywords: *Celebrity fashion, Influence, Youth, Menswear*

A Qualitative Study on Consumer Behavior Towards Customization for all Sizes and Body Types

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ABSTRACT

Brands are seeking ways to cater to the needs and demands of consumers and explore untapped markets. One such need that is felt all over the world is women facing issues with sizing and fit while shopping. In this era of delivering new and meaningful brand experiences to consumers, companies are finding ways to personalize the customer experience. Customization is a concept that has gained momentum in the past few years and is believed to be the future in retail for several reasons- to provide a level of exclusivity, to cater to personal choices and preferences, and to help consumers find their ideal size and fit. Therefore, the purpose of this study is to understand consumer needs and their preferences towards customization for all sizes and body types. Data for this study was obtained from various sources such as published research papers and journals, articles in journals, online magazines, blogs, brand websites, and other internet sources. The primary data for this study was obtained through surveys and expert interviews of people working in the field. This is a qualitative research that is descriptive and exploratory in approach, with a sample of 59 women from metropolitan cities of age group 21-40. Mass customization offers a personalized shopping experience to consumers and a sense of exclusivity in terms of design, that helps in building customer loyalty. Through this study, we analyze their needs, buying habits, customization preferences, and buying frequency which helps us understand their expectations and requirements from brands.

Keywords: Mass Customization, Consumer needs, Consumer preferences, Consumer behaviors, Sizes and body types.

Rethinking Pink for Indian Men

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ABSTRACT

Pink has always remained a matter of doubt for menswear. Classic pink, delicate pastel which is considered as feminine only due to stereotypes. Pink colour has a soft nature and it is defined as a Sign of Hope and empathy. A certain gender-based tradition has been followed by the people over decades. In the 18th century, it was considered masculine for a man to wear a pink silk suit with floral work. No matter what it is said about pink being 'unmanly' - is fading away. Every individual can decide for themselves and has their own right for choosing colour choice. They can't be forced to restrict their opinions, nature and choices.

In other countries, pink has been embraced and encouraged to be worn but here in India it still remains a question to see on men. The paper will study about the acceptability and preferences of color pink for Indian men.

Keywords: Pink, feminine, unmanly, acceptability, Social.

Unconventional Sustainable Textile Fibres for Luxury Fashion Industry

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ABSTRACT

With an ever increasing trend towards achieving sustainability in the fashion industry, the search for eco friendly textile fibres has been gathering momentum. The importance of natural fibres and their contribution towards sustainable development has also been noted by United Nations in the resolution adopted by the General Assembly in December 2019, to encourage sustainable production and use of natural fibres and to preserve indigenous knowledge and technologies associated with such fibres. This poster aims to shed some light on selected, cellulose based bast and leaf fibres traditionally used to create exclusive one of a kind textiles, which were an important part of the cultural identity of the people associated with making and using them. The crafts for creating textiles out of these fibres were traditionally carried out by rural communities using handmade techniques which the artisans honed after practicing these crafts for long periods of time. These textiles were truly eco friendly and sustainable due to the nature of the entire process, starting from the manual extraction of the fibres to the hand weaving of fabric on traditional looms. These unique cultural textiles gradually became more or less obsolete with the introduction of cotton and other man made fibres which proved to be economically viable for large scale production. The properties of such fibres and their potential use as textile fibres for sustainable luxury sector have been discussed. Though efforts for commercializing these fibres for large scale replacement of conventional fibres have not yielded positive results, they can be used in the luxury fashion industry to create high end, quality products. Incorporating these unconventional fibres in the sustainable luxury industry can provide two fold benefit- of reducing the burden on conventional textile fibres and nurturing local craftsmanship in order to keep precious skills alive for generations to come. Lotus fibre, Pineapple leaf fibre, Ramie and Banana fibre have been found to be suitable for creating delicate, luxury apparel. Coarser fibres such as Nettle and Hemp find their application in home furnishings as well as for making winter garments.

Keywords: Unconventional textile fibres, Sustainable luxury, Eco-friendly natural fibres.

A Study on Silver Metallic Material for Menswear

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ABSTRACT

Metallic comes from metal, it is defined as a solid material that is usually hard, bold, malleable and shiny. Silver metallic symbolizes riches and wealth. It is believed to be a mirror to the soul, helping us to see ourselves as others see us. This research describes all the variations and nature of this colour like: where this colour is shown on the colour wheel and the history of this elegant and sophisticated colour. It also explains modern day applications in all sorts. The study of this paper is about silver metallic which is solid as inspired from 80's rock and roll which is going to explain how silver metallic through makeover and footwear is huge to promote glamour, shine, elegant, luxury and sophisticated environment.

Keywords: Rock and Roll, Silver Metallic, Bold, Elegant
