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INTERNATIONAL CONFERENCE ON FASHION APPAREL & TEXTILE 2022 (INCFAT'22)

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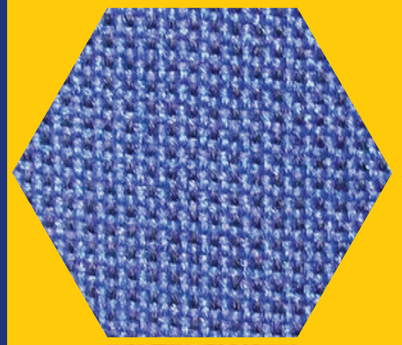

Proceedings of
online
International Conference on Fashion Apparel & Textile
(INCFAT'22)

THEME: "Advancements in Fashion and Textiles: Emerging Opportunities"

Date: 14th and 15th Nov 2022

Organized by
AMITY SCHOOL OF FASHION TECHNOLOGY
Faculty 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
Patron – INCFAT 2022
Professor – Entrepreneurship, Leadership, and IT
Vice Chancellor, Amity University Uttar Pradesh

I am pleased to learn that **Amity School of Fashion Technology** under Faculty of Applied Arts/Fine Arts/Performing Arts/Visual Arts, Amity University, Uttar Pradesh is organising 6th online "**International Conference on Fashion, Apparel & Textile 2022 (INCFAT'22)** on the theme "**Advancements in Fashion and Textiles: Emerging Opportunities**" on 14th and 15th November 2022.

INCFAT'22 is organised virtually to deliberate on Fashion, Apparel and Textile Industry expectations from professional education in the field and to bring together academicians, researchers, and experts for facilitating, interaction and exchanging ideas for the same.

The global textile industry is undergoing a paradigm shift characterized by fundamental trends such as shifts in sourcing, impact of climate change, digitalization, dominance of man-made fibres and emerging trade blocs. India, being the second largest textile industry in the world, will be impacted by opportunities and risks posed by emerging trends. India has a significant potential to upgrade its finishing capacity both for woven and knits to add value and improve competitiveness. The emerging trends provide opportunities for the Indian textile industry to reposition itself for the current decade and realize its greater potential.

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

I would like to express my appreciation and best wishes to all the participants for their active participation and valuable contributions to this conference. The knowledge and insights shared during the event will undoubtedly contribute to the advancement of research and innovation in the field of Fashion and Textiles.

My Heartiest congratulations to INCFAT'22 organising team for organising this conference on an important topic of academic interest and industry relevance.

My best wishes for the success of the INCFAT'22!

Prof. (Dr.) Balvinder Shukla

Message by Conference Chairperson (INCFAT `22)

Prof. (Dr.) Pradeep Joshi
Group Addl. Pro Vice Chancellor
Director General & Dean
(Applied Arts/Fine Arts/Performing Arts/Visual Arts)
Amity University
&
Conference Chair

It gives me immense pleasure to welcome all delegates, industry members and esteemed speakers to online "International Conference on Fashion, Apparel &Textile 2022 (INCFAT `22)" (theme "Advancements in Fashion and Textiles: Emerging Opportunities") being organized by Amity School of Fashion Technology under Faculty of Applied Arts/Fine Arts/Performing Arts/Visual Arts, Amity University, UP. Emerging Trends in the Business of Fashion, Sustainable Fashion, Innovations in Textile & Apparel, Technological Advancements in Apparel Industry are Sub Theme(s) for technical session of INCFAT `22.

INCFAT `22 proposes to deliberate on recent developments and trends related to Emerging Role of Digital Technologies and AI in Fashion and Textiles, Color and Harmony in Design, Innovation in Design, Advancements in Textile Materials, E-Business for Fashion and Textiles, Impact of Visual Merchandising on Consumer, Entrepreneurship for Fashion and Textiles, Marketing and Merchandising for Fashion & Textiles, Sustainable Fashion, Skill Development for Apparel Industry.

India with natural advantage in raw material (cotton, silks, cellulosic fibre etc.) and availability of skilled labour & strong base of varied traditional design- colour- embroidery combination provide key advantage to Indian fashion textile & apparel Industry. Apparel and Textile Industry is one of the key sectors of the Indian economy. Textile and apparel contributes 4% of India's Gross Domestic Product (GDP) and constitutes 15% of the country's export earnings.

Innovation is key & driving force of the industry. Continuous product development and continuous changes in product offering with "Speed" is differentiating factor for the trade. Textiles and Apparel is one of the most dynamic manufacturing sector where eternal demand for something new or change keeps business alive. There are technological developments which are transforming various segments of the industry. This includes design, manufacturing and marketing of Fashion Textiles and Apparel products. There are emerging opportunities in the areas of smart textiles, protective apparel, industrial fabrics and technical textiles. IT integration with manufacturing technology is enabling higher productivity and lesser dependence on manpower. New software are playing crucial role in design and merchandising functions of industry.

Artificial Intelligence has a significant potential to change whole manufacturing processes and business models for labor intensive textile and apparel industry. Artificial Intelligence is also playing an important

role to track the consumer purchase behavior and provide the crucial information to industry to enable it to respond to customer's need and increase the business. E-commerce has changed the landscape of the Fashion & Textile business. Covid has played an important role in the growth of new business model for ease of customers. Co-existence of on-line retail with traditional retail format is today's reality. Requirement and awareness for sustainable products is also playing an important role in growth of industry. Industry is making an attempt to offer sustainable products at affordable prices. Sustainability is also becoming a differentiating factor for the product offerings in the fashion and textiles. Skill development & entrepreneurship development are key requirements for success of fashion & apparel Industry.

INCFAT `22 aims to bring together academicians, researchers and experts in the field of fashion, apparel and textile for facilitating, interacting and exchange of ideas to further deliberate upon the current scenario of the industry and road ahead. Further to it; it will also focus on deliberation on Industry expectations from professional education in the field. I take this opportunity to thank all Academicians, Researchers, Industry Leaders, Delegates & faculty colleagues who are associated with INCFAT `22 and making this reality.

I wish INCFAT `22 a great success.

Prof. (Dr.) Pradeep Joshi

Brief Profile of Invited Speakers

- **Mr. Jayant Kochar, CEI, Unbox Retail, Ex Founder- MD Lacoste India, Founder Barista**

  Mr. Jayant Kochar is one of the most experienced professionals in the Indian retail industry and curator of unBOX retail. He started his career with automobile major Mahindra & Mahindra Limited, then pioneered the entry of organized retail in India by launching the French apparel brand LACOSTE as MD. He built the pioneering chain of espresso bars in India – Barista. Since then, he has played a key role in creating or developing various other retail brands as a professional, an entrepreneur and a mentor. He has also led the Images Group – a retail media company that publishes B2B magazines and organises retail conferences like the India Retail Forum, India Fashion Forum, etc. Jayant now heads GO FISH RETAIL SOLUTIONS – a focused retail consulting practice. He nurtures some exciting new retail ventures, and mentors some highly regarded Retail leaders.

- **Mr. Lalit Thukral, President, Noida Apparel Export Cluster, Executive Member, AEPC**

  Mr. Lalit Thukral is the founder of Maharana group of companies. He is the founder member of India International Garment Fair Association and Executive member of the Apparel Export Promotion Council (Sponsored by the Govt. of India, Ministry and Textile). His vision and guidance have made Maharana of India a name to reckon with in the international garment industry. Mr. Lalit Thukral introduced the 'Reversible Dress' which was highly applauded and recognized overseas.

- **Mr. Rajeev Bansal, Managing Director, Celestial Knits & Fabs Pvt. Ltd.**

  Mr. Rajeev Bansal, Managing Director, Celestial Knits & Fabs Pvt. Ltd. He with his Company are involved in manufacturing and export of fabrics and readymade garments for decades now. Mr Bansal has developed a state of the art factory with inhouse fabric manufacturing, printing, embroidery and garment manufacturing facilities.

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

  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.

- **Ms. Varija Bajaj, Eminent Fashion Designer, Varija Lifestyles**

  VARIJA is a leading name in the Indian fashion segment. VARIJA is a member of FDCI (Fashion Design Council of India) and has been part of India Fashion Weeks for several seasons. VARIJA also has a lot of joint shows with various lifestyle and fashion brands besides doing her own shows with different themes to her credit. Varija Bajaj currently has 3 apparel brands: OFFICE & YOU-focusing on Workwear for a indian women (www.officeandyou.in) LELA-is all about fusion Pret wear (www.lela.co.in) VARIJA DESIGN STUDIO-focuses on Bridal. Varija Bajaj is an interior designer and caters to architectural and bespoke interior needs under her brand VARIJA HOME. Being a successful entrepreneur, in an unorganized fashion sector, she is now a case study in ISB Hyderabad, the most reputed B-schools of the country. She is a mentor in over 35 colleges across the country like BD Somani-Mumbai, FMS-Delhi, LeMark Mumbai. She is also on the advisory board of Amity University, Suryadatta Group of Institutes, Pune and International Polytechnic for Women.

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

  Mr. Mathur has over 42 years of experience in the Fashion & textile industry is Currently Director General and

CEO 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.

- **Prof. Dr. G. Hari Shankar Prasad, Director NIFT Jodhpur**

  Dr. Prasad is currently Campus Director of NIFT Jodhpur, on deputation from National Institute of Fashion Technology, Hyderabad where he is a professor in the department of Fashion Management Studies. He joined NIFT in June, 2000 as faculty member and established the Fashion Management Studies department from scratch and was the Head of the department for more than nine years. He has five years of executive apparel industry experience with Shahi Export House before joining NIFT. He held the responsibility of Joint Director of NIFT, Hyderabad for about 3 years. He was also Chairperson of Fashion Management Studies for more than three years. As a Chairperson he was leading and managing academics of the department at 14 campuses of NIFT across India.

- **Dr. Neera Chandra, Director ATDC India**

  Ms. Neera Chandra is professionally qualified and Has gained the expertise during 28yrs+ experience including the work in industry, academia and skill Development.

  She has been doing exemplary work in the area of Education and Skill Development for youth community. She believes that Youth is the pillar of our nation and empowering the youth with education and employable skills would strengthen our country and induce its multifaceted growth.

  For her contribution to youth community, she has also been awarded as" Heralder of Humanity" by Satyug Darshan Trust. Due to her core expertise and understanding of the Apparel industry, she has mentored the industry start-ups and entrepreneurship also. For her contribution, she has been awarded by prestigious "KAUSHAL ACHARYA" AWARD by Ministry of Skill Development and Entrepreneurship.

- **Ms. Rinku Sobti, Fashion Designer**

  Ms. Rinku Sobti as a label has been abiding by this ideology for more than 20 years and continues to do so in her journey of fashion. Starting her career with a London based designer and moving to gaining an experience in an Export House, she always wanted to start something of her own and never stopped herself from fulfilling it and did own a flagship store in Vasant Kunj, New Delhi. Today, as a label – Rinku Sobti has made its mark in the fashion industry and continues to achieve new heights ever since it has come to the world of fashion. She is in the advisory committee of the Indian Handloom Brand, promoting the artisans and the art of weaving by working closely with multiple clusters and bringing new designs to these clusters so that the handloom gets associated with the young generation by participating in the numerous exhibitions. She has also been affiliated with the Ministry of Textiles, Government of India and also an active member of Fair Trade Forum which is a not-for-profit organization, registered under the Societies Registration Act 1860.

- **Mr. Paul Bruski, Dept. Chair, Graphic Design Asso. Prof., College of Design, IOWA State University.**

  Paul R. Bruski (BFA, College of Visual Arts; MFA, University of Minnesota) is an Associate Professor and the Department Chair of Graphic Design at Iowa State University. He specializes in information design (particularly maps), and the intersection of design and cultural iconography. He has presented research nationally and internationally on interactive design education, information design and visual literacy. Current research includes the branding of small breweries and consumer experiences in brewery taprooms.

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

  Dr. Roopak Vasishtha is CEO and Director General of 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 4500Training Partners. Arranged for more than 1.2 million trainings across the country. Additional 0.45 million currently underway.

- **Mr. Pratik Gadia, Founder & CEO, Yarn Bazaar**

  Mr Pratik Gadia is an inquisitive individual who is motivated by a sense of legacy. Born into a typical middle-class Marwari business family, he has always balanced his studies, sports, music, business, and extracurricular activities. He enjoys solving complex business problems and plays the role of an entrepreneur, podcaster, and guest lecturer.

  He has a Master's degree in Innovation and Entrepreneurship from the University of Warwick. From being a member of the school football and athletics teams to organising a metal music concert in his grad school to representing the University of Warwick in The Apprentice style inter university competition in the UK sponsored by EY, he has made certain that he adds value to all of his Alma Mater. He has always been driven to improve his business skills and advance professionally. As a result, he had been involved in his family business since he was 15 years old, and he had also completed a few internships in various job profiles. When he was 17, he worked at a placement agency, interviewing candidates for global BPO companies like 3G. After leading his family's fabric manufacturing business for 7+ years, he identified a gap in the industry and decided to pursue the opportunity, launching The Yarn Bazaar. Currently the founder and CEO of 'The Yarn Bazaar,' a startup that is building a holistic B2B Yarn Marketplace with the vision of organizing an unorganized textile industry. They have completed over INR 300+ Cr in transactions in less than three years and have recently raised equity funding in Shark Tank India from four sharks.

- **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.

- **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.

- **Mr. Munish Tyagi, CEO, Nuovatex Projects**

  Munish Tyagi is a senior and global Textile and Apparel industry consultant, based at New Delhi. He has a rich and diversified experience of serving the contemporary Textile indy in India and overseas, over last 35 years, and with working footprints in 10 countries. Presently, he is a global though leader in the domain of Textile Sustainability and, emerging areas of Technical textiles. Mr Tyagi has accrued 35 years in -depth and proactive experience in planning and running the operations of large Textile corporates, including GPI Textiles of global Ispat group, Taichobang Textiles in Gujarat, leading Vardhman Group, Alps and Satia textile groups in north India. He was associated with planning and setting up one of the largest textile mill complex of outlay Rs 350 crore in 1995 of GPI Textiles in Himachal Pradesh, and which remained a technology Benchmark for a decade.

- **Mr. Surinder Tandon, CText FTI, Tandon Textile Innovations, New Zealand**

  A New Zealand citizen, is an international Textile Consultant (Process and Product Innovation & Commercialisation) after serving as Senior Scientist in Textile Group at WRONZ /AgResearch Ltd, Lincoln, New Zealand, where he had worked for 27 years. He has B.Tech (Hons) from TIT Bhiwani, M.Tech from IIT Delhi and PhD from Leeds University. He has worked on R&D and technology transfer for commercialisation with a number of textile companies, research organisations and educational institutions worldwide.

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Business Strategy for Entrepreneurship Development: A Case of Handloom Clusters in Odisha

Dr. Santosh Tarai
Associate Professor, NIFT, Bhubaneswar

ABSTRACT

The handloom sector has emerged as one of the crucial sectors in the present context due to its sustainable based products. The development of the rural economy has been one of the main focuses of the government of India. It appears that the handloom sector is yet to create ample entrepreneurship despite its potentiality and numerous interventions by many stakeholders, including government bodies. This sector appears to have failed to create an entrepreneurial environment for its community, although there is a huge opportunity in the market. The study identifies the critical determining factors responsible for the entrepreneurial climate's growth, and the proposed strategy framework is designed to address the issues in the cluster.

Keywords: Entrepreneurship, rural economy, handloom clusters and artisans, and strategy.

1. INTRODUCTION

The handloom sector is the ages-old cottage sector in which weavers are the leading producers and designers. They have been fulfilling the basic needs of human beings since the inception. This sector not only maintains the rural economic activities constantly but also sustains the traditional cultural values systems by making a variety of traditional and unique products. In fact, weavers are the leading producers; they have been practicing since their inception. Nevertheless, over time, they have yet to get the status of an entrepreneur, and to bring them under the MSME act as an entrepreneur, some challenges must be addressed. The contribution of this sector to the economy is significant; for instance, it is the second largest employment generator after agriculture which employs more than 30 lakhs weavers both directly and indirectly, particularly in the non-farm sector in rural areas. It is found that the majority of looms (87%) are operating in rural areas (EXIM handloom study, 2018). It also contributes 23% of cloth production in the country. In addition, India is leading in handloom production with a 95 % contribution at the global level (Annual report 2016-17, Ministry of Textile). Therefore, it plays a vital role in the rural economy by checking rural-urban migration. Further, in the globalization and modernization era, this sector gains its fame and acclamation worldwide by producing unique artistic work, product diversification, and setting up contemporary designs as per the need of the markets. Therefore, entrepreneurial or business strategies are required to address the issues and bring them under the organisation structure so that they can create economic activities effectively, which leads to the development of the livelihood and growth of the sector.

2. PROBLEM STATEMENT

Odisha is a state of rich culture and heritage, and the handloom sector adds to that. The traditional textile of Odisha is renowned for its exclusivity, which sets it apart from the other handlooms in India. This sector is one of the most significant economic activities of Orissa, employing more than 1.50 lakh weavers' households with an average of 3 weavers per household (ORMAS, 2020). There have been continuous efforts and policy support by the central and state governments from time to time in various forms to uplift the rural socio-economy life, in the handloom sector, since the independence. Besides, other stakeholders like private players, marketing entities, institutions, and NGOs have been involved in developing the artisans' life in the weaving society and bringing them to the mainstream of the economy on a sustainable basis. It is observed that despite many efforts, there exist the problems of poverty, unemployment, slow growth rate, and migration from rural to urban. To mitigate all these issues, there is a need to address and set up entrepreneurship in the handloom sector, which can create employment opportunities in that sector. In fact, a very small number of artisans are trading from the weaving community, but most entrepreneurs are not from this community; they act as a middleman, independent designers, and entrepreneurs who connect with the niche markets. As a

result, livelihood and enterprise development among the weavers' community are miserable and yet to be established. With this backdrop, the study has taken two important and distinct clusters, namely Kotpad and Sonepur from Odisha, which have magnificent craftsmanship with high-quality products, unique designs, and typical methods they follow to produce saris and other categories. The study aims to discover the critical hindrance factors in creating entrepreneurial opportunities and explore the key enabling factors that can bring in the required ecosystem for entrepreneurship in the handloom clusters. To suggest an effective business strategy to create an entrepreneurial climate for the cluster weavers.

3. MOTIVATIONAL OF THE STUDY

Looking at the importance and contribution of the handloom sector both at the national and global level, it is expected that there will be huge scope for handloom-based products in the future. The most important aspect is that products from this sector are sustainable and environmentally friendly, which is vital in the present context, and sustainability is becoming now vocal. The government of India is also keen on developing the rural economy to improve the economic and social well-being of people in rural areas on a sustainable basis, and entrepreneurship has been the key focuses. The earlier study reveals that in 1977, it was estimated that every Indian handloom offered employment to six persons (Chatterjee 2015). This indicates the role played by the handloom sector in generating employment in India and sustainably creating economic activities. The study (Bhagavatula, 2010) indicates that master weavers with enterprise skills and economic activity have created 70-80 % of jobs for the livelihood of weavers in the clusters.

Further, it suggests that the weavers are primarily dependent upon master weavers or skilled weavers in their respective clusters. It shows that there is scope for developing entrepreneurship among the weaving community, provided the artisans' concerns are needed to be addressed. Some studies, including the government reports, indicate that the income level and lifestyle of the weaver society for the last ten years has changed moderately compared to other professions in India despite their hard work. Few other studies argue that the young generation has gradually shifted from mass consumption towards environmentally friendly, ecologically based sustainable products. Moreover, traditional handloom sarees are now being rediscovered by the young generation. Thus, the Kotpad cluster has always performed sustainable practices in its manufacturing procedure. To capture the upcoming market, Kotpad needs to be omnipresent in the places in which their upcoming customers. Therefore, it appears to be tremendous scope for livelihood development and entrepreneurship in the handloom cluster with the constantly increasing trend of consumers toward handloom-based sustainable fashion products.

4. BRIEF BACKGROUND OF TWO HANDLOOM CLUSTERS

Kotpad handloom fabrics have massive demand in the national and international markets due to their unique design and natural-vegetable dyed colors produced by tribal weavers. The whole process of manufacturing is natural, organic, and eco-friendly. The beauty of the products is that they use tribal motifs depicting local stories on cotton or tussar silk to make them more desirable and authentic. They produce products such as saree, dupatta, stole, or fabric as a regular production. Besides, due to the design intervention and training, they have already started selling contemporary apparel such as western wear- dresses, blouses, shrugs, blazers, and Kurtis. It is one of the first clusters in Odisha that has got intellectual property right (GI) tag for its beautiful saris and fabric. The unique product of this cluster is constantly maintained with their tribal origins through materials and techniques. It takes different value chains and a tedious dying process to produce each one.

In the case of Orissa's Sonepur handloom cluster, it is famous for its Ikat and Bomkai design. It has enormous potential as a handloom, producing a beautiful fine silk sari with an extraordinary fabric using the Bomkai design technique. The artisans use the motives from nature and tribal art, a magnificent innovation that has taken over the textile industry and given it a global push.

The beauty of the Bomkai silk sari from Sonepur with unique weft designs through the extraordinary craftmanship and the vibrancy of organic colours bring nature, flora, and fauna alive. In addition, they also use large motifs along with Konark temple borders is a feast for the eyes. The product mix of this cluster is cotton sari, silk sari, dress material, etc. The distinctive feature of the Orissa handloom industry is the ikat design (tie and dye on the yarn of Orissa) due to their quality, craftsmanship, and design characteristics. The study by (Mehta, R. N. 1961) revealed Odisha ikat ranks as one of the finest among the ikat-producing states in India.

5. LITERATURE REVIEW

The handloom sector is the primary source of income for the weaving community in India. Many studies are available on various socio-economic and operational aspects of the weaving community in the cluster; there are hardly any studies on entrepreneurship strategy in the handloom context. Thus, few selective studies have been identified and reviewed concerning the aim of the study to have perspective for framing of business strategy for the weaving community in the clusters. In fact, a significant portion of the workforce in handloom clusters are women (DC handloom website). They are very successful as entrepreneurs in the MSMEs sector. They also significantly contribute towards the economic development of a nation through employment and income generation, poverty eradication, and bringing the diversity of entrepreneurship into economic activities (Deng, Wang, and Alon 2011). There is a scope for weaver or master weaver entrepreneurs if they can be given status under the MSMEs act. It is evident from the Erode cluster that many master artisans with more than 30 years of experience have gained managerial skills and have a better understanding of the market, leading to the success of clusters and the development of entrepreneurial skills (Kumudha, 2012). Rural entrepreneurship implies emerging in rural areas. Institutions and individuals promoting rural development now see entrepreneurship as a strategic development intervention that could accelerate the rural development process (Saxena, 2012). Other issues affecting them in their professions include lack of implementation of schemes, commitment, and adequate electricity and solar light (Das, Sandhya, 2015). The entrepreneurial climate is fragile as they lack knowledge about the end market, their choices, modern business practices, physical and digital connectivity, and organized support from the agencies, both government and private (Rakhin, 2015).

6. METHOD

An attempt is made to find out the key critical issues from the existing two clusters and how they have become responsible for creating entrepreneurial opportunities for the community. In this context, various published resources such as government reports, journal articles, and cluster study reports of students, NIFT, have been used, including opinions from various stakeholders. The focus group discussion has been used as the primary source concerning their issues in the cluster. The focus group discussion as primary data collection has been used and ten number weavers from each cluster were selected based on experience, design skills and market knowledge consisting of weaver entrepreneurs and master entrepreneurs

7. MAJOR FINDINGS OF FOCUS GROUP DISCUSSION

Through the focus group's discussion, most of the members believe that lack of good education, lack of information about the market trend, lack of internet marketing, lack of updated looms, lack of easily getting credit, limited design and product diversification, poor understanding of modern business practices, exploitation, corruption practices, weak supply chain and collectiveness approach, are the major reasons for the poor entrepreneurial climate in the weavers' community. It was also found that not a single weaver from the communities has registered themselves as a business entity under the companies act or even operating as a sole proprietorship.

8. PROPOSED STRATEGY

Strategy factors	**Focus Description**
Setting up Incubation and Training centre	Need-based vocational training (computer knowledge). Training on yarn quality, colour, and surface ornamentation. Training on Entrepreneurship and schemes related to entrepreneurship. Facilitating market & financial access, and business development
Local Fabric centre	Institutions like NHDC or KVIC must be involved in supplying raw materials like yarn, dyes and other accessories. Reduce the lead time in supply chain activity and fulfill the market requirement by attending training regularly.
Technological Intervention	Modernization of looms with hand-pulled jacquard and dobby loom, and dyeing tools. Help to produce wide range of high-end products, faster. Has zero defects in production and with no effect on the environment.
Digitisation of products	Providing a wider audience & connectivity, understanding competitive strategy, staying connected with consumers and potential consumers, and understanding consumer preference led to better business in the weaver's

Strategy factors	Focus Description
	community.
Sustainable growth	The world is concerned about sustainable products; hence, there is an opportunity for pitching sustainable products, leading to higher global demand.
Cluster Identity and Teamwork	Most of the clusters are known by a Geographical Indication (GI). Developing high-quality products and using Marketing concepts will lead to brand building. Leadership and team-building activity among the weavers may bring ownership and feeling of the association to strengthen the cluster society.
Being cost competitive	Adopting new operational technique with the modernization of looms make handloom products cost-competitive globally.
Community Development Center (CDC)	More CDC facilities in modernized form in the cluster society may encourage weavers to access easily, develop new designs, and spend more time in looms.
Collaborative work & Research Support	Enable the cluster to be financially sound, and get new ideas, innovation, exposure, and design support.
The startup, stand-up mode, and MSME mode	To enable them to access the government financial schemes and recognition as sole proprietorship or partnership
Pull Supply Chain Strategy	Push strategy is not practical. Pull strategy will be low risk for weavers in which the entire supply chain responsibility lies on buyers or retailers.
Hand-holding	Initial handholding through incubation in their locality can bring in synergy through exposure, training, credit, market, and other linkages
Market Linkage	Both forward and backward linkage Awareness about the market for eco-friendly fashion, green fashion, and ethical fashion
Market Structure	Government, Corporate, and Community Marketing

9. CONCLUSIONS

The clusters embody our cultural heritage and the centre for sustainability. In fact, many of the weavers are born entrepreneurs for generations; however, they are trapped because of their detachment from the modern-day mainstream market. If suggested strategy can be considered, the sector may have enormous potential, creating thousands of entrepreneurs who can provide further employment in rural India, strengthen the rural economy, and arrest migration. With the increasing opportunity for eco-friendly fashion and positive consumer awareness, each cluster can create its own identity for its uniqueness through entrepreneurs from the same community.

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Entrepreneurship for Fashion and Textile

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ABSTRACT

'Entrepreneurship for Fashion & Textile' – this is really two sides of the coin. Retailing in fashion is descriptive of the era one lives in. If there is no textile, it portends that there won't be fashion, in the conventional sense. Fashion relies on fabric and the variety of materials in the market. Even inventing newer materials to ensure that the populace is dressed up and is ready to meet the day; whether simple life or military. One aspect that has changed is the 'sustainability factor' – caring for the environment. Fabric, and garments are now envisaged to be developed in a more sustainable manner; further designs are evolving to think of practices that will be healthier to the environment and lower carbon footprint.

That is where the role of an entrepreneur comes in. Be it the fashion designer, the merchandiser, the retailer, the local tailor, the small and medium business enterprise, or tailoring for oneself. Understanding the role of the entrepreneur is what my paper will elucidate. It would foretell the scope of fashion and textile, the nuances and their benefits and pitfalls.

Based on research methodology, speaking with fashion entrepreneurs and textile manufacturers, I will illuminate how each aspect of fashion and textile rely on each other to reveal a dichotomous relationship that heralds newness leading to a flourish of new fabrics, the inventiveness of concepts, the immense possibility of ideation and creativity, the use of artificial intelligence and technology and the simple-mindedness of human invention and intervention. Along with this is adhering to the United Nations Sustainable Development Goals (UN SDG). Along with the environment, there is a positive movement to deeply look at our manufacturing processes, and subsequently look at fashion and garments.

This research paper will forecast the journey towards entrepreneurial triumph. The paper aims to show how trends in fashion and textile challenge the conventional norms of how fabric needs to be played upon; of how diverse raw material are devised to make a lower carbon footprint produce; of how retail views fashion and how the customer leads on to absorb and identify it enough to make it a hallmark of their personality.

My Research Paper will entail understanding the value of Entrepreneurship in Fashion and Textile, their role in the value chain and how these differences and similarities expound on the skills required to recognise and appreciate each other. I will illustrate from the industry point of view and the consumer, and conclusively illuminate the knowledge and the talent inherent in these two sections that are symbiotic towards success.

Keywords: Entrepreneurship, Marketing, Fashion, Textile, Communications, Retail

1. INTRODUCTION

Dr. Margaret Mead, the American anthropologist is quoted stating that humanity in civilisation is supposed to have begun with the healing of the femur – the largest bone in the body. Anyone who has broken a leg knows that the thighbone or the femur is the toughest to break and also the slowest to heal. Hence, if prehistoric man was to heal, then it was paramount that he had someone to take care of him. My contention here is that besides food, shelter, warmth, he was also clothed for the approximately six-odd months' time that the leg had to heal and recuperate. Thus, attire that was conditioned by the elements prehistorically, had to be also styled by peers, especially for convalescents.

Consequently, began styling in fashion.

Textile is a sign of the times – whether prehistoric or contemporary – born of a need. The need to share your ideas/sense of aesthetic. Since the industrial revolution and later post World War II, textile came to be a product that, with multiple uses and multiple formats, have now seen development from the mundane to the exotic; from basic utilitarian purpose, to high exotic purpose, to the fancy and fantasy woven; from basic cotton, wool, silk, jute, fibre now to nylons, rayon and other industrially formatted material, to even non-penetrative combat material of Teflon, mylar, even to showcasing foam, ice,

AI and 3D printing.

Fashion designers have created a demand that necessitates new design, texture, materials, among others. Consumers have demanded change and a uniqueness in styles, colour, inventiveness and functional practical use. Paris Fashion Week Coperni Spring Summer 2023 by Sébastien Meyer and Arnaud Vaillant had the model Bela Hadid as a mannequin with a foam spray on dress which was sprayed and cut on her.

2. ENTREPRENEURSHIP IN FASHION AND TEXTILE

This paper discusses innovation in the field of entrepreneurship in the Fashion and Textile industry; The end use of inventiveness in entrepreneurship is consumer satisfaction. The end is also consumerism and profits.

Entrepreneurs are known for their high innovativeness, skill, marketing acumen and push. Underlining this is the ability of skilful decision-making, leadership with a vision, economic viability and financial development, including environmental factors and sustainability. Predicting trends in fabric and fashion is about skill and creating demand.

2.1 Entrepreneurship in Fashion

Entrepreneurship in Fashion is akin to a medium and small enterprise (MSME), a small-scale industry, a basic entrepreneurial venture employing a variety of workers. It depends sorely on the individual to embark on a complete SWOT (Strength-Weakness-Opportunities-Threats) analysis and to venture forward towards economic viability and of course, satisfaction of the clients and customers. Clients are defined as one-to-one consultation, a personal touch; customers can be defined for mass market or retail, where you need not meet or know the exact specifications of the customers.

Entrepreneurship is growing, individual talent is having a say. The Global Entrepreneurship Monitor (GEM) India Report (2021-22) showed that India's entrepreneurial activity expanded in 2021 with its Total Entrepreneurial Activity rate (percentage of adults (aged 18–64) who are starting or running a new business) increased to 14.4% in 2021, up from 5.3% in 2020. The Ministry of Skill Development and Entrepreneurship, India (MSDE) has embarked on implementing various pilot programmes, aimed at women, to encourage entrepreneurship in the country, though not all related to the Fashion Industry, but the push has begun.

Entrepreneurship in the fashion industry is seen in various forms. It starts with the fashion designer, master cutter, tailor, finisher, merchandiser, retailer, and has allied industries dependent too – photographer, stylist, model, makeup & hair, even legal and marketing & communications; and ancillary industries of accessories, perfumes, nail care, footwear, bags, jewellery, even travel and location shoots, among others, especially with the advent of social media, blogs, vlogs, reels, stories, etc. Entrepreneurship in the fashion industry is about business acumen. It is the fervour towards creating a niche and rising above obstacles. The latest to grow is Content Creation and Sustainable Fashion marketing.

Social Media (SM) has led to an increase in the fashion industry entrepreneurial space. Reels, stories, posts have given rise to innovation and ideation. Instagram, Pinterest, Facebook, YouTube has seen the surge in demand of content. Content is King, or Queen in this case, where fashion is mostly targeted towards the X-chromosome and the LGBTQI+ community, and then the menswear industry. Fashion rules, the idea of putting images or videos on SM has led to a non-repeat of outfits. This again has its bearing on environment and sustainability. If clothes are not repeated, and consumption increases, this leads to a probable environmental disaster.

Sustainable fashion comes in here. Upcycling, recycling, clothing exchange, re-imaging, fashion forward depictions of age-old styles, the vehemence to be relevant and recognisable in being 'different' or seen as 'unique' is of paramount importance. The value of 'likes' and forwards to a post is deemed important. And though looking towards eco-friendly methods, there is some ego-trip enthusiasm at work too.

2.2 Entrepreneurship in Textile

Entrepreneurship in Textile sings a bit differently. Innovation in materials and fabrics are continuously emerging with fabric for athletic-wear innovating to be more streamlined for the body and the games they play, be in in contact sport, water-sports, athletics, snow-sports, individual performance, fabrics are evolving to suit the need. Be it performance enhancement, weather, sweat, among others. Artificial Intelligence (AI) is enabling performance enhancement. There is continual research to ensure that fabric is breathable.

But where textile entrepreneurial proclivity is is in grass-root level fabric. Going back to tradition. Take the case of saris in India. Indian tradition is on the loom.

Handloom fabrics are seeing a comeback. Khadi Village Industries Commission (KVIC), the leading brand for all things handloom, reported a 20.54% growth (2020-21). (FY2021-22 overall turnover of KVIC stood at Rs.1,15,415.22 crore as compared to Rs.95,741.74 crore in 2020-21). This includes other allied handicrafts and personal items sold and may not be only saris and fabric.

Understanding textile is understanding the entire process – growing cotton, ginning, pulling, dyeing, making fibres, looming fabric, etc. The appetite now is sustainability. It is in product design that the thrust towards sustainability exists. Ensuring optimum advantage with less natural resources is the way to reducing natural resources to leave a lower carbon footprint. Usage of water, recyclability, dyes, etc.

From saris to fabric material, more consumers are veering towards breathable fabrics, towards blended fabric, towards recyclable fabric. The basis of inventiveness in Textile is because fashion relies on fabric; the corollary is true too; fabric relies on fashion. This symbiotic relationship of a very dichotomous nature ensures the industry sustains.

2.3 Understanding the role of the Entrepreneur

The entrepreneur utilises their talent towards making a business for themselves, a start-up; but understanding this role is deeper. In trying to formulate their business, the innovator is actually using his passion towards setting a new goal for the industry; in understanding the industry and its nuances, positives, pitfalls, lifecycle, etc. In Fashion Forecasting one learns of setting trends. But here the entrepreneur creates their own trend. In purchasing fabric according to what they need for their immediate styles, they are actually forecasting a trend. Designers making a demand on fabric is propelling industry to try out newer forms and strategies. This analytic strategy is the basis for innovation and creativity in art. Fashion and textile are an art form, albeit worn on an everyday basis.

Fashion institutes need to understand this art and give impetus to students to enhance their creativity in going solo. Teaching entrepreneurship should be part of the lexicon and curriculum of fashion schools. Independence and enthusiasm in this industry needs to be honed to a skill level that individuals can make a mark for themselves and empower the workforce to newness. Learning never stops and creativity knows no bounds.

2.3 Impact on the consumer and markets

Entrepreneurship leads to economic activity. It is a source of income and employment to myriad workers. It also leads to a burgeoning ancillary industry. India with its 1.4 billion population, second only to China, has seen job loss in the main marketplace, but individual zeal has led to a burgeoning of talent in various spheres. Speaking to Fashion Designers, one sees that talent is there and social media is ripe with many examples. But a singular lament is that with the advent of social media and pictures of every outfit being posted, no one wants to repeat garments. This has led to a glut of sales, but everyone wants clothes at a lower cost. High-end garments are seen for a season and then relegated to the back of closets.

Upcycling, recycling, sharing garments has its opponents, though few, are gaining strength. Traditional wear is brought out at Indian festivals, and western wear is usually at end of calendar year New Year parties. Fusion of garments are rare, and in select circles.

The other entrant is the ‘Influencer’. These start out as enthusiasts who want to showcase their talent and with traction get paid to showcase products of marketing companies. The global fashion influencer marketing market size was valued at USD 1.5 billion in 2019 and is expected to expand at a compound annual growth rate (CAGR) of 35.7% from 2020 to 2027. India's *Influencer Marketing Industry Report 2022* states that India is set to reach Rs.2,200 crores by 2025 with increasing partnerships between Brands and Creators.

2.4 Future prognoses

For a brighter future, a fervent effort must be given to manufacturing materials that can be recycled; or even materials and end products that lower the usage of water in their lifecycle. Future generations need to understand the value of natural resources, and the absolute beauty of Nature and natural resources. The age of Millennials, Gen X, Gen Y and Gen Z has now reached a stage that individual style matters, and ‘expression’ is key to an intensive growth. The scale and scope of fashion and textile are in personal tastes guided with a sense of style. Fashion is gender agnostic and reaches out to anyone who wants to clothe themselves.

Alternate manufacture of eco-friendly fabric can be utilised – jute, hemp, organic cotton and linen, bamboo fibres, recycled cotton, cork and the latest being econyl i.e. recycled nylon made from synthetic ocean waste, aka abandoned fishing nets, plastic fibre and waste fabric to make new nylon fabric. The so called ‘vegan’ alternate to clothing. Innovating fabric is Tencel – made from wood pulp; recycled polyester (rPET) – from plastic bottles that would have gone to the landfill; Piñatex – made

from plant and fruit fibre, especially pineapples, (though it may not be completely biodegradable, as it could contain petroleum), Qmonos (synthetic spider silk fabric). Additionally, footwear made from recycled automobile tyres have seen a surge in Korea, India and the African continent.

3. CONCLUSION

An entrepreneur in fashion and textile has to be bold and strong emotionally, risk-taking, a never-say-die attitude, adaptable and accommodating change, has to have industry foresight, and foretell change, fashion forecast has to be made in quick decisions to herald change and followers. Product knowledge is paramount.

The idea of reduce, reuse, recycle is the mantra that everyone lives by. It can be challenging at times but is always an entrepreneurial spirit that gives impetus to quality products. Gone are the days of industrial materials, polyester, rayon, acrylic, nylon; now comes the glory of organic and/or recycled material. Fashion and Textile have so much more to shine. It is just the value of individual proclivity to push through and see the light. And individuals have the temerity to source newer materials and invent and ideate for a better tomorrow. Creative ideas don't die. They are aplenty. They culminate in glory!

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Use of Disruptive Technologies in Fashion – The New Era

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ABSTRACT

Emerging Technologies and Additive Manufacturing mark a new era of fashion creation and manufacturing while balancing the sustainability factor with zero-waste garments manufactured on a commercial scale. Influenced by technological innovation and concerns around ethicality and sustainability, this paper delves deep into the systemic change brought about by emerging technologies such as additive manufacturing, kinematics and 3D technology in the luxury clothing and consumer fashion sectors.

Accelerated by the pandemic gap years, fashion as a commercial enterprise faces existential challenges. Seismic and behavioral shifts in consumer attitudes, the evolution of brand-consumer communication, overall consumption patterns and disruptions, the fundamental structure of the global fashion system is challenging fashion businesses and professionals to radically adapt their methods, production techniques, policies and practices. In turn, the effects of commercial and technical innovation, social and political changes and the fast-paced growth of emerging technologies in the fashion business – the opportunity to drive transformation far beyond shape, cut and color of clothing – is now a possibility.

Additive manufacturing techniques, such as 3D printing, enable optimization of production processes, customization possibilities, cost optimization, storage with on-demand printing, manufacturing with low or zero material scraps, prototyping, or creation of complex shapes is all now a possibility whilst facilitating creative job opportunities in the industry, as well as create a sustainable and zero waste industry environment.

Additive manufacturing is effectively changing the fashion industry and is starting to shape our interaction with the clothes we wear. This paper follows two brands as a research paradigm who apply zero-waste principles to 3D printing in their efforts to ensure sustainable applications of 3D technology in the apparel and fashion industry. The first is "Uniqlo" that is producing knitwear manufactured for the ready-to-wear retail market using "WHOLEGARMENT®' technology, and the second, "Bottega Veneta" whose 3D printed leather jeans and plaids were standout items at the Milan Fashion Week 2022. These are the latest example of creative ways in which designers are using technology to aid craftsmanship, not replace it.

The technology permits one to create elaborate designs with biodegradable zero-waste fashion notions while encouraging design thinking and strategies to create garments without the use of excessive cloth, thread, seams, that usually result in waste creation. This paper tries to prove that there is a considerable potential to use disruptive technology in designing and creating fashion that is unique, sustainable (zero-waste) and made-on-demand almost marking a new era in textile and garment production.

Key words: 3D printing, Additive Manufacturing, disruptive technologies, machine learning, emerging technologies, fashion, sustainability, zero-waste

"The future cannot be predicted, but futures can be invented"
(Gabor, 1963).

This statement made by Dennis Gabor, Nobel laureate for his invention of the holograph, has become a mantra in recent times, attributed to many who are simply rephrasing Gabor. But one can not deny its underlined meaning - which is man's ability to invent that which has made human society what it is today. This world we live in is for the good or for worse a creation and an outcome of our actions and imaginations. Eight billion or more people, eight billion or more daily experiences - that many ideas and imaginations exist on this planet at any given point. It is only fair to say that the progress of our world is nothing but an application of these multiple imaginations and an amalgamation of these ideas.

In these post pandemic, politically and financially unstable times, as the world dabbles with fear over a predicted recession in the year 2023, development in the field of A.I Technology and its commercial applications have gained unstipulated momentum. The application of A.I based technologies in various industries with the

intention to operate with optimum efficiency at a B2C level has been made possible. This progress in disruptive technologies, mainly such as AR, VR, XR, 3D Printing, A.I generated content and products clubbed with decentralized financial systems(DeFi), Web3.0, Blockchains, Crypto Currency, NFTs, Metaverse, and other FinTch developments is a clear indication that the world is moving into its next phase of evolution - The New Era, wherein, A.I and disruptive technologies will not only regulate our lifestyles and consumption patterns but will also condition our emotional and behavioral patterns. Whether this creation - the A.I, which is now its own, ever expanding micro-organism, the result of man's imagination, be it utopian or dystopian for our future is something one cannot predict, but what one can hope is that the imagination of those who create these technologies will work toward the invention of a better future and a new global order.

We currently live in an eco system that is highly suggested by A.I. right from what we eat to what we wear to how we live is all influenced and suggested by aggregated data analysis done by an A.I, based on our behavioral pattern and universal trends. Right from our social media activities to the various websites and marketplaces that we use are constantly collating data and converting it to marketing leads. Every industry today is dependent on some form of A.I based system.

For years the Fashion industry has relied on A.I generated trend reports and forecasts. But to highlight the recent developments in the field of detailed data collation and informatics one could refer to TAGWALK a platform that is cited as the "Google of fashion". [1] The French start-up has created fashion's first search engine. By using key words, users can search by brand, season, city, trend, color, fabric or style through data collation and algorithmic collection of various pictures from the past and the present making this Paris-based company the world's first search engine for fashion.

As search volumes rapidly began picking up, Tagwalk needed an automated solution to annotate over a 1000 elements across the millions of images pouring in every week from fashion runways around the world -- and that's where Labyrinth (A.I) stepped in. [2] At Labyrinth, A.I is not just a buzzword, their expertise in machine learning, data intelligence, and software development, to deliver results that solve problems at scale which is incomparable. Their team creates, designs and executes effective machine learning solutions to solve workflow problems. The process usually starts with ML architects, as they explore and assess the data; an approach is then validated and finalized by running various experiments. Finally, an engineering team builds and scales the solution to work on production loads.

Their work has helped clients reduce cost, build strong proprietary technologies, and create better experiences for companies like Tagwalk and their customers.

Tagwalk is in the business of reporting fast-changing trends in real-time, as new designs are perennially revealed during fashion weeks around the world. This put them in a constant crunch for talent that could analyze images and their immediate challenge was to find human resources with relevant expertise and knowledge about the latest trends, to accomplish the task of perusing through thousands of images on a daily basis and categorizing them for further use.

Another problem the company faced was maintaining consistency in how images were being annotated, as different people analyzed them at different times. Due to this, they were unable to strictly enforce consistent guidelines on annotation. With the demands of the fashion industry's ever-changing nature, a capable solution was needed to detect and study new trends and efficiently implement the resultant learning's. The solution was found using Labyrinth.

- A hierarchical Machine Learning model was set up that can quickly spit out a list of fashion attributes that correspond to a given input image
- A feedback-loop that can learn new attributes and corrections performed by the human experts, to improve overall performance with changing trends
- An engine that can find images similar to a given one, to be used as a base for recommendations.

Using this technology the Tagwalk A.I generated the following trend reports at Paris Fashion Week 2022. It recorded that there were total 247 runway shows during spring summer 22/23. 90 Brands included curvy models, up from 62 last seasons. 77% featured wide leg Pants 54%low waist pants and 23% cargo pants. 95% designers had minis in their collection and 51% Designers Featured Denims in their collections, While 25%was Total Denim. 270 looks were embellished with flowers and that Coperni's final look spray painted on supermodel Bella Hadid was the most viewed content this season.

The Coperni 22/23 show was one that will go down in history, a reminiscent equivalent of 'Alexander McQueen's Robotic Arm' spray painting model Shalom

Harlow's white dress almost in a coup de théâtre manner. In a similar fashion the model walked onto stage in a white bikini and designers Arnaud Vaillant and Sébastien Meyer, who partnered with Manel Torres, the inventor of the Spray-on fabric technology called Fabrican, sprayed a white dress onto Bella Hadid's body on stage as a performance act. But this wasn't just some fancy fashion show gimmick, but a true breakthrough in fashion technology. Fabrican technology has captured the imagination of designers, the industry and consumers around the world. The technology has been developed for industrial applications, as well as for personal and healthcare, decorative and fashion/apparel products.

[3]Fabrican Spray-on fabric © creates an instant sprayable non-woven fabric that can be sprayed directly from a can onto the body, creating a seamless garment instantly. It also very easily disintegrates back into the primary substance, which can be resprayed as another designed garment. With no ozone-depleting substances, this technology compresses the industrial supply chain, making it more efficient, and reduces reliance on overseas component suppliers, thereby reducing its carbon footprint and making it one of a kind fully recyclable material. Fabrican is patented by the company which is based in London, at the London Bioscience Innovation Centre.

Similarly another technology that retail brand Uniqlo is using called WHOLEGARMENT, is the world's first seam-free knitwear producing technology that is produced on SHIMA SEIKI's WHOLEGARMENT knitting machine. WHOLEGARMENT products are knit in three dimensions without seams, offering benefits never before found in any other type of garment, with zero left over waste. The retail brand has produced a range of sweatshirts and pullovers for their S/S 22/23 collection which are now available across multiple retail stores of the brand.

Such unique fashion engineering wherein the eventual goal is to prevent the ill after effects of fashion is exactly the need of the hour. One such company, striving towards zero waste and completely environment friendly apparel and accessories is Athos. Along with HP they company has invented HP SCULPTEO – End to end – Scan to Printing customization of climbing shoes . As astutely realized by the team at ATHOS — started by students at Barcelona's ELISAVA School of Design and Engineering — 3D printing's potential for customization makes the technology particularly optimal for footwear used by mountain climbers.

In 2021 ATHOS' released the world's first 3D printed climbing shoes under the leadership of CEO Alexandre d'Orsetti, Sculpteo. This brilliant technology enables mass customization and allows ergonomics that seemed inaccessible in climbing. With ATHOS, the custom-made slipper fits the foot perfectly for every user, as per the exact shape of their feet which is scanned and measured using and A.I software and then printed, for the benefit of optimum comfort when climbing. It was very important for them to implement additive manufacturing [AM] in an innovative way, which is why HP [MJF] 3D printing technology was the perfect choice for creating more accurate, customizable and sustainable products. The benefit of customization and on-demand production helps the company deploy a more environmentally responsible consumer and manufacturing model.

Additive manufacturing has found its way into the consumer market. Influencers and celebrities are adapting such products for example [4]Kanye West has been seen wearing boots in photos which are not only a part of the Yeezy Season 9 collection, but were also entirely printed by the Brooklyn-based, US division of German additive manufacturing (AM) firm Zellerfeld, a company that intensifies the demand surrounding its products by requiring customers to apply to be beta testers for the company's shoes before they're even given permission to purchase them. BASF along with Adidas has invested in an ongoing research to create chemistry and technology for a sustainable future combining economic success with environmental protection and social responsibility.

In India Pieux won the R-Elan Circular Design Challenge, chosen for its innovative designs made with eco-friendly digital printing and 3D printing techniques by FDCI. Styled with sunglasses, goggles, and sneakers, the collection had 3D printed wearable basics and used digital printing to transform them into conceptual garments.

But this leads us to a dilemma that - if fashion intelligence is being manipulated right from directing our choices to showing us accurate trends, to accurate real time garment production and customization methods such as made to order 3d printing with zero waste what happens to our human resource and need of man power. The effects of A.I conditioning our lifestyle choices and habits might certainly be good to deal with climate issues, but definitely not conducive to human resources, in fact it may have adverse effects on those whose livelihoods depend on the garment industry. Large-scale

applications of such technologies with the consideration of its backlash may not be such a wise idea after all. There are artisans, craftsmen and billions of garment workers in Bangladesh, India and other third world countries whose livelihoods depend on the seams of the garments made by them.

One would also wonder about traditional artisans who have for centuries passed down their traditions to the younger generations. What if the younger generations cease to imbibe, adapt and document the culture, it will wipe out a lot of old techniques and craftsmanship. Much like the old santoor maker from the valleys of Kashmir Ghulam Mohammad Zaz, an octogenarian, belonging to the eighth generation of a family in Srinagar that crafted the stringed instruments for maestros like Pandit Bhajan Sopori and Pandit Shiv Kumar Sharma. Zaz has three daughters, but they all have chosen other careers. He, therefore, believes that the artistic channel cultivated for several decades may probably soon vanish into oblivion.

But what if an A.I was to replicate his Santoor making patterns and make the instrument the same way, would it sound the same as one made by the hands of the greatest artisan? Maybe not.

But this does lead us to an interesting idea that maybe A.I. should be used to recreate dying art forms and equip newer artisans with tools and techniques which may help them grasp better. The concept of A.I as a Co Creator should be the idea that tech companies should invest in. Technology that co creates with humans, wherein the functionality is derived my making work hours lesser and tasks more easier for human workers should be a priority for Fashion Tech companies. A co – creator approach to Fashion A.I technologies will help maintain equilibrium between human inputs and machine inputs making it a win win situation.

[6]Bottega Veneta's printed leather jeans and plaids were standout items at Milan Fashion Week 22/23 and the latest example of the creative ways designers are using technology to aid craftsmanship, not replace it. Bottega Veneta is definitely the brand everyone is talking about right now. There are two things to be mentioned before jumping to the outfits. The famous Bottega *intrecciato* bag, which has been a bit of a diamond in the production so far, becomes double-faced, meaning that the beautiful exterior patterns are equally visible on the inside. Unnecessary? Perhaps, but precisely for this reason extremely chic and expensive. And then there were high heel sandals, ergonomic on the foot, which were made by a 3D printer and a craftsman together. The balance between human efforts and machine inputs were balanced during the making of all theses products. Ergonomic is more or less the word that defines the entire collection. This could be enough to explain all the situation. The use of technology should be in service of the craft and craftsmen.

Another solution to save Human Resources is to upgrade worker skillset and enable them to carry forward more creative and technological tasks.

In the face of the greatest challenge of our times, its easy to look at the profits these machines will make for large conglomerates, but what one needs to think about is what loss will such endeavors bring to the garment manufacturing eco system all across the world. Millions of people will be left jobless in the fashion industry in the coming years. Sure a machine can create something unique but it can never carry forward the essence or tradition and the warmth and comfort of a hand made garment. An A.I is nothing but an amalgamation of human intelligence, so before we keep on thriving towards progress, its important to take a step back and review the repercussions of the application of this intelligence. Through science and innovation the aim should be to enable workers and manufacturers alike in nearly every industry to meet the current and future needs of the society tactfully.

Because surely a machine can learn but it can never love.

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Virtual Visual Experiences of Fashion Products on Consumer Purchase Decision Making in Online Experiential Shopping

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ABSTRACT

The shopping experience in the real world is purely based on the physical interaction with fashion products, in-store visual merchandise and the relationship between service personnel and consumer. There are no constraints in a physical retail environment where the consumer gets an opportunity to experience, evaluate, and purchase the product by satisfying self with all the five senses sight, touch, smell, taste, and hearing. On the other hand, in the internet web-based retail environment, shopping is mainly done through virtual visual experiences.

The explosive growth in the user-interface-item interaction and the increasing need for virtual immersive visual presentations of fashion products has become vital elements in motivating consumers' purchase decision-making.

This study will investigate the relation between the various critical factors of virtual visual influence and consumer purchase psychology triggered by Artificial intelligence-based recommendation.

Keywords: User- interface - item interaction, virtual visual experience, consumer psychology, e-commerce, purchase decision, AI based recommendation

1. INTRODUCTION

The online shopping experience has changed how we interact with the virtual product through the interface and the influence of the interface on our purchase decision-making. The influence on decision-making has been the core goal of the current Artificial Intelligence-based recommendations and the entire focused, immersive, experience-driven shopping activity.

Consumer purchases are mainly based on cyberspace appearances such as pictures, images, quality information, and video clips of products, not on the experience of the product in a physical store. The virtual visual content on the e-commerce site/platforms has evolved from static images of fashion products to a new concept of products through lifestyle photos, 360-degree views, virtual try-on technology, and product videos. The added feature of customizable fit, style, and look shoppability layers to visual content on the e-commerce sites.

The attributes of the interface as information and digital virtual platform's presentation, color psychology, navigations, typeface, product presentation and details, and the product purchase process fulfilment in a shopping medium is considered a more critical factor in building virtual commerce trust than in the traditional retailing (Alba et at., 1997; Reynolds, 2000).

Consumer satisfaction and consumer behaviour are directly associated with their interaction with the interface, product presentation, time spent to virtually interact and analyze the product effectively to make a decision, decision-making to purchase, the purchase process and finally, the delivery confirmation of the product.

Fashion brands are rapidly adopting digitalization, automation, and technological advancement. Artificial intelligence (AI) has gradually permeated every industry layer, from client-facing solutions to enhanced processes behind the scenes. Those who are impactful in redesigning their entire processes with technology and data intelligence at their core will be able to leap and stay ahead of the curve.

Recommender systems have become a crucial part of the e-commerce user experience. Based on information from the product itself and how users interact with it, these systems determine which products to recommend for each item. A recommendation engine, for example, can show the most similar items for each product or those that can complete the look. All users of an e-commerce

site will see the same recommendations for each product in a baseline recommendation system.

Customization is a more sophisticated approach. This layer adds another dimension to the mix, allowing brands to recommend not only based on predefined criteria, as well as personal user preferences.

Based on user interactions, AI-powered personalization allows for a unique experience, which means that no two viewers should see the same recommendations in a fully automated platform.

AI is being utilized by forward-thinking fashion e-commerce brands to make the most of customization. They crafted their experience around personalized content, allowing shoppers to narrow the platform down to what is relevant to them, resulting in higher customer engagement and conversions, repeat purchases, an improved shopping experience, and increased revenue.

A personalization layer displays different recommendations for the same product to different users based on their interests, likes, purchases, browsing patterns, and other factors. Consumers can customize the site experience to each user's preferences by displaying specific offers, projections, or designs.

For this reason, there are two-research area in this paper

- The impact of virtual visual interactive interface influencing shopping experience in terms of effective decision making.
- The Impact of Artificial intelligence recommendations in consumer purchase psychology

2. LITERATURE REVIEW

Virtual Visual Characteristics of the virtual store – Interactive Interface

As they have evolved, virtual stores now provide an experiential online shopping experience that is visual appeal, creative engagement, contextual assortment, and curated. Instead of the dry, boring grid, the graphical interface motivates consumers with a virtual immersive and discovery-driven brand experience. Custom design is possible with a virtual store for every brand, category, and collection. In addition, contextual environments can be created to bring products to life by displaying them in various contexts, allowing users to visualize their use. Virtual stores use CGI (Computer Generated Imagery) technology, similar to that used for special effects in movies and games, but in real-time for shopping.

Virtual stores cater to a younger audience, which is a valuable target for many brands. Millennials and Gen Z generations are accustomed to the visual content, interactivity, and experiences central to gaming and social media platforms.

Finally, because our physical and retail stores are 3D, virtual stores offer a more natural interface for digital shopping. This makes it an intuitive experience for anyone. Today, brands and retailers worldwide are already using virtual stores on their websites for various purposes, including creating unique and memorable experiences for their customers and thus increasing engagement, sales, and loyalty. Below are examples of virtual stores created with the Obsess Experiential E-commerce Platform, allowing brands to create photorealistic 3D virtual stores easily.

The e-commerce interface is evolving alongside consumer behaviours and expectations. A virtual store is a new digital shopping experience that offers the customer a much higher level of engagement and immersion. At their most basic, virtual stores are 3D, 360-degree full-page visual experiences that live on a brand's e-commerce site. Customers can browse the virtual store on their phones or computers in the same way that they would in a physical store. However, within a virtual store, products are visually merchandised, and customers can choose a product as they move around.

Customers' virtual assistants can assist with product details, advice, and guidance to provide a tailored clientele to aid in purchase completion. Online and offline experiences are fully integrated.

Even after a customer makes a purchase, virtual associates can follow up with them to see how they like it and provide extra value by providing advice on how to care for the product. It's another excellent way to provide customers with exceptional personalization.

Customers are given virtual video chats with the virtual assistant, which delights them with the interaction. Customers can get in-store service at any time and from any location on the planet. These customer service experiences save them time while also assisting them in meeting their needs and achieving their objectives. In addition, virtual stores give customers a realistic preview of what to expect in your physical stores, encouraging them to come in. Another possibility is to use in-store employees as virtual assistants.

Artificial intelligence recommendations

Customers can use artificial intelligence to reduce costs,

improve efficiency, make intelligent and consistent decisions, and automate and scale operations.

When customers interact with digital platforms, AI relies on the data they collect. For example, engines can track relevant events, such as when a customer buys something, interacts with a page, or expresses interest in a product, and AI can learn from these.

Pricing Intelligence: pricing an item and scaling pricing operations intelligently, consistently, and efficiently are critical for many e-commerce fashion brands. Pricing decisions are vastly improved by AI and data intelligence.

Automated Pricing: Every item in resale e-commerce has the potential to be unique (single SKU). Brands must learn how to price these one-of-a-kind items without direct access to information like production costs or even how much these items are worth. Although external information can be accessed, it can be expensive to do so for each and every item listed on a resale marketplace.

Typically, fashion-savvy individuals are hired by brands tasked with pricing the products using the information at hand and their market value estimation. Because different people place different values on the same thing, this manual process occasionally produces inconsistent results. Every piece published on a website must be priced by a human, which affects costs and publication speed. This is known as the human bottleneck. A person finds it challenging to consider all the variables that affect demand and price.

The machine uses image recognition technology to comprehend how the product appears and considers various factors, including brand, fabric, category, description, historical sales data, and previous pricing decisions for items that are similar to the one being purchased.

According to this model, an intelligent algorithm can automatically choose a suggested price point and range and provide the seller with explanations of why the price is reasonable. This is achieved by displaying similarly priced items from the same category, designer, or style. The objective is to instil confidence in the seller regarding the AI's suggested price. The vendor receives details linking the product they are selling to the AI's suggested fair price.

Optimization of Prices: The pricing strategy used in the fashion industry is customarily based on an initial fixed price, then a series of drastic discounts as the season progresses.

Based on corporate policies, these discounts are frequently applied to collections of goods (for instance, particular categories). A product selling well all season long may be discounted due to this strategy, even though it doesn't require a price reduction to be profitable. Equally, a product that isn't selling well might profit from a price cut ahead of schedule, missing out on weeks of potential sales. For businesses, this causes an avoidable loss of profit.

Once AI has been incorporated into some operations, price optimization is more involved than price automation or recommendation. Nevertheless, this pricing strategy has enormous potential and will probably prevail in the future, particularly for fashion e-commerce companies.

Automation of Operations: These problems are frequently encountered when using the conventional manual process: inconsistent (some too long and detailed, some too short) descriptions of similar items - missing attributes, Materials described in a way that does not add up to 100%, Criteria for attributes or values are not aligned with human values.

People are no longer required to perform the tedious and error-prone tasks required for product tagging thanks to AI. It can automate the process, accelerate it, and improve its consistency and dependability. Better data quality is the result, which is essential for opening a wide range of data-driven business cases. Considering that AI can learn a more complex taxonomy and attributes, it can also enhance the process by making it more thorough.

Individualized Recommendation: The consumer desire for a more personalized online shopping experience is the critical factor influencing the growth and adoption of AI in the fashion industry. These consumers anticipate tailored product and attire recommendations based on their personal preferences. Since AI-powered personalization is based on user interactions, viewers should have a different experience, even on a fully automated platform. Drafted to provide a personalized recommendation experience, enabling users to focus on the most relevant content, leading to higher customer engagement and conversion rates, repeat business, improved shopping experiences, and higher sales. A personalization layer displays user recommendations for the same product based on interests, likes, purchases, browsing habits, and other factors. In addition, AI tailors the website experience by displaying offers, trends, or styles based on each user's preferences.

3. CONCLUSION

When it comes to online shopping, the information feature is one of the key elements influencing customer site loyalty and their choice of whether to visit the store or not. This highlights the value of user interface design and product information quality, the impact of a consumer's perceived relational benefits from online shopping, and the importance of service information quality.

Virtual store attributes include essential elements that influence how consumers interact with products. Artificial intelligence also optimizes the entire service and the purchase process through visual search, image presentation, and price intelligence, all of which save time, impact and aid in purchasing decisions. This article uses user experience as the design guiding principle to compare the interaction factors. Consumers and Internet products are closely linked by interaction design, which also improves the usability and effectiveness of online shopping interfaces and creates the most natural possible interaction between users and the interface.

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TECHNICAL SESSION-II
SUSTAINABLE FASHION

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A Study of the Consumer Buying Behaviour towards Sustainable Fashion in Delhi NCR

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ABSTRACT

There has been a tremendous evolution in global economy with upsurge in the consumption round the globe. This excess consumption has led to worsening of the environment. The consequences of this environmental dilapidation are pollution, global warming, health threats etc which have turned out to be a cause of communal apprehension which in turn has resulted to the move towards a sustainability for the conservancy of environment. Apprehensions on environmental impact of commercialization is being deliberated for decades among environmentalists. Industries are being stimulated to adopt more ecologically approachable business practices and are judiciously scrutinized for their environmental performance. Individual consumers are also now make an effort to direct their efforts towards sustainable buying by consuming less, producing and buying locally, acquiring environmentally responsive goods, sharing and sticking to the model of reduce, reuse and recycle. The purpose of this study is to understand and determine the factors affecting the consumer buying behavior towards Sustainable fashion in Delhi NCR . The purpose of this research is also to contribute to make a sneak peak into the stimuluses and inhibitors for consumer's move towards sustainability.

KeyWords: Global economy, Fashion, Industry, Sustainability, Consumer Buying Behaviour

1. INTRODUCTION

The biosphere is presently facing the environmental sustainability problems and environmental issues inducing and altering the consumptions forms of human life and activities on this planet. Worries on environmental impact of commercialization is being pondered for decades among environmentalists. Industries are being enthused to adopt more ecologically approachable business practices and are judiciously scrutinized for their environmental performance. Individual consumers are also now making an effort to direct their efforts towards sustainable buying by consuming less, producing and buying locally, acquiring environmentally responsive goods, sharing and sticking to the model of reduce, reuse and recycle.

This has resulted to considerable impact on marketing as well. Both marketers and consumers are becoming more and more sensitive in the direction of using sustainable products and services. The modern and updated consumers of today are very anxious about environmental issues but they are stressed to decipher this into real acquisitions. Every time a consumer makes a buying decision, there is the probability for that buying decision to contribute to sustainability.

When Fashion consumers consider the acceptance of sustainable lifestyles, they engage in complex decision-making process.

2. BACKGROUND

2.1 Definition of Consumer Behaviour: Each consumer is different and unique. This uniqueness is reflected in the consumption behaviour, pattern and process of purchase. The term consumer behaviour is defined as the behaviour that consumer display in searching for, purchasing using, evaluating and disposing of products and services that they expect will satisfy their needs. Consumer behaviour focuses on how individuals make decisions to spend their available resources (i.e time, money, effort) on consumption-related items that includes what they buy, why they buy, when they buy it, where they buy it, how often they buy it, how often they use it, how they evaluate it after the purchase and the impact of such evaluations on future purchases, and how they dispose of it.

2.2 Definition of Sustainable Consumer Behaviour: This is consumers' behaviour that progresses social and environmental performance as well as meet the needs of the consumers. It studies why and how consumers do or do not integrate sustainability issues into their buying,

usage and disposal behaviour. Likewise, it probes into several issues like what products consumers buy or do not buy, how they use them and how they dispose them .

3. LITERATURE REVIEW

Kristen Salyer, (2019) "Fashion, as an all-encompassing term for the apparel, footwear and textiles sector, is a huge global industry that touches us all and employs millions of people, but it is concurrently a very muted business that has long concealed it's working."

The cognizance about the problems of the environment can regulate the behavior of the individuals towards environment. The mindfulness and insolence have a positive effect on the purchasing behavior of the consumers (Roberts, 1996). The more the individual is aware about the environmental concerns, it could create favorable behavior towards the same. The augmented knowledge about the environmental issues produces positive attitudes (Arcury, 1990). The acquaintance about the environment is correlated with the attitude and behavior towards the environment (Laroche et a1., 2001).

As per Vogue Business report, in the past year, the emphasis around sustainable fashion has constantly grown, as industry leaders made initiates to sustainability at COP26, augmented material modernization and began to explore circularity. Most significantly, a budding realisation arose that climate change is as much about impartiality as it is about carbon footprints.

Correct information about environmental complications have all chances to have entities becoming more responsible towards the environment (Schahn & Holzer, 1990). Patrons who are more cognizant and sensible about the environment make more green choices (Birgelen et al.2009) An individual's positive environmental behavior doesn't not necessarily guarantee his engrossment or partaking towards the environment.

But despite the fact that a lot of concentration and prominence is bestowed on sustainable fashion, the industry actually has made little tangible progress this year. Emissions have been happening, circularity remains indefinable, impact of Smart textiles are still to be gauged, labour laws are still not being followed. But in an optimistic tone it is pertinent to mention that the fashion industry is being very vocal about this issue.

Many clients are worried about ecological wellbeing and some are concerned about their health and also about cost. Cost is a decisive factor when the disposition to pay a premium for green products is concerned and there is a lesser brand awareness of eco-friendly (Shukla et al, 1998).

The implications of textile dyeing are now a bigger part of the ethical fashion conversation. As a result of synthetic dyes and chemicals being applied to textiles, toxins are released into the wastewater near clothing manufacturing plants. The water consumed and used by residents in those areas causes serious health and environmental damage — including increased risk of cancer, skin problems and extermination of animal populations. Now, in countries like Bangladesh and China, which house major clothing manufacturing hubs, the government is beginning to take action.

Companies are beginning to prioritise not only the sustainability of their product but also the impact of their packaging on the environment — which, with the rise of e-commerce, has become especially wasteful.

To date, the progress around fashion sustainability has been slow because it is designed to be, by tweaking only around the edges, advocates say. The changes that would result in the biggest impact — eliminating fossil fuels in manufacturing processes and increasing garment worker wages — both require systemic transformation of industry infrastructure and business models. They top experts' lists as the most fundamental priorities to address next year and rank among the key sustainable fashion trends in 2022.

4. OBJECTIVES OF STUDY

1. To study the buying behavior of the respondents towards sustainable Fashion products
2. To examine the buying motives and the level of awareness of the consumers towards sustainable Fashion products
3. To study the factors that influences the willingness of consumers in the purchase of sustainable Fashion products and their level of satisfaction towards the sustainable Fashion products

5. RESEARCH METHODOLOGY

The area of study is confined to Delhi NCR. The data collected for the study through a structured questionnaire adapted from a previous research. The study consists of both primary and secondary data. Convenient random sampling technique was adopted to determine the sample

size. The data for the study were collected from 200 respondents.

Data Sources:-

a) Primary Data: Fresh data collected, through survey forms, distributed randomly.

b) Secondary Data: Published data was collected from sources like the previous researches, websites etc.

Sampling Size:- It is the total number of respondents targeted for collecting the data for the research. We have taken a sample size of 200 respondents for our research,

Sampling Technique:- Random sampling technique is used in this research project.

H01: There is no significant relationship between sustainable Fashion product usage and gender of the respondents.

H02: There is no significant relationship between sustainable Fashion product usage and age of the respondents.

H03: There is no significant relationship between sustainable Fashion product usage and educational qualification of the respondents.

H04: There is no significant relationship between sustainable Fashion product usage and income of the respondents.

H05: There is no significant relationship between sustainable Fashion product buying intention of the respondents.

6. DATA ANALYSIS AND RESULTS

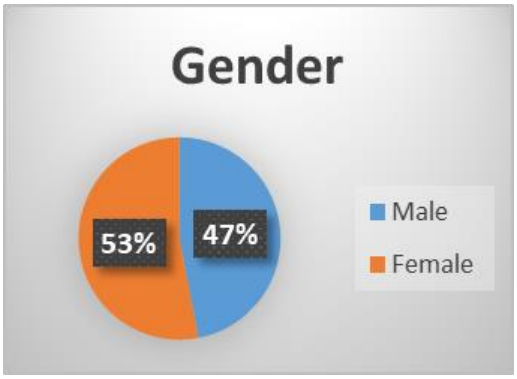
6.1 Descriptive Statistics

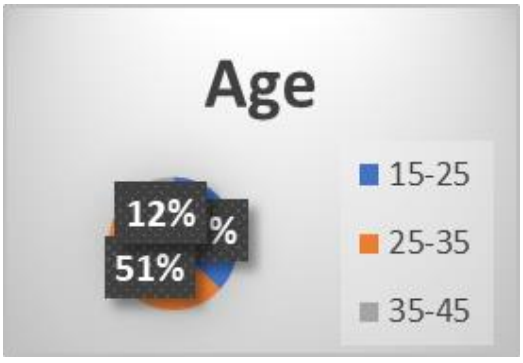
The Statistical Package for the Social Science (SPSS) VERSION 16.0 was used to analyze the collected data.

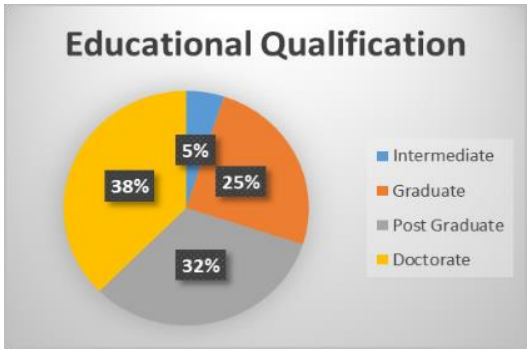
7. DATA ANALYSIS AND FINDINGS:

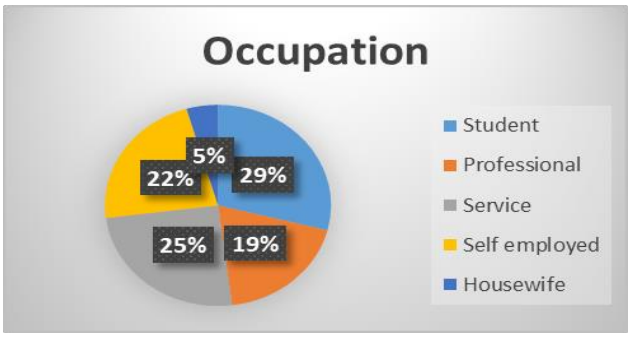
TABLE 1: Demographic profile of the respondents

Gender	Frequency	Percentage
Male	94	47%
Female	106	53%
total	200	
Age	**Frequency**	**Percentage**
15-25	74	37%
25-35	102	51%
35-45	24	12%
Total	200	
Gender	**Frequency**	**Percentage**
Total	200	
Educational Qualification	**Frequency**	**Percentage**
Intermediate	10	5%
Graduate	50	25%
Post Graduate	65	33%
Doctorate	75	38%
Total	200	
Occupation	**Frequency**	**Percentage**
Student	58	29%
Professional	38	19%
Service	50	25%
Self employed	45	23%
Housewife	9	5%
Total	200	









The data has been collected from 200 respondents. 47% are Male and 53% are Females. 37% of the respondents belong to the age group 15-25 yrs, 51% of the respondents belong to age group 25-35 yrs and remaining 12% of the age group 35-45 yrs.

Looking at the specific breakdown of usage pattern among consumers based on their educational qualification. It shows that 38% of the respondents who are doctorates use sustainable products followed by post graduates (33%), graduates (25%) and lastly intermediates (5%). A very important inference is drawn here stating that educational level has a direct relation on the sustainable product usage. Acceptance of sustainable products is directly related to educational qualifications.

The demographic profile of respondents also shows that 25% of respondents are in service, 29% are students, 23% are self employed, 19% are working professionals and 5% are housewives.

TABLE 2: Factors motivating usage of sustainable products

Variable	Frequency	Percentage
Social recognition	80	40%
Government incentives/policies	4	2%
Environment sustainability	86	43%
Personal consciousness	10	5%
Peer pressure	14	7%
Cost factor	6	3%
total	200	

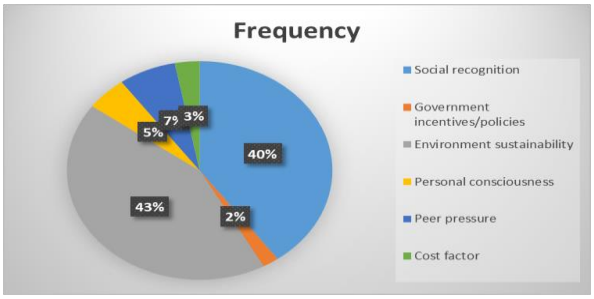


Table 2 shows the factors that usually motivate the respondents for buying/ using sustainable products. It is clearly seen from the data collected that environment sustainability is the most effective reason to motivate consumers . The next factor is Social recognition followed by other factors like Peer pressure, Personal consciousness, Cost factor and Government incentives/policies.

TABLE 3 Factors demotivating usage of sustainable products

Variable	Frequency	Percentage
Unfamiliarity	50	25%
Unobtainability	15	8%
Resistance to change	25	13%
Peer/social pressure	50	25%
Cost factor	60	30%
total	200	

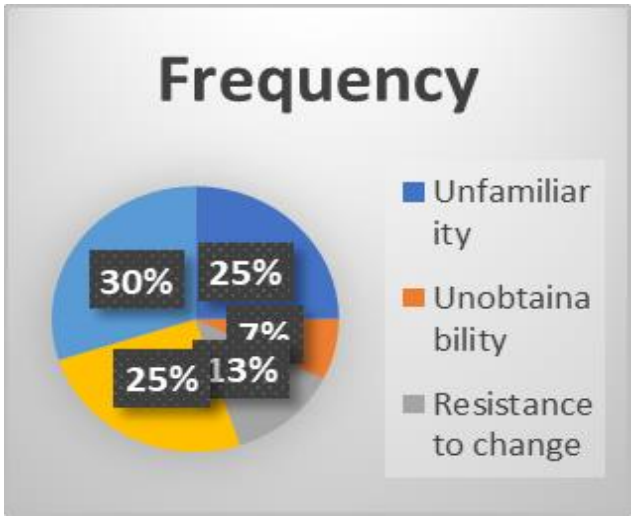
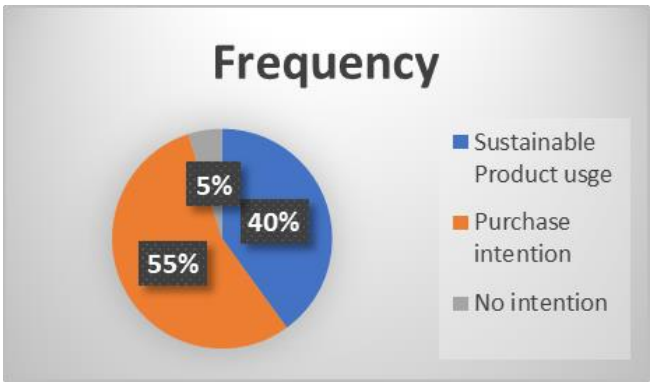


Table 3 shows the factors that usually demotivate the respondents for buying/ using sustainable products. It is clearly seen from the data collected that Cost factor is the most effective reason to demotivate consumers from buying sustainable products. The next factors are Peer/social pressure & Unfamiliarity to sustainable products followed by other factors like Resistance to change & Unobtainability.

TABLE 4: Usage and purchase intention statistics

Variable	Frequency	Percentage
Sustainable Product usage	80	40%
Purchase intention	110	55%

No intention	10	5%
total	200	



H01: There is no significant relationship between sustainable Fashion product usage and gender of the respondents.

The data which has been collected had been analysed and the results shows that significance of chi-square is 0.872, which is greater than 0.05 (5%). So, the null hypothesis cannot be rejected at 5% significance level, concluding that there is no significant relationship between the sustainable Fashion product usage and gender of the respondents.

The analysis of the composed data shows that Clients use sustainable Fashion products irrespective of their gender.

H02: There is no significant relationship between sustainable Fashion product usage and age of the respondents.

The data which has been collected had been analysed and the results shows that significance of chi-square is 0.770, which is greater than 0.05 (5%). So, the null hypothesis cannot be rejected at 5% significance level, concluding that there is no significant relationship between the sustainable Fashion product usage and age of the respondents. The analysis of the composed data shows that Clients use sustainable Fashion products irrespective of their age.

H03: There is no significant relationship between sustainable Fashion product usage and educational qualification of the respondents

The data which has been collected had been analysed and the results shows that significance of chi-square is 0.02, which is lesser than 0.05 (5%). So, the null hypothesis is rejected at 5% significance level, concluding that there is significant relationship between sustainable Fashion product usage and educational qualification of the respondents. The higher the educational qualification higher is the usage of sustainable products.

H04: There is no significant relationship between sustainable Fashion product usage and income of the respondents.

The data which has been collected had been analysed and the results shows that significance of chi-square is 0.03, which is lesser than 0.05 (5%). So, the null hypothesis is rejected at 5% significance level, concluding that there is significant relationship between sustainable Fashion product usage and income of the respondents. The higher the income of the respondents higher is the usage of sustainable products.

H05: There is no significant relationship between sustainable Fashion product and buying intention of the respondents.

The data which has been collected had been analysed and the results shows that significance of chi-square is 0.01, which is lesser than 0.05 (5%). So, the null hypothesis is rejected at 5% significance level, concluding that there is significant relationship between sustainable Fashion product usage and buying intention of the respondents.

Table 4 shows that 40% of the sample are already using one or the other sustainable products. 55% already have an intention to use sustainable product. However only 5% have no intent to use sustainable products

8. CONCLUSIONS

Sustainability is the thought which has taken deliberation at the level of academicians, researchers and Fashion & Textile industry. Consumers of today are very anxious about environmental and societal issues. This apprehension is very much evident in their behaviour due to growing inclination towards sustainable products. The results of this study are practical and theoretical useful for both industries and scholars. By determining result, it will be clear the characteristics of consumers who might purchase these Fashion products. Hence if the Fashion & Textile industry plans to launch sustainable products then the study may be helpful in identifying potential consumers.

Commercials and profile-raising events must be taken to make people aware, converging on the environmental aspect as it is found to be the most influential factor motivating sustainable Fashion product purchase and usage. Moreover, personal consciousness of consumers must be given due consideration, besides promotion, as it is also found to be a rousing factor. Awareness programs of environmental degradation and benefits of green

products must be launched along with the different types of such products that consumers can use.

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Sustainable Apparel Design for Longevity: Review and Analysis

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ABSTRACT

The apparel industry, in present era targets large volume, low cost, and fast manufacturing, which has a considerable negative influence on the environment (Fletcher, 2008; Fletcher & Grose, 2012). The benefits of extending product life cycle from an environmental perspective are numerous (Cooper, 2010). A short lifespan makes items need to be replaced more frequently, which has a negative impact on the environment during the stages of manufacture, transportation, and disposal. Several innovative techniques are being implemented to compensate for overall environmental impacts caused by rising consumer goods demand, with the goal of achieving a sustainable production and consumption paradigm. Increasing garment durability is a well-known key technique for reducing the overall environmental impact of the apparel industry. In this context, the modification or degradation of a garment's aesthetic or visual appeal with use is an important component that has a big influence on its longevity. Design for Longevity stands in stark contrast to the prevailing quick fashion model and explores interesting practices through which apparels can evolve beyond the design stage through mending, sharing or adaptation as per the changing requirements, thus increasing the lifespan of a garment. Accordingly, the present research paper examines the design solutions for extending the lifespan of fashion products, which contribute to the longevity of consumers' wardrobes.

Keywords: Longevity, Durability, Sustainable fashion, Design solutions

1. INTRODUCTION

Textiles and apparel are now predicted to be the fourth greatest sector in terms of primary raw material consumption (Manshoven et al., 2019), with only less than 1% of recycled textiles reused in new clothes (Ellen MacArthur Foundation, 2017). Moreover the impact of fast fashion and its association environmental depletion, waste generation, and the spread of the "disposable" mentality is well-documented in the literature. Low-cost, fast fashion clothing articles can only tolerate a very brief cycle of use before losing wear ability. Short lifespan promotes rapid replacement of clothing products, posing a danger to sustainable clothing usage (Laitala & Klepp, 2015).

Several innovative techniques are being implemented to compensate for overall environmental impacts caused by rising consumer goods demand, with the goal of achieving a sustainable production and consumption paradigm (Akenji et al., 2015). One such essential strategy is to extend the product's lifetime (Rogers et al., 2015; Goworek et al., 2020). It strives to meet global consumer demand by extending product lifetime, which results in a slower consumption cycle, fewer new items, and a decrease in raw material demand (Rogers et al., 2015). Furthermore, increasing product lifespan has been considered as a key enabler of circular business models (Gillabel et al., 2021).

1.1 Reasons for clothing Disposal

Purchases are made based on specified characteristics (intrinsic and extrinsic features of a product). Quality (good fit, durable materials, high quality production, durability in use and laundering); utility (suitability in use, ease of maintenance); and aesthetic (beauty, classic design, colour, fit) are all important in the context of product longevity (Niinimäki, 2014). Clothing is abandoned for a variety of reasons. Clothing is rejected because the fabric appears worn (usually around the cuffs, sleeves, collar, or knees), has been torn, discoloured, or otherwise damaged, or has shrunk or faded over time. Zips and elastic may have failed, or buttons may have been misplaced. However, more often than not, the reason is not product failure, but rather that the item no longer fits owing to a change in body size or is no longer desired due to a change in the owner's style or taste, sometimes related to fashion.

A variety of factors influence clothing life expectancy,

including fibre and yarn selection, fabric construction and finishing, trimmings, and garment design and make-up. Because these selections are often taken at the design stage, product design has been identified as critical to determining the garment's lifetime. Designers can specify several important aspects of the finished garment. Some of these features are physical and can be objectively assessed; others, such as 'fashionability' or styling, are subjective and cannot be tested objectively. Nonetheless, they are critical in determining garment lifespan.

Lately, fast fashion has made clothing products more affordable than ever before by utilising lower quality materials in clothing manufacture (Birtwistle & Moore, 2007; McLaren & McLauchlan, 2015). For example, Zara, the most commonly cited fast fashion company, introduced outfits deemed "items to be worn 10 times" (McAfee, Dessain, & Sjoeman, 2004, p. 4). As a result, the lifespan of garments has decreased which leads to throw away mentality amongst the consumers. In this context, garment longevity is claimed to be the single most important method for significantly reducing the environmental footprint (Cooper et al., 2013).

1.2 Designs and Perspectives for Longevity in Apparel Design

To effectively guide garment design for durability, it is important to understand the various elements that affect how long clothes last. Design for longevity is an emerging area of design research. Modifications to design principles can have a big influence at the designing stage to extend the wearability of individual items of clothing

1.2.1 Modular & Transformable design - Individual clothing components are attached together by fasteners such as zippers, hook & eyes, Velcro tape, and/or buttons in this unique approach. At the consumer's discretion, each component can be disconnected and re-configured to produce an altogether alternative clothing style. For example, if the fundamental shape is a long robe, by removing the sleeves, the garment can be turned into a long dress, or it can be transformed into a short skirt, a vest, and other designs by attaching/detaching different pieces of the garment. (Image source:

https://www.marialauraberlinguer.com/en/transformable-clothes-made-in-italy/)

1.2.2 Upcycling - Upcycling is commonly defined as a design-based circular fashion technique in which pre- or post-consumer textile waste is reused to generate new clothing (Aus, 2011). Utilizing already existing materials allows upcycling to avoid squandering potentially useful ones. This lowers the amount of materials needed to make new items, which lowers the amount of energy used, air and water pollution, and even greenhouse gas emissions. (Iamge

source:*https://sourcingjournal.com/topics/business-news/upcycling-mills-turning-old-clothes-new-fabrics-31065/)*

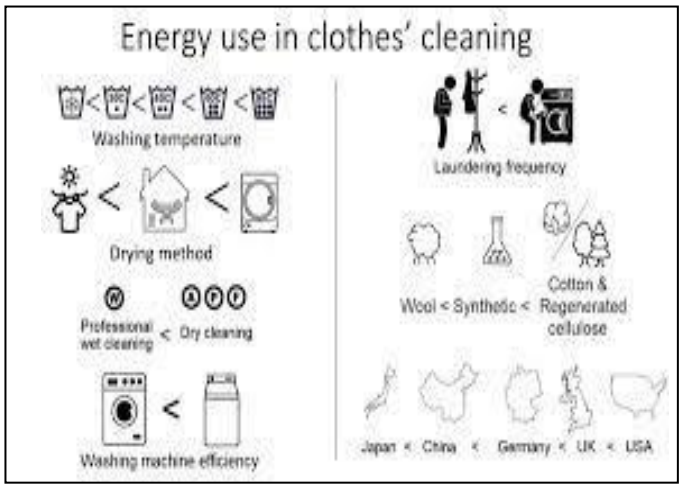
1.2.3. Alteration and Mending- Alterations are the changes made to the size or shape of a piece of clothing so that it fits better. It explains how to change a shirt that is too short or too tight, and it even suggests recycling a blouse front that ties under the sleeves and waist. For more complex modifications, there is also a reference to publicly available' renovation patterns. Most seam

allowances in mass-produced clothes today are a standardised 1 cm width. Rissanen (2011) advocates for the restoration of adequately sized seam allowances in modern clothing for making required changes as and when required. Whereas, Mending is a way of repairing clothes that have holes, stains, or other signs of wear to make them more useful and beautiful. It's about using what you have, embracing imperfections, fixing what's broken, and rejecting the idea that newer is better**.** These both methods help in reusing the existing garment thus extending their longevity. (Image source: *https://www.goldenstitch.com.au/*)

1.2.4 Care and Maintenance

The way clothing is used and maintained affects its lifespan. Depending on the circumstances of use, garments are prone to abrasion, stains, and soiling to varied degrees, and certain types of clothing will require more regular cleaning than others. However, the frequency with which a garment is laundered affects its lifetime, and washing at the incorrect temperature is likely to diminish its life.

Customers can receive guidance from designers and brands about how a garment's fibre, fabric, trimmings, and general structure help to extend the durability.



(Image Source: *https://uni.oslomet.no/klesforskning/tag/clothing-maintenance/)*

1.3 Sustainable solutions for Longevity in Apparel design: *A Summary*

Garments designed for longevity feature high levels of aesthetic durability, which refers to the ability of surfaces and components to repair without risk of an unpleasant aesthetic effect (Zafarmand et al., 2003) and the continuation of aesthetic appeal throughout product lifecycle (Ghim & Shin, 2016).

There are four key areas where modifications in design techniques can assist guarantee products appear beautiful for extended periods of time, hence extending their useable life.

- **Size and fit -** One of the most common reasons for throwing away intact products is that they no longer fit. Designers can help increase longevity by creating garments that can be easily changed to accommodate realistic variances in an individual's size. Designing-in a growth allowance, designing clothing with modular, multi-functional features (such as reversible coats and jackets) and creating attractive fit by using bias cutting, pleating, draping, or a flared or larger skirt could be adopted as some of the design solutions.
- **Fabric quality -** Better quality textiles are more likely to resist long-term wear and tear. Obviously, the type of wear and tear depends on how the garment is worn; childrenswear and occasionwear have distinct demands. However, even within these many categories, fabric quality can have a considerable impact on how long an item lasts. Using materials and components that have been shown to be durable and colorfast.
- **Colors and styles -** While the turnover of fashion goods will always be higher, designers may help increase the durability of many outfits by adopting 'classic' or timeless styles and colours, which are less likely to go out of style. Classic designs and hues (black, navy, white, grey, and cream) help an item stand the test of time and increase the likelihood that it will be worn again when trends shift.
- **Care and Repair-** Proper maintenance and repair are essential for extending the life of clothing. Designers and retailers can have an impact on this by ensuring that customers receive the right guidance on maintenance and options for recycling and reusing. Applying fabric treatments to fabrics to lessen the possibility of stains and strengthening vulnerable areas, such as the knees and elbows, which are prone

to additional stress could increase the longevity of the apparels.

2. CONCLUSION

This paper discusses how concept of longevity in apparel design can influence design practise in the fashion industry, as well as recommendations that could for creating sustainable apparel designs. Designers and consumers can influence one another, and this iterative process may result in increased product longevity. Practical considerations for designers, such as selecting materials that are easy to launder, providing clearer care instructions, and ensuring designs are comfortable to wear, could increase users' perception of a garment's value, improving clothing care and maintenance and extending active use before disposal. Clothing that is meant to be versatile and adaptable in its styling and purpose may also serve to reduce the need for consumers to purchase more clothing. Creating awareness for the methods which would extend the life of their apparels would encourage the consumers them to adopt these practices leading to sustainable fashion.

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Sustainable Fashion and our Ecosystem

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ABSTRACT

Sustainable Fashion is an inclusive term including, processing, production and consumption in Fashion Industry with their impact on the ecosystem. While considering sustainability, various environmental issues are of great concern. When we sustain our fashionable and stylish approach along with eco-friendly consciousness, it is called sustainable fashion. Nowadays it became not only a necessity but also the latest fashionable approach. People locate reflection of their consumer awareness as well as fashionable Persona with green fashion adoption or ethical fashion. In addition to the adoption of biodegradable products, reuse and recycling are some other ways to inculcate sustainable fashion practices. By increasing recycled consumption like the use of recycled cotton, recycled wool, recycled nylon and other textiles we can cut down so many chemicals based, health hazardous and eco-hazardous practices that are involved at the initial stages of fiber production. By reducing our wardrobe stuff by adopting a zero-waste fashion approach, we again can play the role of motivating integral constituents of the sustainable fashion moment. This review paper is an effort to find out not only various hurdles as well as strengths of sustainable fashion but also the practices we can adopt to become ethically fashionable. Peace Silk, Zero-waste fashion, and Standardized approaches such as GOTS, and SANE could be milestones of fashion and sustainability. The main objectives are-

1. To know about sustainable fashion.

2. To identify the affecting factors.

3. To know about the ways to become sustainably fashionable.

Keywords: GOTS, SANE, Peace silk, Fast fashion, Zero-waste fashion, Eco-friendly Recycled

1. INTRODUCTION

The word Sustainable means able to be maintained at a certain pace for a long time. Sustainability consists of fulfilling the needs of current generations without compromising the needs of future generations while ensuring a balance between economic growth, environmental care and social well-being. Environmental sustainability focuses on the conservation of biodiversity without foregoing economic and social progress. Various factors of environmental sustainability could be measurements for safeguarding water utilization, reducing waste production, ensuring usage of recycled packaging, minimizing the use of harmful and non-biodegradable plastic material, sustainable transport means, and reuse of textiles and other stuff to protect flora and fauna.[1]

Some of the **factors** which are directly or indirectly related to the ecosystem and sustainability of fashion are as follows:

Heavy pressure on natural resources- There is great hiking in clothing production which exerts heavy pressure on natural resources such as soil water, air, forests, etc. Cotton which is grown in warm and dry atmospheres needs approximately 20000: l ratio of water to produce only one kilogram of cotton. This results in again imbalance of the ecological system and the desertification of the Ural Sea is an example of such an ecological imbalance where cotton production for a long time resulted in a desert area. Water is not only utilized in crop production but also at various stages of fiber production and also in finishing and dying processes. If we dye a fabric then per ton, 200 tons of freshwater are required, which is already left very limited on our planet. 85% of the daily needs of water of the entire population of India could be covered by the water used to grow cotton in the country. In our country, millions of people do not have access to fresh drinking water. The felling of trees for meeting the raw material supply for cellulosic fiber is also exerting pressure on forests which negatively affects our ecosystem.

We know that goat is the source of woolen. China and Mongolia are 80% producers of world Cashmere. While

grazing, the goats pulled out the grass by the roots, and as a result, it doesn't grow again resulting in desertification. The overpopulation of goats is becoming the main environmental threat even in Mongolia. [6]

Release of microfibers- whenever we wash or put on and put off the synthetic stuff microfibers either drained out in the water or are released into the atmosphere resulting in air pollution. It has been found that generally one person on average releases almost 300 million polyester microfibers per year by washing and more than 900 million into the air by putting on and off the garment. Such a large number of microfibers again becomes fatal for the environment. Firstly, they go to water sources through sewage, and from water sources, they add to our food chain through sea-foods and through irrigation.

Huge piles of textile waste - when we talk about pollution the textile industry is the second producer of pollutants after the oil industry. Large landfills are the result of extreme textile production as well as consumption.

Fast fashion -To meet out increasing demands of consumers there is a bulk production of low-cost to high-cost clothing consisting of a high percentage of cheap stuff. In the USA, 35-kilogram textile waste is generated per person on average.

Fertilizers and Pesticides- The use of fertilizers and pesticides in crop production are also major constituents of pollution. They are discarded in water sources and then come back to the food chain through water and sea-foods.

2. SOME POSITIVE FACTORS FOR SUSTAINABLE FASHION

We have witnessed some textile-related hazardous factors raising an alarm for the ecosystem. The solution for all is, we should cut down our wardrobe collection. **Someone said that the most eco-friendly jacket is the one that is already in the wardrobe.**

More use of natural fibers- Since they are biodegradable in nature, they are much better than synthetic ones. But again, in the case of cotton lots of water and other types of pesticides and chemicals are used from production to processing. Other natural fibers such as linen or hemp and jute require comparatively less water. Linen stuff is already a very trendy one. If consumers opted for jute and linen, they can be a part of sustainable fashion.

Sometimes we also take bamboo clothing as a new alternative but again in bamboo clothing the plant is reduced to pulp and then process with chemicals to make the fabric. Rayon which is the cellulosic fiber also involves the same steps of production. The use of these chemicals again exerts pressure not only on the environment but also upon the skin and respiratory tract.

Eco-friendly labeling (**Koszewska 2019**)- In the context of sustainability, we most frequently refer to eco-friendly and social labels that are either awarded by public or private organizations. Some manufacturers also use the labels themselves to promote the popularity of their own products that are socially or environmentally friendlier than the others that are produced in conventional ways.

The ISO classified these labels mainly into three types-

Type I: This is a voluntary, multiple-criteria-based, third-party ecolabelling.

Type II: They are self-declared ones. Developed by the producer without independent third-party certification.

Type III: Certification by a third party is involved. This is an environmental declaration based on quantified environmental data of a product and verified by a third party.

Certification for sustainable fashion- Based on qualitative and sustainable production, mandatory certification can strengthen the widespread concept of sustainability. Certification can be the only proof of purity.

GOTS- Global Organic Textile Standard

It is a leading textile standard for organic fibers, including ecological and social criteria. It includes certification for organic cotton. Certification of linen and wool can also be included. [3]

SANE- It is a holistic certification for sustainable fashion products. The product should be healthy for the planet and people. It is also concerned with environmental, social, and consumer safety aspects. It is a third-party certification, inspected by independent auditors, irrespective of the influence of producers. It not only covers garments but also fashion accessories, footwear and other home related-textiles. [3]

3. CAMPAIGNS FOR SUSTAINABLE FASHION

3.1 Greenpeace Detox Campaign

It was started in 2011 by Greenpeace. It showcases the relationship between global clothing brand and their role in increasing water pollution at the world level. The campaign is setting standards for a toxic-free future.

3.2 SDGs- 17 Sustainable Development Goals

When we talk about sustainable development, it is essential to mention the Sustainable Development Goals and the 2030 Agenda of the United Nation. The 2030 Agenda is the successor to the Millennium Development Goals, with a total of 17 goals. It is a collaboration of 150 companies. United Nations (UN) publishes an annual report analyzing how each goal is progressing. Ending poverty, and hunger, ensuring inclusive and equitable quality education, achieving gender equality, ensuring the availability and sustainable management of water and sanitation for all, promoting inclusive and sustainable economic growth, building resilient infrastructure, promoting inclusive and sustainable industrialization, ensuring sustainable consumption and production patterns, conserving and sustainably using the oceans, seas and marine resources for sustainable development, Protecting, restoring and promoting the sustainable use of terrestrial ecosystems, strengthening the means of implementation and revitalizing the global partnership for sustainable development [2] are some of these goals.

3.3 CCS- Clean Cloth Campaign

This campaign shows its responsiveness in ensuring workers' rights, exploring judicial mechanisms for workers' voices and setting companies accountable.

3.4 ZDHC- Zero Discharge of Hazardous Chemicals

It has a collaboration of 70 companies. They aim at zero discharge of chemicals by the textile, leather and footwear sectors for a sustainable environment.

3.5 How we can be part of a sustainable Fashion Movement

There are some tips to be a part of a sustainable fashion approach.

1. **A Big NO to Fast Fashion**- Fast fashion is a synonym for piles of clothes with the most of compromising quality in our wardrobe. We can set the limits for our wardrobe and strengthen the sustainable movement.
2. **Cloth Swapping**- It's a worldwide movement nowadays. We can exchange our clothing and we can rejuvenate our wardrobe with different varieties without exerting pressure on pockets and the environment. Also, we can establish clubs for the same purpose of cloth swapping. [4]
3. **Second-hand shop**- This concept is also gaining popularity. Many websites and apps like Vinted are offering second-hand branded quality at a very low cost. [5]
4. **Rented clothing**- The clothing which is not in use like a wedding dress, pregnancy wear, baby clothing, party wear, etc. can be rented out to ensure the inflow of income.
5. **Donate your stagnant stuff**- Instead of filling your wardrobe, we can donate that clothing that is not in use. This will adore the wardrobe of the receiver.
6. **No Dustbin-** Never discard your textiles in normal dustbins. Most of them are non-biodegradable and environmentally hazardous. Try to ensure them to be a part of the Recycling process so that they can be turned into new clothing through construction or chemical changes.
7. **Be a sustainable Buyer**- We can locate our favorite sustainable brands in the section The Brands We Like. The more we demand sustainable textiles, the more we can ensure their availability.
8. **Recycled textiles-** There are 2 ways to recycle the fabric:

- **mechanical recycling-** The textile stuff is melted to make new yarn. This process has its own limitations. It can only be done a few times and after that, the fiber loses its quality.
- **Chemical recycling** involves breaking down the textile molecules and transforming them into yarn. This process sustains the original quality of the fiber and allows the material to be recycled infinite times. This process is more expensive and chemical use cannot be overlooked.
- **Recycled polyester**- This is also called rPet. It is thought to be a sustainable choice. Although it is non-biodegradable in nature and takes years to disappear once thrown. During use, It also releases plastic microfibers. It results in 54% lesser carbon production as compared to virgin ones. [6]
- **Recycled nylon**- 600,000 Tons of fishing material

including nylon nets is released every year into the ocean. If nylon textiles including tires, nets, clothes, tights, carpets, and bags are recycled, the garbage from the ocean can be diverted and water pollution can be reduced.

- **Citrous fiber**- It is raised from onion peels which are byproducts of juice and other orange industries. Lenzing & Catania. Lenzing Group is a leading global producer of wood-based specialty fibers. It is doing a partnership with Orange Fiber, an Italian company that has patented the process of raising pulp from citrus by-products, to produce the first fiber from orange and wood pulp. This new product also identifies the companies' vision to promote sustainability in the textile and fashion industry. The new TENCEL™ Limited Edition raises new products by combining the imagination, innovation and inspiration of eco-responsible textiles, through reinventing branded fibers using unconventional sustainable raw materials.[7]
- **Organic Cotton** is grown by conventional methods of crop rotation and mixed farming without pesticides and insecticide usage. It is grown from non-GMO seeds. No negative impact on skin, respiratory tract and environment. Silk is a protein fiber spun by silkworms and is a renewable resource. Silk is also biodegradable. For these reasons, it is thought to be a sustainable one. However, chemicals are used to produce conventional silk, so it is considered that organic silk is a better option.

  In conventional silk, the killing of silkworms is involved. Animal rights activists always advocate "Peace Silk", Tussah, and Ahimsa silks which allow the moth to evacuate the cocoon before it is boiled or baked to produce silk.[8]

4. CONCLUSION

Sustainable fashion means not only a fashion term but also a need of society nowadays. Zero-waste fashion, eco-friendly approach, and biodegradability is also some of the remarkable terms when we talk about sustainability. A sustainable fashionable approach provokes maximum utilization of eco-friendly means of production, processing and consumption. If we go for optimum utilization of reuse and recycling practices then not only, we can save our society but also the whole environment. To maintain sustainability the heavy pressure on natural resources should be cut down at a universal level. GOTS and SANE are the terms that are related to the certification of sustainable fashion. There are some campaigns that are held for promoting sustainable fashion like green peace, Detox Campaign, SDGs- 17 sustainable development goals, CCS- clean cloth campaign, ZDHC- zero discharge of hazardous chemicals, etc. We can avoid piling of textile waste by saying a big no to fast fashion and by adopting cloth swapping and second-hand shop buying practices, rented clothing, and recycled textiles. Organic and citrus fiber clothing are also options for biodegradable stuff. Instead of conventional silk production methods, the adoption of peace silk and ahimsa silk can be a step towards protecting animal rights. In last we can conclude that a sustainable fashionable approach will not only secure the beauty and elegance of our life but also going to secure the future of upcoming generations.

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Sustainable Fashion Brands: Hope for Safe Planet

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ABSTRACT

Sustainable fashion has become the buzz word in recent times and at the same time misinterpreted to a large extent by consumers and brands promoting it. At one hand many brands are greenwashing consumers by exaggerating their miniscule efforts in the direction of sustainable fashion, whereas at other hand, due to lack of awareness consumers are failing to take holistic approach to ensure sustainable future. In this paper, an effort has been made to document the sustainable business model and sustainable textile design process opted by the brands. Case studies on brands like raasleela, ethicus, doodlage etc have been discussed. Moreover, what all steps consumers can take to ensure sustainability have been included. This study would enable budding designers to use conscious design process and provide creative ideas in order to produce fashion collections which are sustainability sourced, produced, used and can be made a part of circular fashion system.

Keywords: sustainable fashion, greenwashing, safe planet, conscious design process

1. INTRODUCTION

India is amongst the world's largest producers and exporters of textiles. The domestic market for textiles in India was valued at $ 100 Billion in 2019-20 with rising exports valued at ~ $ 50 Bn. Textile industry starts showing its larger impact over planet generating from cultivation of raw materials, processing of petroleum based synthetic fibres, yarns to fabric manufacturing to clothing construction to packaging, distribution and use across globe. Hence calculation of carbon footprints during all these phases becomes very challenging task. Any fashion brand claiming to be sustainable brand just because of one of its collections is using some amount of organic fibre is not justified. Hence for brands and consumers its becomes indispensable to be able to comprehend the meaning of sustainability.

Any 100% sustainable product is a myth. As there would be some amount of carbon footprint generation at any stage of production, be it manufacturing, supply, use or disposal. However if there are sufficient interventions being undertaken to reduce the extent of carbon footprint it shall be considered a sustainable brand. At present many terms are used interchangeably to convey the different aspects of sustainability like green fashion, ethical fashion, eco-friendly fashion, etc

At present when many brands are taking initiatives to promote their products as sustainable fashion product, many of these are ignoring the crucial role of imbibing sustainability into their business model to ensure better outcome. Examples of such brands could be brands like H&M which are largely focussing on producing collections to meet the changing trends and using non sustainable materials and processes but launching one or two collections being promoted as conscious or green collections would be considered as greenwashing, a term which means false vague, misleading claims made by the company regarding eco-friendliness of its products. Some brands just use minor percentage of organic cotton or recycled polyester in the fabric composition and quote their product as 100% sustainable. So there is a huge disparity in sustainable fashion category which needs to be addressed by the industry and assess their fashion collection in various aspects of sustainability. So having understood the implication of business model on overall outcome, the brands can eliminate a lot of processes ad procedures which end up leading to increased carbon footprint.

Fortunately, some designers are taking the initiative of setting examples for the upcoming designers by embedding sustainability into their business model**.**

Case study of some such brands have been discussed in this paper to explore various possibilities of practicing sustainability in the fashion industry.

2. RAASLEELA TEXTILES

Raasleela textiles, an Ahmedabad based label, is one of the best examples of following sustainable business model. It is avoiding the use of dyes be it natural or synthetic in its fabrics, since natural dyeing also involves

use of high amount of water and metal mordants in its process. The brand is using Kala cotton and unbleached raw cotton in all their products. Each of their products is completely hand sewn using the age-old techniques from Gujarat. The brand produces only on demand specific products and most of their products are largely handstitched. The brand is known for appreciating acknowledging the skillset of their workers as they are involved in the design process. Their workers are appreciated for the uniqueness of aesthetic sense they possess and errors are accepted into the product designing as an integral part. Every woman artisan is considered having her own style and defined skillset to perform which always leads to the product being one of its kind.

100% Hand-Stitched, Up-cycle Remnants, Raw - Dye free & Bleach free

Doodlage

Doodlage is one of those few known brands which is judiciously using post production waste of industry.

The core business model lies in utilizing the post cutting waster and post production waste into exclusive products and the leftover fabric pieces are converted into other products like accessories, packaging materials, soft furnishing products. Most clothing is designed to be size free, adjustable, having drop shoulders, elasticated cuffs and necklines using patchwork, panelled techniques for creating seasonless garments etc. They recycle post-consumer waste and post cutting scraps into new fabrics to create season-less well finished garments made for longevity. Their fabrics are made with ethical production units and packaging is designed to be plastic free.

Figures showing Limited edition garments using leftover pieces/industry waste

Upasana: The brand considers fashion as a medium to bring change int live of all the stakeholders including from farmers to spinners to weavers to printers to designers.

They have undertaken projects to address specific challenges faced by farmers, fisherwomen and weavers etc.

Ethicus

Ethicus is claimed to be India's first 'Farm to Fashion Organic & Sustainable Fashion Brand'.They grow their own Organic Cotton which is branded as 'Eco-Logic Cotton'. This enables them to source the best long & extralong staple cotton that is used across all their products. They have established a Handloom Design Studio in their hometown Pollachi in TamilNadu, India and work with local handloom weavers & traditional artisans from all over the country to create world class textiles for their customers in India & all over the world. They consider sari as the most sustainable fashion option as it can fit to any size, can be styled to suit different occasions. To ensure that each player in its textile value chain, from Farmer to the Artisan are respected & treated fairly. All Ethicus products carry tags with the name & picture of the traditional artisan & states the number of days taken to make the product. Thereby, giving due credit, restoring identity & making them feel proud of their work & heritage. The brand produces handloom sarees for festive wear, occasion wear and workwear using ahimsa silk, organic cotton and natural dyes. Also they are promoting different traditional Indian craft like Ajrakh, Bandhani, Chikankari, Kalamkari etc and their by sustaining the legacy Traditional techniques and skills of traditional artisans.

After studying the brands in detail, it can be suggested that sustainability can be incorporated at various levels of fashion system in terms of:

- Use of materials
- Use of workforce
- Use of technology and processes
- Packaging and promotion of product range
- Distribution of products
- Afteruse of products etc

Conscious brands can ensure sustainability by following below steps:

- By not using any new virgin material in production
- By not using pesticides, harmful chemicals in production of fibres
- By not using any hazardous materials, process or technology
- By not wasting any materials in all the stages of production
- By not using any plastic in packaging
- Taking care and paying fair wages to the workforce
- By not producing trendy clothes and size specific garments
- By reusing waste water and disposed materials
- Use locally available skills and materials
- Use recycled materials like recycled cotton, recycled polyester

Awarenss level and sensitivity of consumers play a very crucial role in ensuring that brands follow suitability and use and post use of fashion products can become part of circular fashion system.

So these are the steps which consumers can follow:

- Buy less

- Buy second hand, rent clothing
- Custom made garments
- Choose durable, long lasting, classic fashion products
- Donate, swap,
- Sell preowned clothes
- Repair, reuse, upcycle products

3. CONCLUSION

Through these case studies, it can be concluded that taking smaller, simpler initiatives could go a long way in safeguarding the planet. This consciousness is equally required on behalf on consumers and brands alike. Some budding labels are proving a ray of hope in ever growing fashion industry in reducing scale of its irreversible impact on the planet.

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Zero Waste Fashion: A New Sustainable Fashion

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ABSTRACT

Fashion industry enclose every stage of production, starting from manufacturing of fibres, fabrics, construct new designing, and sales of garments. This publication is intended to be used as a source of inspiration for designers and companies, and all stakeholders whose interest lies in the area of sustainable fashion. But its very natural, fashion promotes innovation in designing new commodities depending on regular rising demands. However, the progress towards zero waste fashion and developing more sustainable forms of manufacturing in this sector is still lagging behind. Designers are seeking new ways to reuse existing garments in order to reduce annual waste. The need to move away from fast fashion and develop a more sustainable and positive fashion landscape is clear. However, when it comes to practice, the path towards sustainable fashion remains equivocal and hard to achieve.

Keywords: Zero waste, Sustainable, Fashion, Clothing, Design

1. INTRODUCTION

Clothing is an integral part of human society. It not only maintains the basic need of protecting human from surrounding atmosphere, diseases, climate for survival but means of expressing identity and wealth. Earlier, most of the garments were made according to the requirement of the consumer. But with the advancement of the technology, people are adopting new items very quickly with which old items are easily disposed off by consumers. Zero waste fashion refers to the production of items with little amount or no waste is generated. Sometimes, entire piece of clothing item is disposed off due to a small imperfection in the fabric. This type of waste must be eliminated in this fashion. The concept of zero waste is where everything is reused and nothing is discarded. Garments are designed and cut in a way that creates “scraps” in useful shapes and sizes that can be used to make other, smaller products. Such fashion is considered to be a part of Sustainable fashion movement. Research in fashion sustainability concludes that the leading cause of textile waste, specifically in the production stage of the garment, is the separation between the design and make processes. Several fashion designers have been using the Zero Waste approach, in which the creative process is executed together with the steps of pattern making and marker making for the textile cut. The long established pattern cutting process, a high-tech drawing process to illustrate every element of a clothing item on paper, cybernated or digital environment to clear the way of cutting the fabrics, considers the garment pattern pieces as irregular shapes, which cannot be placed next to each other like a jigsaw puzzle. Therefore, it cannot make the full use of the length and width of a fabric spread.

Zero Waste Fashion: A New, Sustainable Fashion Practice: its very nature, fashion promotes innovation and change. However, the progress towards zero waste fashion and developing more sustainable forms of manufacturing in this sector is still lagging behind. The need to move away from fast fashion and develop a more sustainable and positive fashion landscape is clear. However, when it comes to practice, the path towards sustainable fashion remains ambiguous and hard to achieve.

“Zero waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.”

2. WHY ZERO WASTE FASHION?

The fashion industry fabricates huge amounts of fabric and garment waste in every year that gets affix to our landfills, come up with carbon emissions and atmospheric warming (global warming). However, it’s not just kept away from

adding to our growing landfills that makes zero waste fashion a more environmentally friendly option. Using zero waste pattern cutting results in brands needing less

yardage of fabric to produce the same number of garments – which means ordering less fabric over time, reducing the resources used to produce fabric.

3. IT'S NOT JUST ABOUT GLOBAL WARMING

Working in a zero-waste technique reduces the disposal of landfills and therefore have a positive impact on Earth, but it also discharges toxic particles polluting the surrounding land, water and air. Other than that, there are many benefits of Zero waste fashion. Zero waste strategy needs few materials for production of garment from fabric thus reducing resources and use of less material. As it requires less material for construction thus reducing cost of item. A zero-waste fashion also fasters the production of goods.

4. REASONS FOR WASTAGE

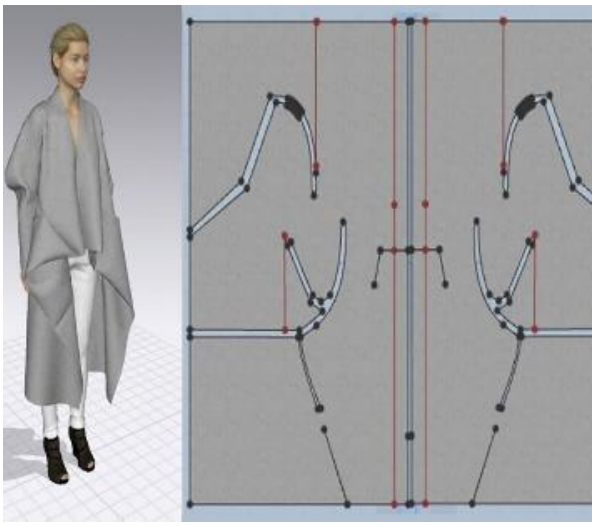
- Generally, the wastage takes place due to out-of-date techniques used in making apparels, ineffectual, lack of skills, fabric defects, designing problems etc.

- Millions of tons of waste are being disposed of by industries in landfills. Improper handling of industrial waste has devastating consequences to the environment. To meet the high demands of the latest fashion, production of non-durable and inexpensive clothing has increased resulting in more wastage.
- Fast fashion trend is very common these days. It provides affordable garments at less prices. However, fast fashion has its pollution footprint. Disposing of waste has environmental as well as occupational hazards.

- Clothing mass- produce fabricate over half a million tonnes of microfibre pollution that ends in the ocean. Half a million tonnes of microfibre are the similar to 50 billion plastic bottles, each year. 90% of waste water in growing countries is discharged into rivers and ocean without treatment which is very Harm full for environment.
- **Zero – waste techniques**
- Apart from the opportunity to eliminate or reduce waste during pattern-making, technology has enabled fashion producers to explore a zero-waste approach at the point of construction.

- A number of designers are beginning to explore techniques that involve directly weaving the pieces of a garment into the correct size and shape, providing the possibility to dramatically reduce the textile waste that occurs during production
- Modern zero waste fashion design from early twentieth century onward, it is possible to identify the creators of zero waste and less waste garments. These demonstrate the foundation of zero waste garments, a relationship between fabric width and garment cut. While waste elimination was unlikely to be a focus for most of the creators mentioned here, it is nonetheless possible to ascertain that the garments

featured here resulted in little or no fabric waste.



- **Clever Cuts** "Zero waste design," or, "zero waste pattern making," refers to the practice of designing patterns for clothing with little to no fabric waste. The practice is being adopted by designers who are using various techniques, materials, and technologies to achieve the perfect zero-waste garment. Technique-wise, it involves fitting all the flat pieces of your clothing pattern like a jigsaw puzzle so no fabric is wasted. Considering that roughly 15 percent of the fabric is discarded when a typical garment is made, the cumulative effect of leaving behind no waste has far-reaching environmental consequences. More than that, zero waste is about working within those constraints to invent beautiful new forms of fashion.

- **Geo Cuts –** Planned Chaos uses conventional garment blocks as the starting point, Geo cut begins with abstract shapes and geometry, while cut and drapes is a free- form approach of working on a dress form.

5. CONCLUSION

In some ways, zero waste is not new. Throughout history, consumers have had to adopt similar practices, like during times of war when women fashioned new outfits from old ones. Also, classic hobbies, like knitting and quilting, can be zero-waste endeavors. The difference now is that it has become an ethical choice, as well as one born out of necessity.

This year, New Zealand Fashion Week has announced their drive towards encouraging more designers to embrace long life fashion the antithesis to fast fashion and to take greater care to ensure the quality and carbon footprint of garments. Across the fashion spectrum, from couture to the high street, designers are listening to their customers and delivering more zero waste options. As technology continues to evolve in fashion practices like 3D printing, we can only imagine the possibilities of a zero waste future.

The increase in popularity of living a more sustainable, conscientious lifestyle that includes decisions on fashion purchases should, in theory, only continue to grow. Mainly the wastage takes place due to inefficient, out of date and conventional technologies, lack of technical skills, lack of quality awareness, designing mistakes communication gaps, fabric faults, etc.

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TECHNICAL SESSION-III

INNOVATIONS IN TEXTILE & APPAREL

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A Study on Extraction and Application of Himalayan Nettle Fibres in Textiles

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ABSTRACT

Girardinia diversifolia (nettle) nettle fibre is a bast fibre extracted from the stem of the plant and other parts of the plant are also used for other purposes. The name "nettle" is been derived from Anglo Saxon word "neodi", meaning "a needle"referring to the sharp sting. There are various species available but due to certain limitations and drawbacks only the himalayan nettle fibres are prevalently used for textile purposes that are mainly found in riverside and moist areas of Nepal, Uttarakhand, Himachal Pradesh, Jammu and Kashmir. This paper is an attempt to review all the details regarding extraction of himalayan nettle fibre and ascertain its use as a sustainable alternative to other synthetic fibres.

Keywords: Sustainability, Nettle fibres, Extraction,

1. INTRODUCTION

Uttarakhand is an Indian state situated in north of India and covers an area of 53,483 sq km which is 1.63% of the geographical area of total geographical area of the country. The state has pleasant atmosphere with abundance of natural resources that gives plethora of opportunities for employment to the rural people that can help to improve the economy of the state as well as utilization of these natural resources in the right direction. Uttarakhand Bamboo and Fibre Development Board initiated identification of natural fibre yielding plants present in the state and product development from them. Himalayan nettle has been identified as one of these plants. Extraction of nettle fibre from himalayan nettle (*Girardinia diversifolia*) could make it valuable as the fibre has high sustainability. It is mainly practised by bhotia community of Uttarakhand (Ghosh., 2019).

2. BHOTIA COMMUNITY

The name bhotia is derived from bhot which means Tibet. Bhotia tribe of Uttarakhand is mostly scattered in three districts namely; Chamoli, Pithoragarh and Uttarkashi. It is further divided into four different groups: the Marchas (traders), Tolachas (farmers) of Chamoli, the Shaukas of Pithoragarh and the Jadhs of Uttarkashi. Over the ages bhotia community has become highly skilled and trained in carpet weaving and woollen weaving near Dharchula and Munsiyari of Pithoragarh. Women of this community have wool weaving tradition that is not very expensive process because the materials and tools used for weaving are very basic and common that contribute to low materials inputs. But with passage of time people of this community have also started working with nettle fibre and found positive outcomes; though it is engaging and laborious process. Earlier this community had a belief that spinning nettle fibre brings evil but with time people of this community started extraction of nettle fibres and its spinning. Nettle fibres are mainly hand woven and hand spun (Badoni., 2019).

The northern part of India has wide variety of natural resources. People have developed many products that are present in abundance and have lot of future potential for employment. Ringal craft (bamboo) used for making baskets, mats, floor coverings, aipan folk art(floor painting), wood carvings, fibre extraction from natural sources are the best example of the employment people provide to themselves. There are many tribal groups engaged in extracting fibre from nettle plant and product development such as ropes, mats, sacks, traditional clothing for local community (Pargai.,2020). There are varieties of natural fibres available here but due to certain limitations only few can be used for textiles e.g. sisal fibre extracted from leaves and bhimal, hemp and nettle fibres extracted from the stem of the plant.

Pandey (2012) studied preparation and utilization of woven and nonwoven fabrics of Girardinia diversifolia, Agave sisalana and bagasse fibres for agro textiles. Information on use of various types of materials for

different agricultural practices were collected to procure the agro based fibres and agro waste bagasse from different sources and study their physical and chemical properties. According to the study, the species that are mostly found in India are as follows:

1. *Girardinia diversifolia* (Himalyan nettle/ Indian stinging nettle): This type of nettle species is found in Kashmir to Sikkim upto an altitude of 7000 feet. Its local names are *Bichho/ Allo/ Awa* in Hindi, *Sisaun* in Kumaoni language, *Kandali* in Garhwali language, *Santhak* in Manipuri, *Ullu*/ *Sishnu* in Nepali.
2. *Girardinia palmata* (Niligiri nettle): It is found in Assam and Khasi hills upto altitude of 4000-7000 feet.
3. *Girardinia zeylanica*: It is abundantly found in Rajasthan and Madhya Pradesh.

Fig. 1. Himalayan nettle

History: Nettle fibre used extensively in many parts of the world like in the middle hills of Nepal and Europe for making clothes. Evidences were found(900-750 BC) from danish voldtofte grave that nettle cloth was used to wrap the human bones (Harwood., 2012). Until 16th century when cotton was introduced to the Europe. Nettle lost its popularity, since cotton was much easier to harvest and spin. However, it was found to be used until 18th century in Europe for making sturdy household clothes. Nettle made a brief come back during first world war when Germans fell shortage of cotton fibre and nettle substituted cotton in soldiers' uniforms that had 85% nettle fibre. During 1860, in Great Britain nettle was high indemand due to its durability and sustainability. During the Second World War British government demanded for 100 tons of nettle fibre for extracting green dye out of it. The dried nettle fibres were twisted for making robe and cloth. It was bronze age when its production began and production process of nettle is same as flax and hemp that could be made into variety of textures from silky to rough. Nettle fibres can be bleached and dyed in the same way as cotton textiles so they remained a popular choice, however, during 3000-2000 B.C. other cheaper fibres became more readily available (Srivastava., 2018).

TABLE 1: Specifications of Himalayan Nettle (G*irardinia diversifolia*)

Botanical name	*Girardinia diversifolia*
Genus	*Girardinia*
Species	*Girardinia diversifolia friis*
Family	Urticaceae
Vernacular(common) names	Allo, Kandali, Bicchu, Sisol, Puwa, Nagai
English name	Himalayan Nettle
Part used for textile	Bark

3. USEFUL PARTS OF NETTLE PLANT:

Himalayan nettle has been identified by the existence of protruding hair like structures from the stem. It causes irritation to the human body when one comes in direct contact with the nettle plant. The liquid substance present in the plant may cause blistering in skin. It is tall, stout, erect, tufted herb that grows 2-2.5 metres in length and its leaves have serrated edges. Its stem, leaves and roots have medicinal importance, used in cosmetics as well and it has high nutritional value. Nettle fibres are harvested once a year and it is grown in the month of July or August and it is ready for harvesting during October/November to January. The fibre yielded from the nettle plant is good in quantity and its range varies from 400-700lb per acre of land. The fibre obtained at first harvesting period is good and the fibre obtained at second harvesting is coarser than first harvest due to maturation of shoots. Nettle fibre production is biodegradable and does not release any harmful substances as compared to man made fibres. These plants are wildly grown and therefore do not require any pesticides or herbicides for their development and need low amount of water as compared to cotton (Hoekstra., 2009).

Roots: The roots are crushed and their extracted juice is used for washing hair. As the availability of packaged shampoos is increasing in remote areas this practice is facing a constant decline.

Flowers and leaves: The flowering time of the nettle

plant is during the month of July - August. Local people use flowers and leaves of the plant as vegetables as it has high nutritious as well as medicinal value.

Stem: Stem of the nettle plant yields good amount of fibre that is sustainable as well as eco-friendly with good fibre strength. Nettle plant is a wildly grown species with no use of chemicals.

4. EXTRACTION PROCESS

Himalayan nettle is processed using the old traditional method for extracting the fibres and their processing. It is mainly hand spun and hand woven on back strap loom. Due to unscientific degumming processes, fibre produced is of low quality and not suitable for quality textiles product. Traditional method of fibre production is labour intensive and it damages the inherent properties of the fibre as well. Thus the yarn produced is of inferior quality and requires longer time to spin small amount of yarn.

It is harvested during the month of July/ August. The plants that have grown 4-5 feet are the ones taken for processing. Gloves are used for protecting skin contact with the nettle plant. The stem is cut with a sharp knife just above the ground level and their roots are left intact. The root structure should not be disturbed as more nettles will grow from them. Finally the leaves are stripped. After cutting, the stem is left for drying in sun so that it is easy to split.

Next step is to split the stem and separate the woody portions from the stem. Separated fibres are boiled in a container so that remaining woody portions can be removed easily. After washing, degumming is done followed by coating in clay so that fibres remain in their position. Before spinning, degumming is done to remove the waxy substance present in the fibre. The fibres containing gummy matter cannot be utilized for making yarn and fabric until they are degummed. Degumming is done by boiling the fibre barks in water containing wood ash for 3-4 hrs. This technique of degumming is labour intensive and incurs high cost of production (Sett et al., 2016).

Rubbing with clay has the combined effect of bleaching and lubricating the fibre. These bundles are dried in the sun. After sun drying fibres can be spun into yarns. Superior quality fibres are obtained from first harvesting. Properties of nettle fibre (Sett et al.,2016):

- Fibre fineness (tex)- 1.44
- Extension (%)-1.50
- Work of rupture (Nmm) -0.17
- Force at 0.2% extension (cN) -24.64
- Tenacity (cN/tex) -43.3
- Initial modulus (N/tex)- 85.6
- Specific work of rupture (N/tex)- 4.58 (Sett et al., 2016)

5. REVIEW OF LITERATURE

Various studies have been conducted on himalayan nettle fibres. Nettle fibres are currently processed and used in the handicraft, whereas european nettle fibres are already used in the textile industry. Girardinia diversifolia has superior characteristics than the other nettle in terms of physical and mechanical properties, the nettle fibre has good tensile strength, elongation at break as compared to european nettle fibres (Lanzilao., 2015).

Nettle fibre was extracted using traditional techniques that are been practiced by local communities.Commonly, Boiling of the dried stem that leads to a little bit of loosing of the outer layer of the stem.The entire slot is washed followed by beating that break the loose outer covering of the plant.The slot is hung in the wires for drying. After drying slot is beaten up and removal of the outer part is achieved. Fibre slot become soft after each beating steps.The slot is cut with the help of the sharp knife to open the entanglements. Fibre roll is made in a foot operated machine (Bageshwari Charkha). At last Carding of nettle fibres is done(http://ubfdb.org). A new degumming method was experimented in which degumming is done at an ambient temperature and under controlled environment without scraping the fibres. Analysis of the chemical composition and evaluation of the physical properties of extracted fibres was carried out. Degumming resulted in much finer fibres rich in cellulose which could be spun into yarn in the modified cotton spinning system suitable for use in textiles (Sett et al., 2016).

Himalayan nettle fibre possessed promising characteristics for creating its significant impact in the textile industry. In order to determine the variation that could influence their physical and mechanical chracteristic. An attempt was made to change the molecular structure from cellulose I to cellulose II in both himalayan nettle and european nettle fibres by increasing concentration of sodium hydoxide was carried out from cellulose I to cellulose II of both himalayan nettle and european nettle fibres.

Researches were conducted not only in the field of fibre extraction but also blending of these fibres with other fibres in certain ratios and then testing the physical and chemical properties of the yarns suitable for use in textiles. In order to open the fibres the fibre was processed through modified cotton spinning system with blends and without blends. Number of yarns were spun using this technique. Fabrics were created using nettle fibre with different ratios of viscose and rayon and their physical properties were tested. Due to brittle and coarse nature of fabric an attempt was made for blending of nettle fibre with jute and viscose in different ratios: 100% nettle, 50%-50% of nettle and viscose,70%-30% of nettle and viscose and 50%-50% of jute and nettle. 50% of nettle and 50% of viscose was used for for fabric production because of its fine count and plain weaving, dabu resist print was applied on the fabric. The results showed that there are possibilities to make a different count yarn and mass production of nettle yarn is possible. Dyeing and printing can also be done on the fabric (Badoni.,2019).

To decrease the use of petrol based derivatives for reducing their carbon footprints and keeping in mind the environmental concerns, nettle fire is a promising fibre that is eco friendly and sustainalble. The fibre production from nettle would generate employment for many local communities. Various procesing units involved in production units of himalayan nettle fibre in Uttarakhand (Radhakrishnan et al., 2015).

Nettle fibre extraction through different methods and to create some desired effect on the quality of the nettle fibre. It focuses on textile quality as nettle fibres shares same chemical and physical properties as flax (Bacci et al., 2009).

Fibre based products constitute a key component of village culture due to limited income generated activities to local artisans. Twenty five species were observed and studied that can be used in local income generating activities (Singh., 2010). For documenting the extraction process of nettle fibres sixteen nettle units established in Chamoli and Uttarkashi districts of Uttarakhand were surveyed by Uttarakhand Bamboo and Fibre Development Board. (Garg et al.,2017).

6. CONCLUSIONS

Nettle can be considered as one of the latest to be added in the list of possible commercial fibre, and the biggest advantage it holds is that it can be 100% sustainable. Nettle fibre is making its remarks due to concern over the environmental damage caused by the processing of synthetic fibres. Nettle is a bast fibre obtained from the stem of the wild growing nettle plant, found in the temperate regions of the world. Countries like the UK and Germany, have been involved in the development of this fibre since 1999, and have made considerable growth in this direction.The physical, chemical properties of the fibres show promising results and sustainalbe superiority of himalayan nettle compared to any other fibres. However, lack of technology has affected its production; lack of design intervention has led to a situation, where nettle products developed here, could not establish a significant market. It was also observed that the skills possessed by the community at the cluster are no longer explored fully for developing nettle based products (http://ubfdb.org).

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Effect of Organic Clothing on Breathing Practices in Yoga

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ABSTRACT

योग: कर्मसु कौशलम् ॥ _ ***Bhagwat Gita, Chapter 2 Verse 50, Lord Krishna says that "work performed to the pinnacle of action is Yoga. Yogic practices have been adopted as ways of all around well-being. Every yogic practice, especially the asanas and pranayamas have their own set of breathing requirements. Our breath has a direct relation with the space around us and our closest space boundary is defined by our clothes.***

The properties of the fabric we wear have an effect on us. For example, cotton absorbs the energy of another's touch relatively easily, but the influence is easily removed by washing. Silk on the other hand is more difficult to maintain, but it shields our system from energies around us much better than other materials. Synthetic materials are manufactured from substances that are polluting our elements like air, water and earth. Since the body is in a constant state of energy transaction with its environment (primarily using breath as a medium of exchange), these materials, when in contact with our body, contaminate these elements in our body also, causing imbalance in breathing. Research shows the positive influence of organic fabric on mood, persona, emotional and mental health, allowing the mindfulness to begin, which in turn allows the breath to attain its natural rhythm.

This study shows how an organic and sustainable attire can stimulate and enhance the movement of breath and at the same time increase the positive results of the yogic practices.

Keywords: Organic Fabric, Breath, Yoga, Mindfulness, Healing, Sustainable, Emotional & Mental Health

1. INTRODUCTION

"Our mind is not in the body, our body is in the mind."

Clothes came into existence long before the tools did. The human race started with loin clothes made from animal hide, and today, thanks to technological advances and brilliant ideas, there are clothes being manufactured from materials even like coffee beans and plastic bottles. But somewhere with all the technological advancement, the science of making healthy clothing has been left behind, and the aesthetic dimension has taken precedence. While aesthetic element of clothing is an important one, it cannot be denied that the importance of effect on health of the cloth we are living in every moment is as important if not more.

It is possible that our ancestors, who were undeniably privier to the ways of nature and living in harmony with it, understood the effect of different fabrics on our physical, mental and emotional health, and discarded materials from use that were not conducive. Some parts of modern life are, at this point, widely known to cause environmental harm – flying overseas, using disposable plastic items, and even driving to and from work, for example. But when it comes to our clothes, the impacts are less obvious. As consumers worldwide buy more clothes, the growing market for cheap items and new styles is taking a toll on the environment. On average, people bought 60% more garments in 2014 than they did in 2000. Fashion production makes up 10% of humanity's carbon emissions, dries up water sources, and pollutes rivers and streams. What's more, 85% of all textiles go to the dump each year. And washing some types of clothes sends thousands of bits of plastic into the ocean. Also it is no coincident that there has been a significant increase in dermatological, and endocrinal diseases.

It has always been a debatable topic when mind and body are used in one context that who controls who, but a little awareness shows that even that thought has been triggered in the mind itself. This idea has often been supported by all our ancient yogic journals, mentioning that to attain the highest state of yoga, the most peculiar task is to control the fickle mind - Maharishi Patanjali defines yoga as "Yogas chitta vritti nirodhah" – to control the fluctuations / vrittis of the mind is yoga. The mental activities are driven by our senses and the senses by the sensory objects that are existing in the gross world. Among all the senses, the sense of touch is very refined – one that allows us to feel, plays a key role in

the yogic practices and breathing. The sense of touch is directly related to the air and space element and the closes space is defined by the clothes we are wearing. This space affects the functions of the body-mind matrix to a larger extent. When you are clothing yourselves, it's not just the body but the mind as well, and it has a direct impact on health, work and the quality of life itself.

Yoga as a practice has grown significantly since last few decades, no yogic practice is complete without the interaction of breath, without mindful breathing, it's just another exercise, breath acts as the bridge between the Gross/Physical Body and Pranic Body. Through the ages, Pranayama has been one of the fundamental parts of the Yogic practices. Enlightened Masters have taught various breathing techniques to control the Prana and hence control the mind. While yoga has evolved, there is an obstruction that needs to be handled that is clothing, to improve the efficacy of the yoga practice that is breathing, which is the focus of this paper.

This Paper aims to emphasise on the need, importance and role of fabric in our dressing citing research and literature, proving that the body is a breathing being and the nature of the fabric has a direct effect on the yogic practices and breathing as a whole.

2. PRACTICAL APPLICATION

Breathing is what causes the movement of energy and what helps the body relax. An already-stiff body that tries to shape itself into different poses will only injure itself. But breathing deeply, can open the practitioner to feel more emotion, as well as be more in tune with what's happening on in the body. Breathing deeply in yoga can actually help you avoid injury.

Deep breathing can also allow one to experience their true essence. The flow that the steady in and out action of breathing creates stimulates a transformation in the body and mind, purifying and cleansing them so that one's true essence shines forth. Circulation is increased, hormonal balance is cultivated, the organs are regenerated and the nervous system is pacified.

Anyone can choose to only do the poses, which can offer a good physical workout. However, yoga is intended to be far more. Breathing deeply allows us to access our transformative power. It opens us to yoga's ability to rejuvenate and refine our minds and bodies. Finally, deep breathing helps us find our way to unity.

The practical aspect of all the above requires a comfortable healthy outfit that supports and allows the peaceful movement of breath and hence the unity itself.

3. CONCLUSION

This is to conclude that the use of organic clothing promotes health in a deeper perspective, breaches the gap between mind-body complex, allows the freer flow of prana infusing mindfulness, peacefulness, and a healthier individual.

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Enamel on Metal – A Potential Art form for Enhancing Fashion Accessories

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ABSTRACT

Art enamel/meenakari flourished on gold and silver as a craft under the patronage of the Mughals. Known as 'meenakari' it is intricate and time-consuming to produce exquisite ornaments and artefacts. Today it is practiced in different parts of India but like a lot of traditional arts, losing practitioners as well as patrons. One reason is that the original art form was extremely elaborate and costly. This research paper aims to find out whether art enamel can be revived by making it part of the course curriculum of art and design courses and be used as an art form for enhancing fashion accessories. The findings of this paper will be based on interviews of renowned enamellists from India and abroad, conducting an introductory workshop for Fashion Design students and studio documentation.

Keywords: Mina, Meena, Art Enamel, Fashion Accessories

1. INTRODUCTION

Art enamel or meenakari (henceforth referred to as art enamel) as was known in India, was a popular method of applying colour to gold and silver artefacts encrusted with gems and pearls since the sixteenth century (Abū et al, 1927). The art and technique of applying mina on gold have a prerequisite of different metalworking techniques. The lavish lifestyle of the Mughals demanded a continuous flow of enamel for personal use as well as diplomatic gifts (Floor, W. 1999). Abū, -F. M., Blochmann, H., Jarrett, H. S., & Sarkar, J. (1927) Enamel/mina on metal is high-fired in a furnace or with a torch on metal prepared by different methods. India used gold and silver while early western enamels found were also gilded bronze and copper. (Hetherington, 2006) Today, enamel tools and materials available allow for enamelling on many different surfaces including steel. Sharpless, R. (2017) Firing the colours at different temperatures leads to unlimited permutation combinations with stunning results.

2. BACKGROUND

Art enamel made in the traditional technique is intricate, labour-intensive, and requires years of training. The studio art enameller is an artist creating designs with modern sensibilities, apparent in the work of international artists and jewellers. Using a cheaper metal like copper, reducing the number of firings and using the enamelled piece without a bezel brings down the cost further. This is the need of the hour as the status of art enamel today is in jeopardy, with reasons ranging from the loss of royal patronage, changing lifestyles, out of reach for the masses because of its cost of materials, and time-consuming making processes. As the demand for enamel fell so did the number of highly trained craftsmen. The direct impact resulted in the limited number of generational families practising the original technique and the lack of awareness of the medium in the art and design community and public domain. To study the feasibility of introducing art enamel in art and design schools, interviews were conducted with national and international enamellers to incorporate their views, a sample piece was created at Culture Chauraha Art Studio, Delhi, and a three-hour workshop was conducted at Ruchi's Institute of Creative Arts (RICA), Allahabad in which sixteen fashion design students of first and second-year fashion designing participated and gave their feedback

Interviews: The Indian enamellers interviewed are Veenu Shah, Dr. Jyoti Singh, Dr. Ruchi Mital, Smriti Sangal, Kirti Kabra Shah and Pooja Shah. The traditional artisan interviewed are Tarun Kumar from Varanasi, Jaswant Singh from Jaipur and Bappi Menawalla from Delhi. The western artists are Jan Harrel. Patricia White, Martha Banyas, Sandra Mc Ewen and Delia Dante from the United States of America, Gille Hyote Byron from the United Kingdom and Gabor Fargo from Switzerland.

The perspective of artists from the enamel community are as follows:

On being asked about their introduction to enamel almost all of the above artists were enamoured at first glance and saw possibilities. Attending a one-day workshop, observing someone work, basic equipment was acquired and they learnt from books and other practising enamellers honing their skills over time. The traditional artists, Tarun and Jaswant grew up learning the technique from their forefathers and practising till they achieved the required skill. The enamelling process is simple and creating awareness goes a long way to convert enthusiasts to follow this medium feels Delia. Jyoti Singh, a potter and enameller feels that learning the medium is fairly easy, though the real work starts with practice. She also reiterates that "enamel has the scope of creating a new line of products for the fashion industry and enamel jewellery is very under-explored. The traditional enamel is stuck in its 'Kundan' avatar and needs to innovate". Kirti Kabra Shah, a jewellery designer from Mumbai learnt about enamel as an element in jewellery and feels introducing it as a subject would benefit designers. Pooja Shah a Mumbai enameller feels enamel has tremendous potential in today's markets. Veenu shares her knowledge by introducing enamel through short workshops while Smriti Sangal from Culture Chauraha Art Studio, promotes enamel, and feels the need for more widespread awareness.

Enamellers Jan, Martha, Patricia, Delia, and Sandra from the west, who teach online as well as offline, by providing videos and resources for techniques, have successfully trained students from around the world, who have access to basic facilities. Their response was that more craft schools need to introduce this enchanting medium in their course curriculum to popularize it.

Practical Documentation: The second documentation was done at the Culture Chauraha studio by preparing a small copper piece to be used as an element for different fashion accessories. An enamelled button (Figure 4) was created to match the fabric. A one-inch copper disc was cut and domed by hand. The enamel applied in a couple of layers mimicked the colours of the fabric and design. The entire process took two to three hours. The disc was now ready to be set in a bezel of, gold, silver, gold plated silver or white metal, depending on the pocket of the end user. As part of the experimentation cut copper flowers (Figure 3) were also made, to be used as fashion accessories.

Fig.1. Workshop Image

Fig. 2. Workshop Products

Fig. 3. S r

Fig.4. Enamel Button by Smriti Sangal

3. WORKSHOP

During the three-hour workshop with fashion design students, they made their designs on paper and then transferred their concept to copper in enamel with the help of enamel artists (Figure1). The disc created by them were visualized to have many different uses as buttons, cuff links, earrings, pendants, purse clasps, slipper buckles, brooches, hair pins and finger rings (Figure 2). Sixteen students attended the workshop, ten females and six males.

After the workshop students were asked to fill a feedback form with the following questions:

Question 1: Would you like to learn enamelling further?

Response: Positive yes from twelve, four were uncertain and one said 'No'

Question 2: Should art enamelling be included in your course syllabi?

Response: eight responded that it should be included, seven were unsure and one said no

Question 3: Can you use this technique for fashion designing products?

Response: All the students said yes.

Question 4: Were you aware of Art enamelling before you came for the workshop

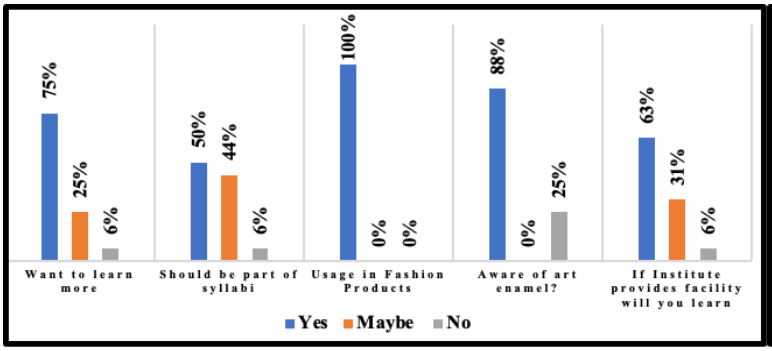
Response: twelve students out of sixteen knew about it. Seven students were aware that enamel used on jewellery and meena are the same.

Question 5: If provided with the facility at your institute would you learn?

Response: Ten said yes, five were unsure and one said no.

Question 6: Was Art enamelling easy to learn:

Response**:** One student found it very easy, eight easy and seven found it difficult (Chart 2).



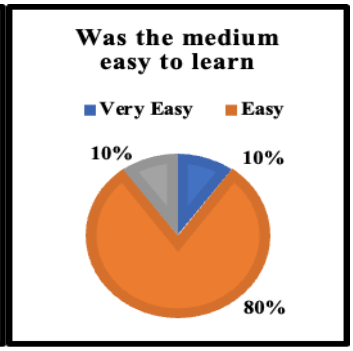


Chart 1: Responses by participants of Art enamel Workshop Chart 2: Learning graph

4. INFERENCE

Awareness can be created and enamel popularized to be learnt as a creative design medium. Majority of the students' reactions were positive, they want to learn and explore the skill as they felt that usage of the art enamel products in the fashion industry would be 100% (Chart 1). The enamel artists who are also teaching are in favour of creating awareness and products that can be created to suit every pocket.

5. PRACTICAL SIGNIFICANCE

Art enamel, introduced in art and design schools and colleges will create awareness and interest which can be a part of skill development. With very basic tools and equipment, an enamel studio can be set up at a low cost. Introducing it in art and design school syllabi and creating fashion accessories will create a scope of developing art enamellers as an accessory industry for fashion. As the enameller, Jyoti Singh rightly points out that "it is through creating awareness of the versatility of the medium we can draw the interest of interior designers, artists, and product designers." There is a need to introduce enamel as a course at craft and art institutions. To improve craft skills and make material available, resource centers should be created. Focused enamel groups for strengthening and promoting enamel and sharing skills and knowledge should be considered. The practical significance of enamel in the fashion industry will be apparent by organizing periodical conferences, and exhibitions dedicated to enamel. Inviting experts to share their skills by way of short workshops will aid learning.

6. CONCLUSION

The interviews with enamel teachers and practitioners, and their views on propagating enamel in the modern world are unanimous. Introducing enamel in the syllabus will create awareness and bring it into the public domain. The student response and the studio documentation reinforced a positive response and proved the product can be made at a low cost. This will enable the craftsmen to impart their traditional knowledge and be a source of earnings for them. Starting a dialogue between the traditional enameller and the design community will lead to a new direction allowing the artisan an opportunity to think in the global context, and marketing trends. The traditional artisan is stuck in a time capsule, replicating old designs. Enamel will get a new relevance and a supporting industry will have a chance to develop.

Enamel accessories on the fashion show ramps will bring enamel into the common space and create awareness. As enamel in its traditional avatar is losing ground, it will have a new lease of life and opportunity for development. Enamel can be as laborious and expensive as it can be quick and affordable. The right incentive, opportunity and training can make it the new favorite technique. The erstwhile Jaipur Maharaja Sawai Jai Singh created a museum and a crafts school for training in the eighteenth century (AMBER/JAIPUR RECORDS). His efforts put the city of Jaipur on the world map, a position it enjoys to this day. Wearing heavy traditional jewellery is passe, and enamel in its new avatar can be the next innovation in design and skill development in the fashion industry leading to entrepreneurs catering to the future.

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Kalamkari in Modern Era

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ABSTRACT

Kalamkari is a word that runs through the history of Indian textile from the beginning as a simple craft, through both great and bad times and down to its revival today. In modern days after revival of Kalamkari, the demand for it has increased, digital printed Kalamkari fabric are majorly replacing the traditional hand painted\printed fabric. Kalamkari involves intricate and tedious procedures, since this is time consuming process, new emerging printing technologies are replacing the traditional methods. This digital printed Kalamkari has created a new trend in the textile and has a great influence on fashion industry since it combines both traditional and modern designs which is the latest craze amongst the younger generation.

Keywords: Kalamkari, Geographical Indication Registry Tag, synthetic, semi-natural.

1. INTRODUCTION

The process of decorating cloth, using dyeing techniques that partially resists parts of the fabric before dyeing the rest of the fabric, is the key to the making of Kalamkari. The Kalamkari tradition is more than three thousand years old. The earliest fabric samples of this craft found in the Mohenjo-daro excavations date back to 3000 B.C.

The art of printing on cotton was an Indian Secret. Cotton does not absorb dye but our printers found that printing was possible only when the cloth was treated first with a fixative or a mordant. This development contributed greatly to the growth of our painters and printers. It is also important to remember that they found a variety of raw material around them, which provided few but very rich colours.

Historically, the art of Kalamkari most prevalently represented the textile arts practiced all over the Coromandal cost. In Southern India, Sri Kalahasti has been considered one of the most prominent Kalamkari centres. The art form flourished under the royal as well as local patronage of the Hindu rulers in between the 13th to 16th centuries CE. The mythological textile paintings of this region served as narrative murals or temple hangings.

Hindu epics like Ramayana, Mahabharata, Shiv Purana, Vishnu Purana and other legendary myths and tales were narrated and illustrated in elaborate ornate style in vibrant colour palette of red, white, black, blue, yellow and green.

In Northern Andhra Pradesh, the port town of Masulipatnam in Golconda was a prominent trading site along the Coromondal Coast from where Kalamkari was traded to far off lands. Under the Golconda Ruler Qutab Shahi and his international trade alliance, Kalamkari textiles gained significance in Persian Safavid Empire for personal and domestic utilization. In the 17th century, the Golconda style was introduced by Quli Qutab Shah the ruler of Golconda (1622-68AD), Stylized Persian motifs the tree of life, roses bulbuls and pomegranate fruit, were added to the lexicon of designs. The Persians demand for prayer mats, bolster and pillow cover, floor mats without human images, grew to such an extent that block printers took over the work from painters and block printed Persian designs began to catch the eye of many traders.

Individuals Europeans in the 17th century bought Kalamkari as they were enchanted by its colors and floral patterns. But major exports to Europe only began a century later adaptations were made for the European market too and they were given various names, the Portuguese called it ‘pintado’ and the word ‘sitz’ (origin from the Tamil word denoting the kalamkari: Chitti or Sitti) was used by the Dutch. The European market declared it as part of the opulent Indian luxury goods and during the 18th to 19th century, Kalamkari textiles adorned the British Empire with exclusive hand painted home furnishings and dress materials. The English however called it Calico or Chintz but chintz also included any printed cloth not necessarily Kalamkari alone. Kalamkari painting started to lose its patronage, fell into steep decline since Indians became more concerned about freeing the country from the British colonialism and the trade with Britain came to grinding

halt Kalamkari workers of Andhra faced a bleak future. In 1957, when almost everyone had abandoned Kalamkari, Kamaladevi Chattopadhyay, who has been entrusted with tasks of revving Indian culture by Pandit Nehru. She got the Handicraft board to fund a training course lasting two years, to revive Kalamkari.

Several efforts were taken to reinstate the glory of Kalamkari paintings as the demand were beginning to increase in the global handicrafts market. New products based on Kalamkari were introduced into the market. Kalamkari paintings which adorned only on walls panels, took innovative forms as design in sarees, dress materials, home furnishings and accessories.

2. MODERNIZATION OF KALAMKARI TECHNIQUES

In 21th Century traditional Kalamkari methods have been simplified to meet the growing demands by using modern printing technologies, semi-natural and synthetic dyes which reduce cost and time. Traditionally suruduchakka bark, chevvallikodi root were used for red colour, this has been replaced with synthetic alizarin, earlier Arabic gum was used a natural thickening agent nowadays, textile printing gum powder is used instead and stencils have replaced wooden blocks. The two most common opted modern methods, first one is screen printing the outlines of the figures and colouring the figures manually using semi- natural dyes with kalam (traditional Kalamkari pen), bamboo sticks or diluted fabric colours with paint brushes to achieve bright colours and the second method is, the design is fully screen printed by using semi-natural dyes or chemical dyes.

3. KALAMKARI PRODUCTS IN MARKET

Traditionally Kalamkari was hand-painted or printed in natural fibres, most commonly used is cotton and for the elite and exquisite needs silk was used since natural dyes can adhere only on these materials. With the advancement of synthetic dyes usage and printing, Kalamkari products now come in different types of fabric like cotton, linen, silk, semi silk, polyester, georgette, muslin, poplin, organza, raw silk, jute silk and so on to appease the latest trends. Apart from fabric, Kalamkari is now used in other merchandise also like bags, wallets, purses, belts, file covers, jewellery and foot wears etc.

4. EFFECTS OF MODERNIZATION

Kalamkari has been given Geographical Indication Registry Tag, because of the traditional methods involved and usage of natural dyes native to its geographical origin. But some of the Kalamkari artists are misusing the Geographical Indication Registry Tag, they are using the tag for products which have been manufactured using latest methods and chemical dyes, which decreases the authenticity of Kalamkari Art form.

There is also rising concern of contamination of water bodies near Kalamkari production unit due to usage of chemical dyes, whereas natural dyes traditionally used have no toxic effect.

5. CONCLUSION

Kalamkari design prints have been popularised all over the world by the advancements in printing technologies and synthetic dyes. Instead of chemical dyes, water-based ink usage should be adopted more since it is eco-friendly and they are free from harmful chemicals, water-based inks are safe, not just for the environment but for the artist as well, and they easily wash up in water.

Thought the art form have get evolved using modern techniques, we should encourage and try to preserve the traditional method so its origin is not lost.

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Mashru - A Joyful Disposition of Colour

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ABSTRACT

The joy of Indian handcrafted edifice lies in the individual manifestation of surrounding, personalized transformation of material in wide artistic and chromatic comprehension. Colour is a leading component to create that delight and gives the first-hand impression to viewer. Uniqueness of certain crafts majorly lies in their colours. Mashru is one of such crafts which is known for its multiple bands of colours. Artisans without having any formal training has been creating wonderful pieces that has beautifully encompassed the art of colour harmony. In this study, author has explored Mashru colour design in context of colour combinations and visual narration that has added its specific character and aesthetics. It was an exploratory qualitative study where interpretation was based on individual perspective, however study of secondary data helped in framing the perspective.

Keywords: Colour-harmony, colour combination, visual narration,

1. INTRODUCTION

India is home to several art and craft since ages. This has also helped in developing its specific palette and sensitivity over period. Of course, globalization has merged colour preferences and sensitivity worldwide, however the traditional one can be still seen to a great extent. This has been only possible due to the beautiful colour combinations and appealing harmony that has existed within them since ages. *Mashru* as craft is profoundly known for its multicolour and appealing composition, in fact it has given identity to this craft to a huge extent. It is commonly known as multicoloured fabric with silk warp and cotton weft. This fabric is quite bright, vibrant & dynamic in nature that adds charm and optimism all around. Being originated as fabric to fulfill the aspiration to wear silk amongst Muslims without infringing their religious norm of silk prohibition, it also filled the life of several communities of arid zone with colours who were devoid of colours in their natural surroundings. It is a joyful disposition of mood in the form of colour that had expressed the sensitivity of both the rich and poor since ages. Artisans without having any formal learning of colour has very well expressed them through attractive colour design compositions and today also hint of that legacy can be experienced in their fabric development. It not only engrossed aesthetics but also touched and sustained the psychological need of user and functional need of product.

It was an exploratory study where data were collected from primary and secondary sources. Especially *Mashru* photographs and samples were analysed in detail as per data received from books, journals, and artisans. Visual analysis of samples was a crucial part of analysis in terms of colour combination, their interaction, inter-colour harmony, stories associated with them and role of weave and material in bringing that impact. Later qualitative analysis was channelized based on individual perspective, however study of secondary data helped in framing the perspective.

2. COLOURS OF *MASHRU* & THEIR FEATURES

The distinctive and influencing colours of *Mashru* were social agents for interweaving religious and mystical motives and key to understanding the life, culture and interest of the rural masses and specific communities of the country. It's colours talks about the approaching and energizing red, invigorating and stimulating pink, refreshing and prosperous green, luxuriant and lush purple, ripened and matured yellow, blooming and blushing golden, murky and dusky black, affectionate and devoted orange. Gujarat as a land of diverse culture can be absolutely represented through the colors of *Mashru*. In a country like India colours had been 'surcharged with nuances of mood and poetic association' **(Bhatnagar, 2005)**. This can be profoundly experienced in *Mashru*. It comprises primarily red colour as accent. The colours of *Mashru* are bright, intense, eye catching, energetic, aggressive yet cheerful. The use of saturated hues in fabrics gives a pure and vivid look, making it more dynamic and live. Colours used in balance and contrasting fashion allowed its colour to coexist with each other harmoniously. This creates strong

interest in viewers eyes by creating a sense of depth and stability.

The higher presence of red, orange and yellow generate warmer appeal. When these warmer colours are used in combination with other colours, they tend to appear in the foreground of the fabric and enable others to recede in the background. Its colours communicate emotion, it was associated with specific meaning due to this many of the specific coloured *Mashru* found place in different rituals and customs, occasions, tribes and communities.

Here red has been used to narrate a variety of emotions such as strength, energy, aggression, love, passion and courage. Black has been used for mystery and pain. Green expressed growth and prosperity. Orange represented boldness, confidence, enthusiasm, optimism and adventurous spirit. The bright colours of *Mashru* are so impactful that they can elicit a barren land with zest of life. *Mashru* is a narrative of multiple colour. Choosing the correct colour by the artisan has been a Paramount in satisfying user without disturbing its essence.

Kacker (1994) also stated that the traditional colours were red, yellow and green. According to description furnished by **Naqvi (1979)** the major colour described about *Mashru* were found red. Recently few of the new developments have been seen in elusive-pastel hues. In traditional designs bright-dark colours formed the ground whereas light coloured motifs or stripes complemented over the dark base to enrich the dimensional effect. Overall, these colours have certain accounts wrapped in a lush of tradition, devotion, ritual, modernization and have passionate urge to come out of the plane in a balanced and composed attitude.

3. USE OF *MASHRU* BASED ON COLOUR DESIGN AND ASSOCIATED NARRATIVES

Textile symbolism in India had been rooted in tradition. Certain colours are traditionally associated with caste traditions are still in practice in its diluted form. Red is associated with the *Kshatriyas* or kings, a sign of valor. It also represented fertility and sexual energy and is preferably worn by brides; *Vaishyas* or traders are associated with green as it represented growth and prosperity; black considered as inauspicious, reflecting sorrow and ill omen **(Hatanka, 1996)**. Its implication has been seen in *Mashru* like, red *Mashru* has been widely used among native royal families of the Bhuj, for the costumes of bride & their relatives. Gujarat being land of traders since past till present, therefore green (*lilo*) *Mashru* had widely prevailed amongst *Vania* community. Green *Mashru* is specialty of Gujarat. Black *Mashru* had been widely used in the *Rabari* community; there is an interesting narrative about their black wearing. Many years ago, Jaiselmer of Rajasthan was the main center for *Rabaris*. Once, a Muslim King fell in love with a young *Rabari* girl. However, his proposal was refused by the community. The king got angry and threatened to kill all of them. The *Rabaris* out of fear broke their camp in the middle of the night with the help of a Muslim man. But the Muslim man while assisting the *Rabaris* for their escape was killed by the king. So, it is told that *Rabari* women wore black from then to mourn his death **(Frater 2003)**.

4. EVOLUTION IN COLOURS OF *MASHRU* OVER TIME & THEIR VISUAL NARRATION

Another major perspective in context of colour were that over time the nature of colour of *Mashru* had varied a lot and consequently its perceived impact had also transformed. The disposition of colours seen today in comparison to past had changed a lot. Like, red is no more the same red, yellow is no more the same yellow. Previously colours were bright yet soft, quiet, fuller and effective. Today also colours are bright but strident, amplified, and deficient. The number of colours used in *Mashru* at present has increased considerably. However, in few of its specific designs like *Paanchpata*, *Panchrangi* etc. numerous colours had been used previously also in a unique manner highlighting each colour's individuality.

Today, specifically in Kutchi *Mashru*, a burst of enormous pattern & colours is into usage, not much upholding the colour harmony of traditional *Mashru*. Overall, in archive samples, the selected colours & created contrast were steep not harsh, daring not unsettling with juxtaposition of warm & gentle colour whereas these characters were found missing to certain extent in recent development. In addition to this several new colours or variation of traditional colours had also been seen like light purple, chocolate brown, peach etc. in present designs. In certain designs attempt to match the urban taste had been made which had also shifted a bit the traditional sensibility of *Mashru* fabrics.

Generally, nature of several colour pattern seems to be overstated and flashy in many of recent designs, at times they give feeling of mere multiplication of colours of varied width. However, in archaic samples they seemed

to be modest and thoughtful, showing higher level of harmony and rhythm within design elements.

The overall feel of older samples tends to be warmer side due to its tawny character. However, in recent samples it is unclear. It seems to create several appeals based on their colour application like tawny, greenish etc. Previously use of natural off white or cream colour of warp yarns especially of silk along with others colours created softer contrast and archaic appeal whereas in recent fabrics mainly pure white had been used with other warp colours which have created stiffer contrast, nasty & hasty appeal. Based on visual interaction and analysis of *Mashru* samples its change and impact had been summarized in below table.

TABLE 1: Nature of colour of *Mashru* over period

Period	Nature of Color	Color Intensity	Overall Impact
19th century	Bright, calm	Less saturated	Subtle and serene
20th century	Bright, Calm & Moderately Advancing	More saturated	Medium robust and bustling
20th century	Bright, bold & highly Advancing	Most saturated	Robust and highly bustling

5. ROLE OF WEAVE AND MATERIAL ON COLOUR IN *MASHRU*

Material and weave interaction had been very significant in fabricating its distinguishing colour depth, colour contrast over patterns. Geometric stripes - woven chevron (*Kataria)*, rectilinear patterns (*mamul*), and decorative satin has turned prominent due to this. Its intensified, bold colours had been enabled due to satin weave, it has prevented the mixing of warp and weft colour because of its specific weave structure. Interaction of bright colours placed together yielded higher contrast value and thus created harmonious visual appeal.

6. EXPLORATION OF ELEMENTS AND PRINCIPLE OF *MASHRU* AND THEIR INTERPRETATION

Vibrant colours, linear bands, geometric motifs and *Ikat* patterns are interwoven with hardship and craftsmanship to create this fabric called "*Mashru*". It exhibits a unique art and science of colour palette. The harmony and rhythm that has been seen among multiple colours is thrilling. In its all form it arouses the special feeling of beauty to the viewer and connects with them emotionally and sensually. From researcher's view *Mashru* enhances beyond usual experience of fabric, with in depth meaning and elevated degree of involvement of senses in its varied pattern and colour.

This was an inquiry to understand various elements and principle of *Mashru* in framing its visual and emotional sensibility, how these elements and principles had been treated to get the desired effect. Its inquiry was beyond technique, an in-depth quest to unravel its attributes like Simplicity, order, contrast, value and harmony which formed the core component of this fabric. Plato has also described that harmony, proportion and symmetry constitute to the beauty of an object **(Plato, Phaedrus, p. 65**).

This is utterly experienced in *Mashru*. According to Ruskin's metaphysical theory "beauty in objects is found in certain qualities, such, unity, repose, symmetry, purity and moderation, which typify divine attributes" **(Puffer, Ethel D., Psychology of Beauty)**. If we talk about *Mashru* in terms of placement of its stripe, use of colour or nature of motifs; everywhere these qualities can be experienced in optimum intensity. The aesthetics of *Mashru* fabrics has been enhanced by the placement of contrast colour band. As day seems extra beautiful when it is compared with night, a white colour seems extra beautiful when it is after black, similarly *Mashru's* beauty is augmented when a green band is placed next to red, red is placed next to white, when a light-coloured *Butti* is ingrained against dark bright base.

Plate 1: Glimpse of colour contrast in *Mashru* swatches

In context of simplicity and order, researcher realized to relate and quote the words of **MC Escher** 'the urge toward simplification and order keeps us going and inspires us in the midst of chaos: chaos is the beginning; simplicity is the end. Order is repetition of units; chaos is

multiplicity without rhythm' **(Escher 1989).** Its simplicity can be easily experienced in coloured stripe patterns where only through colour bands engaging patterns have been created. Similarly, in *Ikat* and *Butti Mashru* judicial repetition of patterns and motifs against harmonizing colour in well composed fashion with adequate breathing space has been created. In *Mashru*, the principle of contrast and value complement each other as well as unveil discrete roles. Juxtaposition of contrasting colours enhances the value and intensity of colours. It is captivating to observe the dexterity of artisans that usually without any complex motif; just with linear coloured bands beautiful design composition had been created. What we observe as beautiful composition in *Mashru* is the relationship of contrast and value of colours which is perceived as distinct visual layers in the pliable structure. That is why multi-chrome appearance combined with lustre framed the identity of this fabric and makes us yearn for it.

Colour has constantly played a mystical role in *Mashru* textiles. Envisaging from sensorial perspective it evokes the mood of the wearer with grace, delightfulness, and gleam. Colours of *Mashru* communicate vividness and vibration where the intense multi-chromatic glow creates boundless richness to linger for a moment. Importance of vibrancy in selection of colours has been well understood by *Mashru* weavers. The choice of colours had been purposefully selected varying from region to region keeping into consideration of occasion and environment. In barren deserts it filled wearer with colour of happiness, in sandy storm it gave them identity, in marriages it imparted emphasis to bride & groom and filled them with fertility and sexual energy, in children it divulged playfulness, in adults it offered impudence and in folk communities it gave a mark of visual differentiation and social identity.

7. CONCLUSION

Adeptness of colour has enabled a variety of visual aspects in *Mashru*, one can effortlessly relish its rhythm, luster, simplicity of design; enabling it to be perfect edifice for physical and psychological interaction. Its unique proposition offers wealth of engagement and nuances depending upon religion, tribe, community etc. Therefore, *Mashru* fabrics give an aesthetically crafted layer of experiences symbolically as well as aesthetically as an amalgamation of many secret or sacred messages, their association, reiteration, expansion and consolidation making its meaning newer with freshness. "I believe it takes centuries to develop a sensibility and make it a tradition. And one cannot just slap designs in traditional sensibilities, even to contemporize the design" (**Belaa Sanghvi, 2020**). We really need to uphold colour sensibilities of *Mashru*. Also, these traditional textiles examples need to be discussed in classroom to make aware about age old colour harmonies that has been created and perfected over years.

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TECHNICAL SESSION-IV

TECHNOLOGICAL ADVANCEMENTS IN APPAREL INDUSTRY

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A Comparative Study of 3D Body Scanning Mobile Applications to Develop Customized Garments

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ABSTRACT

The purpose of the research is to explore the literature of various 3D body scanning technologies, which are prevalent in the market. Nowadays consumers are more fashion oriented; they want to experience how the garment will look like when they wear it before it is actually made. It has been reported many times that ordered product through e-commerce doesn't provide that level of satisfaction as consumer demands. The paper highlights various 3D scanning technologies like laser-based, light based and stereovision & image processing scanning techniques which could be beneficial for customers who are looking for garments with a perfect fit. Literature review reveals that consumers are appreciating the use of 3D body scanning technologies to scan their actual measurement but are apprehensive about the cost issues. This research study highlights about mobile scanning technologies which may offer an alternative cost-effective solution for consumer who are interested in 3D body scanning technologies for better fit. The mobile scanning applications are selected considering their functionalities, usage, processing, application expenses, ratings etc. The applications selected for research are Nettelo, 3D avatar, Me 360, True to Form, Polycam and Em3D. The preliminary trails were taken of 3D mobile applications and the results are interpreted based on scanning observations and questionnaire filled by respondents after scanning. The key points considered are scanning time, scanning re-takes, satisfaction with results & 3D avatar model and the comparison of measurements with extracted measurements. Looking at the scope and adaptability of 3D body scanning technologies it is expected that with time, competency and advancement future seems promising for customize solutions through 3D body scanning.

Keywords: 3D body scanning technologies, Nettelo, True to Form.

1. INTRODUCTION

3D body scanning is a technology that allows the scanning of human bodies and creates a 3D model. Infrared depth sensing and image technologies are used in 3D body scanning to scan the human body. It gathers measurements and creates a digital duplicate avatar of the human body's surface (Mindlessmag, 2020). It is a simple, quick, and accurate procedure. 3D body scanning will eliminate the requirement for fitting rooms. Instead, the machines will show them how the clothing will fit their body and forecast the proper sizing. All of this contributes to a more pleasant and customized shopping experience. As a result, the customer has a favorable impression of the retailer. The information acquired could also help designers better understand consumers' requirements through their scans. 3D scanning allows customers to visualize how clothes will look before purchasing them. 3D body scanning will discourage an individual from buying before testing, thus reducing the number of returns (*www.Fibre2fashion.Com*). 3D body scanning seems to be the future of the fashion industry, and the scanning machine will be found in retail stores because 3D body scanning is much faster than the traditional tape method. It combines all the data in seconds and provides accurate measurements of the scanned human body. It also helps self-checkouts rather than waiting for salespersons to show the likely apparel or accessories. Every new invention has some advantage and limitations and so do body scanning applications. While scanning the human body, scanning may get obstructions from hairs, consumer's clothing and the invisibility of some body parts like the top of the shoulder, neck, crotch, etc. Apart from it, 3D body scanner studio demands a huge investment including the software technologies.

There are limited 3D body scanning manufacturing companies in every continent—North America-19, Europe-29, Asia-7—and this is the reason behind the expensive nature of 3D body scanning (D'Apuzzo, 2007). However, infrared sensor technology is available in smart phones, which have been used for body scanning. With the help of different mobile scanning applications, an attempt has been made to scan a human

body and transfer the data to the proper software, which can help extracting the body measurements.

2. RESEARCH METHODOLGY

Research methodology involves the selection of 3D body mobile scanning application based on their functionalities, features, ratings, processing, expense, accuracy of measurements etc. Preliminary trials were taken and based on customer feedback, optimizing of scanning methods was done to develop 3D avatar and to extract physical measurements. Results were analysed based on scanning time, re-takes, accuracy of measurements and respondent feedback.

1. Exploring of 3D Body Mobile Scanning:

Smartphones were selected based on their operating system i.e IOS (by Apple) and Android. On app store there are many applications related to 3D body scanning like: 3D scanner pro, My fit 3D: 3D body composition, Abody.ai, Bodygee, 3D probox: 3D scanning model, Scan 3D, Polycam, Kiri engine, Ei pose 3D etc. Many applications were failed to achieve their aim. To achieve the objective of research, Preliminary trails were performed with every application for their suitability in customized fashion.

2. Developing 3D Avatar:

3D model extraction by application creates the exact human body with the help of infrared sensor technology. This process is done by two methods, one is by camera scanning method with the front camera and another one is with the image processing method by capturing maximum numbers of pictures and process them to create 3D avatar. After exporting the data to the 3D illustration software, suitable applications used for developing 3D avatar.

3. Extracting measurements:

Measurements extraction can be performed by the two different methods similarly as performed in developing 3D avatar, one by the camera scanning and the another with picture and image scanning. Extraction measurement scanning does not process or create the same shade and colour of respondent's skin tone. It generates the basic structure of solid colour with the measurements which are extracted by the scanning.

4. Questionnaire Feedback:

A small survey from respondent is taken to get the feedback of 3D body mobile scanning applications for its acceptance, accuracy, scanning time, number of re-takes and 3D avatar.

3. EXPERIMENTAL WORK

Experimental work to scan 3D body mobile scanning was carried out on many applications, however limited applications which met consumer's expectations based on their functionalities and suitability are reported here.

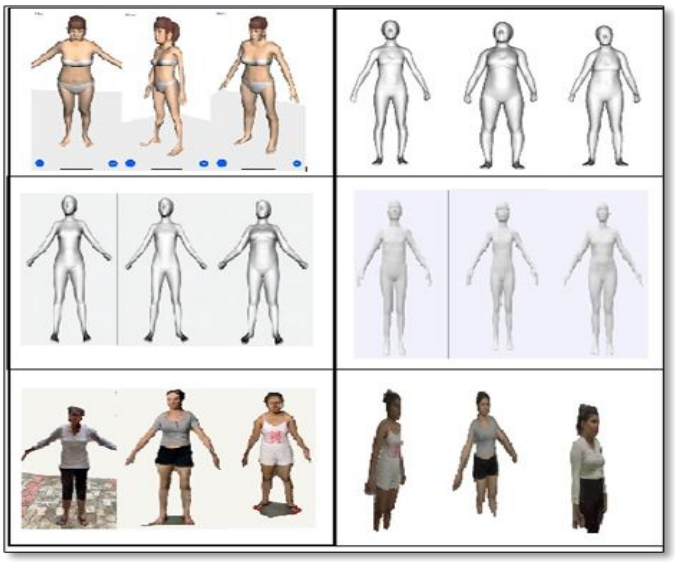


Fig 1: Top left: Nettelo application, Top right: 3D Avtar Application, Middle left: Me Three Sixty Application, Middle right: True to Form Application, Bottom left: Polycam Application, Bottom right: EM3D Application.

- **NETTELO APPLICATION**

Nettelo application is available in both the operating system of smartphones. This application helped to extract measurement in simple and easy way and required minor editing according to the human body. This application is self-scanning application, an individual can scan himself by keeping a mobile at accurate place and followed by the steps guided by the app. Nettelo application extracts the 21 measurements of human body from in seam to wrist. Application has a feature to extract the dimensions from anywhere-to-anywhere length and grith. The only disadvantage of the application is that it needs high-speed internet otherwise it starts hanging. The measurement extracted are in the centimeter and deviates ±2 cm for most of the scanning. The scanning of Nettelo

application is performed on 11 respondents and three are shown in Fig 1.

- **3D AVATAR APPLICATION**

3D avatar application is also available in iOS and android operating system. It creates the avatar with the image processing and converts it into the 3D model. During scanning on various respondent, it was experienced that the application was stopping in between the scanning and some technical glitch was faced after the scanning to proceed for next step. It requires high speed internet connection for smooth functioning of the software for 3D scan.

- **ME 360 APPLICATION**

Me 360 is the application which is available in android and iPhone smartphone. This application uses image processing technique which converts the 2-dimensional data to the 3-dimensional and this helps to extract the measurement. After creating account, some personal details to be filled for height and weight. According to your height a human body shape is created while scanning, you must adjust the body according to the shape and get ready for the scan. Before capturing the picture, body must be straight and visible which will be detected by the lines joining different parts of body. This process is followed in two position one is in front view and another inside. After clicking the image data is converted into 3D to create avatar and to extract measurements and the fat of the body. This application is used for fitness purpose, but the extraction of measurements provides the advantage to fashion industry also.

- **TRUE TO FORM APPLICATION**

True to form application is available at iPhone app store and used by various professional designer which helps them to achieve perfect fit, saves the cost and time, and also helps to expand the option available for 3D avatar. The application is guided by the voice speaker and before scanning it will guide the steps by video. After scanning both parts, the avatar can be shared to the dashboard but for that you should have a beta version which is paid. The application dashboard allows to transfer the 3D model into different 3D illustration software.

- **POLYCAM APPLICATION**

Polycam is the leading 3D capture applications available in iPhone app store. This application allows to create 3D model by the capturing lots of pictures by manual mode and automatic mode. Clicked pictures are created in 3D model by the triangle mesh formula and creates the same model as human with same shades and colour. It was noticed that while creating model of human being, the results are somewhat distorted as shown in Fig 5. This application has some basic tools for editing the model and measuring the measurements. The application enables the exporting of mesh data, colour point, cloud data, blueprints and it can be shared on messages by the polycam pro.

- **EM3D APPLICATION**

EM3D application is available at IOS app store, and the full name of application is Ethane Makes 3D. It scans the object in 3D by using front facing true depth camera sensor. It creates the 360-degree selfie model. The app interface is simple, but it detects the body shivering and sometimes overlaps the human position, and the result gets distorted.

4. RESULT AND ANAYLSIS

Experimental results performed on 66 respondents have been considered in terms of scanning time, scanning retakes and body measurement extracted (refer Table 1) while performing 3D body scanning through mobile apps.

TABLE 1: Scanning Results on various applications

Scanning Application	Avg. Scan time (Approx.)	Avg Re-takes	Avg. deviation in body measurement
Nettelo	5 min	1	3
3D Avatar	4 min	1	5.6
ME360	7 Min	1	4.6
True to Form	10 Min	4	5.3
Polycam	5 Min	1	Substantial deviations
EM3D	30 Min	5	Feature not available

From the Table 1, it is observed that the maximum scanning time was taken using EM3D mobile app while Nettelo, 3D Avatar and Polycam scanning was performed within 5 min. Similarly, Nettelo, 3D Avatar, ME360 and Polycam outperformed True to Form and EM3D in terms of scanning re-takes. Scanning on EM3D was a concern because shaking of mobile or the user or the respondent caused difficulty in scanning and needed stationery situations.

5. RESPONDENT FEEDBACK RESULTS:

- ***Satisfaction about the results***

The satisfaction of scanning results is the most important factor for acceptance of application. Filled in Questionnaire was received from each respondent for research purpose and the results have been plotted in terms of bar graph. From the Fig 7. it is depicted that the Nettelo application is highly accepted by the respondents (81%) and the least satisfaction of scanning results was through polycam application (65%) and EM3D (69%).

- ***3D Simulation (Avatar).***

The satisfaction of 3D simulation(avatar) was highly accepted in Nettelo application based on respondent results favoured by 89% followed by True to Form from Fig 8. However scanning time was little bit higher in True to Form. Polycom yielded least satisfaction results in terms of 3D Avatar.

- ***Scanning time.***

In terms of scanning time 3D Avatar application is highly accepted by the respondents (87%) followed by Nettelo application (83%) and the least by Em3D application (54%) and it also takes several re-takes.

- ***Scanning Re-takes***

The satisfaction of least scanning re-takes is highly accepted by the respondents with Nettelo application (85%) and the several scanning re-take taken while scanning is Em3D application (54%).

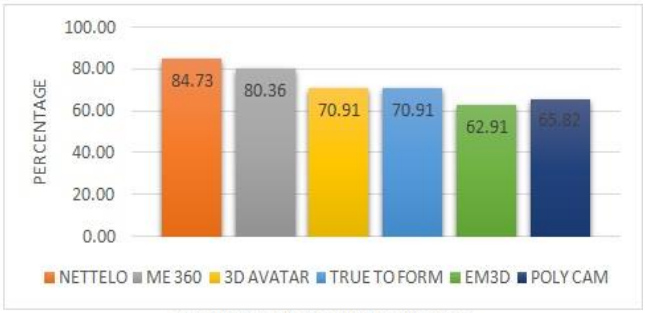
- ***Acceptance of 3D Body Scanning Application***

Acceptance of the scanning application was also surveyed in questionnaire from 66 respondents which is reported in Fig 11, it is depicted that the scanning application which is preferred by respondents is Nettelo (84%) and least liked application is Em3D (62%) application.

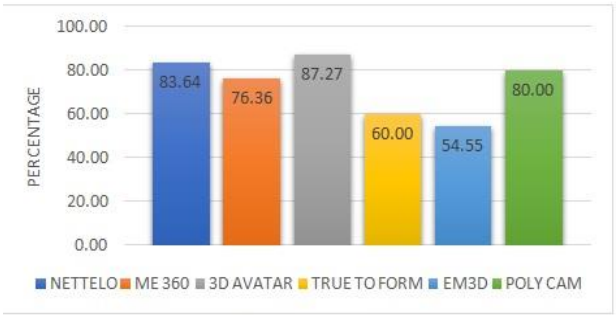
3D Simulation (Avatar) Satisfaction

Satisfaction among respondents

Scanning Re-takes.



Acceptance of scanning application.



Scanning Time.

Fig. 2. Respondent's feedback for applications.

6. CONCLUSION

The research study was an attempt to explore 3D Body Mobile Scanning technologies which may offer an alternative cost-effective solution for consumer who are interested in 3D body scanning for better fit. The mobile

scanning applications are selected considering their functionalities, usage, processing, application expenses, ratings etc. Results reveals that though there are many 3D mobile scanning apps are there but very few could match consumer's expectations. Nettelo, 3D Avatar, True to Form and Me360 have shown better results in terms of body measurements while for other applications substantial deviations were observed. Looking at the scope and adaptability of 3D body scanning technologies it is expected that with time, competency and advancement in technology, future seems promising for customize solutions through 3D body scanning.

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Gender Fluid Clothing - A Reality or Myth in India

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ABSTRACT

India has a rich history of textiles, both fabric and garments. Garments have always been a means of expression for status symbolism throughout Indian history. Heavily worked upon flowing garments were worn by both genders. The women's liberation movement saw the craze for slim silhouettes without frills and fancies. Although social and cultural norms have restricted Indian mindsets to strongly differentiate between the biological gender of the human body, attire is used to express the self. Gender fluid clothing, unisex outfits, androgyny fashion, gender-agnostic clothes, are terms are of recent origin in the fashion world, because there has been so much of gender-ization of garments. Blue is for boys and pink for girls, is the accepted norm and vice-versa is regarded as 'weird'. This paper tries to understand whether the Indian society is ready to accept gender fluid clothing as a reality moving towards becoming popular as 'the fashion of the day'. The findings of this research paper are based on a survey done on a population aged between 18 to 40 years.

Keywords: Gender fluid clothing, Unisex outfits, Androgyny fashion, Gender-agnostic clothes

1. INTRODUCTION

India has had a long history of garments which did not classify themselves based on gender. Men wore long flowing angark has with churridars and all decked up with heavy jewelry (Ranavaade et al., 2017). It was not only the royalty which wore such outfits, but it was the norm of the day to wear bright colored outfits (Raniwala, 2020). It, was only during the British rule and the long period of freedom struggle that the attire took a simplified look and version, influenced by the color pallete of the west. The silhouette went straight with minimalistic embellishments for the men. However, the women's clothing was still elaborate, but toned down. During the past century we find the Indian fashion scenario advocating a men's wear and a women's wear. It is only during the past decade that terms like unisex garments, genderless outfits, gender fluid clothing, androgyny fashion, gender-agnostic clothes, have come into existence. This concept has emerged and is deep rooted in the changing socio-economic and cultural mindset of the Indian society. Women education, empowerment, the fight for an equal status within the framework of the marital bond, a desire for sharing of responsibilities both at work and home, not characterising work as 'only to be done by males' or 'only to be done by females', has all contributed towards moving forward and taking baby steps towards a small section of a genderless society.

There is a biological difference in the human body by virtue of which the body is characterized as a female, male of transgender. There is no such thing like a female brain or a male brain or for that matter a female heart and a male heart (Eliot, n.d.). The nervous system in the human body does not have a assigned gender, it is an individual's own psychological perception, it doesn't really have to match the biological gender. (Rokach, and Patel, 2021). These are conditionings done during the formative years of upbringing. It is done by the society one is born in where language adds to this gender-ization, by giving inanimate objects their gender identification. In India the garments also have a gender; the kurta is masculine and kurti is feminine! Our society has very strict gender definitions and we tend to stick to these. Women have stereotype norms of wearing a sari, sindoor, toe ring, etc., after getting married (Baruah, 2016). Garments are a strong means of visual communication and the youth of today is eager to experiment with new ideas (Rosenfeld and Plax, 1977). Western fashion designers have been showcasing androgynous clothing on the runway for a quite some time now and Indian designers have not been far behind. Gender neutral clothing is seen widely amongst men during the wedding season (Achrekar, 2021). India has a young population and many young designers have launched their unisex brands of clothing, like Almost

Gods, Six5Six Street, Two Point Two Studio, Biskit, Moral Science, and The Pot Plant (Lakhina, 2020). But the question remains whether neutral clothing is moving towards becoming 'The Fashion' in India.

Objective: The main objective of this paper is to find out whether the Indian youth is moving towards adopting gender fluid clothing as the fashion of the day.

Methodology: A questionnaire was prepared for primary data collection. The questionnaire in google form format was distributed amongst students from diverse cultural and educational backgrounds aged between 18 and 40 years. The responses were sought on a two and three-point Likert scale.

Survey: The total responses received were 251, out of which there were 86% female and 14% male responses. It was interesting to note that there were no transgenders and no one ticked the 'prefer not to say' option. The analysis of the six questions is as follows:

Question 1: In your opinion do clothes establish gender identity?

Response: Majority of the population felt that clothes established gender identity (Chart 1).

Question 2: In your opinion are jeans, trousers and pants only male garments and skirts only female?

Response: Majority of the population felt that jeans trousers and pants were not only male garments, while a maximum number of respondents felt that skirts were only female garments (Chart 2).

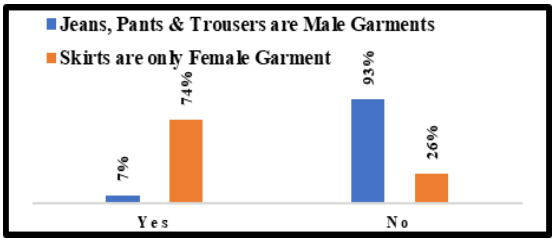


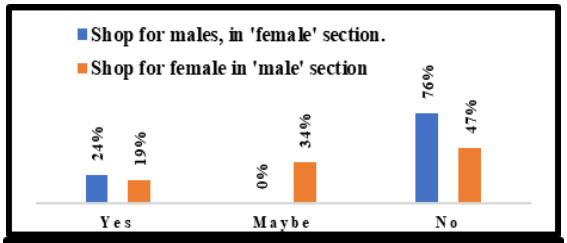
Chart 1: Clothes Establish Gender Identity **Chart 2: Trousers are male and skirts are female garments**

Question 3: Would you shop for males, in 'female' section and for females, in 'male' section?

Response: The responses for the question on whether they would shop for males in the female section were clear cut with a yes and no. No one answered with a maybe. However, majority said no they would not shop for males in female sections. While shopping for females in the male sections was responded with a only 46% no, 34% maybe and a 19% yes (Chart 3).

Question 4: What is your reaction on seeing a female in men's wear and a male in women's wear?

Response: The Chart 4 clearly reveals that 82% of the population does not react on seeing on seeing females wearing so-called men's attire and only 10% regard it as weird. Whereas on seeing men wear so-called female attires 41% find it weird and only 25% have no reaction.



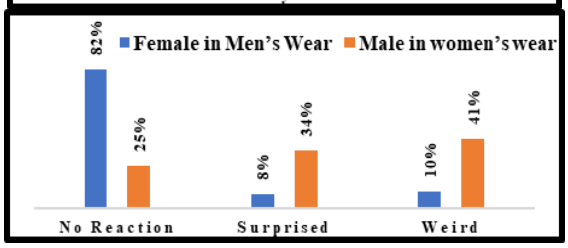


Chart 3: Shop for males and female in opposite sections. **Chart 4: Reactions on females in men's wear and males in female wear**

Question 5: Are you aware of the given terms? Unisex Garments, Genderless Outfits, Gender Neutral Clothing, Gender Fluid Clothing, Gender-Agnostic Clothes, Androgyny Fashion?

Response: The population answering the survey question was educated and were from that section of the society which bought and wore readymade garments. Slightly more than half the population was aware of the terms used for genderless clothing by the fashion Industry (Chart 5).

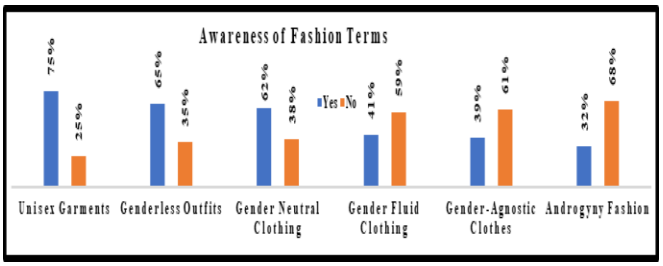


Chart 5: Awareness of Fashion terms

Question 6: Do you think fashion industry can help in making a Gender free world and that the Indian society is ready to accept gender fluid clothing?

Response: 68% of the population felt that by promoting genderless fashions the industry will move towards a gender free world. Whether the Indian society is ready to accept gender fluid clothing of not; only 33% said yes, 45% said maybe and 21% said no. It is interesting to note that the population is clear that clothes will help in a genderless society, but regarding the influx of genderless garments they are relatively unsure (Chart 6).

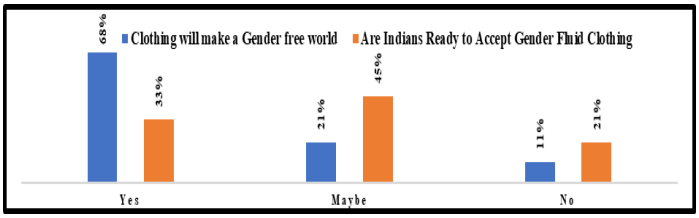


Chart 6: Clothing will make a Gender free world: Are Indians ready to Accept Gender Fluid Clothing

Findings: The responses to the six questions put forth reveal that:

13. People still prefer to identify themselves through their respective biological genders
14. Majority feel that gender can be identified through clothes.
15. Pants, jeans, and trousers are male and skirts female garments.
16. For males most would shop in male sections only, however for females more number of people would shop in male sections.
17. The population was more familiar with the terms unisex, genderless and gender neutral garments as compared to the rest of the terms.
18. Seeing women in male attire did not get much reactions of being surprised or weird (only 18%), but men in female clothing is still regarded with surprise and weirdness by most people (75%).
19. They do feel clothing will help in making a gender free world.
20. Most of the population was doubtful whether Indians are ready to accept gender fluid clothing. However the number of people who said yes were more than the ones who said no, showing that there is a rising trend of acceptability of gender fluid garments.

2. CONCLUSION

The Indian society is in a transitional stage where along with its changing social, political, and economic conditions there is a subtle change in its cultural environment also. The shift from joint families to nuclear families, from trousseaus consisting of only saris to western wears, from simple housewives to educated working women, and much more, the scenario is changing and evolving. This is seen visually in the attire also. The acceptance of gender fluid clothing is increasing in India. People are aware of such clothing and there is a considerable percentage which is accepting such clothing. This paper has tried to access the extent of awareness and acceptability of gender fluid clothing amongst the youth in India. The acceptance of women in male clothing is much more than of men in so called women's attire. The results of the survey suggest that people are aware of the existence of unisex clothing and are accepting it without much surprise. However, much needs to be done in this front as it is not only an isolated question of genderless garments but the entire perception of looking at a person not with a gender identification but as a human being. The demarcating lines of gender in clothes needs to be diminished further in India, so that the segregated conversation between 'men's wear' and 'women's wear' is negligible. This study has scope for further research on gender fluid clothing.

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Importance and Role of Natural Fibre's Properties in Athleisure Wear

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ABSTRACT

Functional clothing for sports and outdoor use is usually polyester, polyamide or elastane. These materials promise good moisture transport, protection against the weather, thermal insulation, and low weight. However, functional clothing made of natural fibres can also offer these advantages. This paper studies why natural fibre plays a vital role in functional clothing.

Exercise is only enjoyable if the body feels comfortable with it. A thoroughly sweaty shirt is a fun break during running, in the gym or as the lowest layer during a ski tour. But unfortunately, it is also harmful to health. The soaked textiles directly on the skin cool the body down to such an extent that there is a risk of cooling. For many years now, the clothing industry has constantly been developing new fabrics and textiles in which people feel comfortable even when they are sweaty. The four most important requirements that athletes place on their clothing must be met, i.e., Protect from wind and weather, Transport the sweat from the skin to the outside, do not keep the body too cold but also not too warm, be light, and be robust.

Keywords: athleisure wear, natural fibre, functional properties, comfort properties

1. INTRODUCTION

The significance of natural fibers in fulfilling the basic human needs of clothing and shelter has been well-proven since time immemorial. However, with the advent of synthetic fibers in 1900s, the popularity and usage of natural fibers became ancient. Nevertheless, the worldwide clamour for sustainable and eco-friendly approaches in textile supply chain and the depletion of petroleum resources has stimulated the usage of natural fibers, thereby replacing synthetic fibers with sustainable natural fibers. Natural fibers are grown naturally and do not pose any detrimental environmental impact except when fertilisers, pesticides and other toxic chemicals are extensively used to improve their yield. The negative environmental effects of synthetic fibres and their fossil fuel-based production encourage industrial organisations, researchers, and technologists to investigate cutting-edge and novel techniques for the growth, development, cultivation, and use of natural fibres in an eco-friendly manner. When it comes to textile applications, cotton commands the largest market share, but the fibre cannot be regarded as sustainable due to its heavy reliance on water, pesticides, fertilisers, and hazardous chemicals, which has a negative impact on the environment and the economy. Apart from cotton, some resource-efficient fibers replacing cotton in various textile applications include linen, hemp, flax, jute and bamboo. Linen is gaining interest among textile designers for designing clothing, footwear and handbags. Hemp and jute are rope-like fibers and exhibit coarseness compared to linen and are generally preferred for apparel and accessories that demand rough texture and durability. Jute is a plant-based multicellular fiber characterised by nodes and cross markings in the longitudinal view and polygon shapes in the cross-section view. Flax is cellulosic fiber in crystalline form featuring a length of 90 cm and a diameter of 12–16 μm. Flax is mainly cultivated in Canada, Netherlands, Belgium and France. The stem of the plant Linum usitatissimum is the fiber source. The fiber extraction is conducted by two processes, retting and scorching, to alter the fiber properties. The enzymatic application during the retting process causes pectin degradation, resulting in fibres' extraction. Flax fiber is extensively used for producing linen besides being used in furniture, home textiles and interior decor items. The bamboo and straw are other plant-based fibers gaining acceptance among fashion designers. Bamboo is wood-like tropical grass, while the sources for straw are wheat stalks, grasses, sisal hemp and rice paper. The

extensive use of natural fibers for a range of textile applications is attributed to their exceptionally brilliant mechanical and physical properties like good specific modulus, low density, toughness properties, low cost, recyclability and nontoxicity. Natural fibres are used in a variety of industries outside textile and fashion, including building, furniture, automotive, and fiber-reinforced composites. Additionally, natural fibres are the best option for the automotive and aerospace industries because to their low weight, superior crash absorption, and sound insulation qualities. The hydrophilic character of natural fibres, which necessitates chemical treatment to enhance their moisture-related properties, limits the applications of these materials to interior structures. Natural fibres' innate ability to absorb moisture when exposed to a range of temperatures and humidity levels poses a significant obstacle to their use in various environmental settings.

2. FIBER PROPERTIES FOR TEXTILE APPLICATIONS

The properties which appropriate for textile fibers to be used for textile applications are discussed in detail in the following section:

3. LENGTH AND APPEARANCE

Length of fiber influence their choice for fabric production. Short staple natural fibers like cotton, jute, and wool impart a stern look to fabrics made from these fibers. However, nylon fabrics and polyester filament yarns show a smooth and shiny look. Moreover, short wavy fibers like cotton and wool are affinity for dirt particles while long, continuous filament fibers like silk or synthetic fibers are easy to clean and do not get as dirty as their natural, staple counterparts. As a nutshell, accessories like scarves and stoles, which called for sheen and a smooth, soft look and feel, use silk or filament fibre yarns and fabrics in their creation. Conversely, clothing and fashion accessories made of jute and wool often have a rough, crimpy appearance.

4. MOISTURE ABSORPTION

The fibers vary in their similarity for water molecules with natural fibers like cotton inherently hydrophilic while synthetic fibers like polyester, nylon exhibit hydrophobicity or low moisture absorption. The moisture absorption property of fibers finds their choice for apparels and accessories suitable for a particular season.

Summer wear apparels and accessories should provide rapid sweat absorption from wearer's skin and thus utilises hydrophilic fibers like cotton. Fabrics made of synthetic fibers, being hydrophobic do not soak sweat and are uncomfortable in summers. A special consideration of fiber type is important while designing textile end products like gloves, socks which are in intimate contact with skin where sweat accumulation may lead to dampness and discomfort to the wearer.

5. THERMAL CONDUCTIVITY

The ability of the fiber to conduct heat away from the wearer's skin is yet another crucial factor influencing the selection of fiber for a particular end use. Cotton and rayon show high thermal conductivity and have the ability to conduct heat from body, lower the body temperature and providing cool feel next to skin, Accordingly, fibers with higher thermal conductivity are preferred for accessories intended for summers like driving gloves, socks, stockings. However, the requirements in winter are quite contrasting with such material choice that can provide thermal insulation and prevent the body heat to escape out. Therefore, fabrics made of wool, acrylic and synthetic fibers, being poor heat conductors of heat aid in keeping the wearer warm in winters.

6. STRENGTH

The strength of fibers finds the ease of washing of fabric made from the chosen fiber. Fibers have property of strength variation in dry and wet states. Fibers like wool, silk, rayon loose strength in wet state while cotton and synthetics show high strength even when wet enabling easy laundering of fabrics made from such fibers. Therefore, cotton and other synthetic fibers should be preferred for daily wear apparels and accessories which require frequent cleaning and laundering. However, occasional wear accessories like silk scarves, stoles are made of delicate fabrics prone to strength loss on repeated washings and need dry cleaning and less frequent washing cycles.

7. FIBRES PROPERTIES AND ITS MODIFICATIONS

Fibres have a wavy undulating structure and contribute many characteristics to the fabrics that are significant for the performance of functional clothing and sportswear. Sportswear depicts multitude of attributes, for instance, it provides functional support, enhances performance, protects athlete from strain/injury, promotes sporting

activity, communicates fashion and style, and more importantly, it offers the wearer comfort. Moisture and thermal balance that create an appropriate microclimate adjacent to the skin are the two most important factors that fibres and filaments contribute to wearer comfort. O'Mahony and Braddock (2002) noted that while in the US sportswear encompasses casual leisure wear, in the UK it frequently refers to active, performance garments developed and made for sports-related activities. Sportswear in this study refers to clothing made for competitive sports. Fibres influence the overall comfort of the wearer, mainly in providing a balance between heat loss and body perspiration. In recent years, there had been a tremendous increase in the development of new fibres to cater for the fast-growing sportswear and functional clothing market. The market for performance sportswear fosters fibre and fabric innovation (Rigby, 1998). The first synthetic fibre, nylon, was developed in 1935 by E. I. DuPont de Nemours in Wilmington, Delaware. Since then, numerous synthetic fibres have been created. Tobacco brush bristles were the first known textile product manufactured of nylon, and stockings that replaced silk were the next. In 1938, commercial nylon stockings first became available (Humpries, 2009). Since the 1970s, polyester has been used to create fabrics that are tough, dimensionally stable, easy to maintain, long-lasting, and resistant to abrasion and sunlight. It is perfect for a variety of sportswear applications because of these qualities. (Kadoph, 2007). Synthetic fibres have been widely preferred 3 for active wear due to the multitude of performance enhancements they offer compared to natural fibres (Kirkwood, 2013). Natural fibres are often blended with synthetic fibres to achieve an optimised performance. For example, cotton is used in apparel because it absorbs perspiration, but it saturates quickly causing discomfort due to fabric cling. In effort to accomplish comfort without cling, cotton and polyester are frequently combined. Functional clothing is currently made with high-functional fibres (Hongu and Phillips, 1997), microfibers (Purane and Panigrahi, 2007), nanofibers (Brown and Stevens, 2007), and smart fibres (Tao, 2001). Numerous claims have been made, especially about the features of moisture control, temperature regulation, and performance monitoring. The multi-dimensional fibres used to make yarn for athletic and utilitarian clothing need to possess a number of other characteristics as well. Fiber fineness, fibre shape, molecular structure, and adding finishes are the factors in the fibre sector that have an impact on performance, according to Hongu and Phillips (1997) and Kadolph (2014). Durability, absorbance, high moisture regain, light weight, extensibility, colour fastness, dimensional stability, and washability are typical characteristics of fibres for sportswear. As was mentioned in this chapter, athletes frequently use phase change materials for temperature regulation. Therefore, textile fibres support UV protection, softness, flexibility, cooling effect, moisture control, and thermal regulation. Synthetic fibres are found in countless applications in apparel and functional clothing due to mechanical and chemical properties (Ravandi and Valizadeh, 2011) compared to natural fibres. There is evidence that innovation in sportswear and performance products is limited in volumes and the leisurewear and sports related fashion clothing is on a rise, which drives 4 the mass market and increases the consumption of fibres. Although this could be arguable in the sense that mass market reaches a broad population and whether mass customisation is either a follower or driver in sportswear. Rigby (1998) described a volume versus performance pyramid, which showed how market volumes change as fabric/garment performance increase, hence the price of garments. However, the quantity of clothing being produced for low-performance sports-related street wear remains higher, whereas the percentage of high-performance sportswear is being produced at a lower rate but at a higher cost. Innovation is frequently associated with product branding and is unrelated to manufacturing volume. Leading cellulose fibre producer Lenzing reported that 84 million tonnes of fibre were produced in 2012. The production of cotton and wool fell between 1991 and 2012, according to CIRFS (European Man-Made Fibres Association), while the production of man-made fibres increased. Cotton production decreased from 46% in 1992 to 31% in 2012, whilst wool production decreased from 5% in 1992 to 1% in 2012. However, there were positive trend for production of man-made fibres which increased to 68% in 2012 from 49% in 1992. This shows that the consumption for man-made fibres is increasing globally. In this study, prominent fibre varieties are emphasised, and their attributes are evaluated critically. Also defined are a number of technical phrases that are used to determine how well fibres perform. Human bodies produce heat, sweat, and perspiration during vigorous exercise, making it crucial to comprehend these physiological changes in the context of athletic activity. Sportswear has different requirements than fashion clothing, and fibres are frequently blended to leverage the combined effects of two or three fibres. Wool, polyester, and elastomeric fibres are an example of this. The performance of fabrics

and the impact of combining fibre varieties are explored. Reviewing recent advancements in fibres including Trinomax AQ, Outlast, Nilit Breeze, Trevira, and Tencel. the demand for novel, intelligent fibres is ever increasing and is highlighted in the context of sportswear and functional clothing. The fibres used in moisture management, wicking, and thermal regulation are discussed and evidence from a wide range of resources are also presented in the context of those garments which are worn next to the skin such as base layer, compression vests and trousers, thermal underwear and stretch tights. The information provided here should be regarded as essential for effective design and development of performance clothing particularly sportswear.

8. NEW DEVELOPMENTS IN FIBRE INDUSTRY

Nilit, an Israeli producer of nylon 6.6, and LincSpun yarns, an Australian producer of intelligent yarns and filaments, have collaborated to develop Trinomax AQ. Merino wool, textured Nilit nylon 6.6, and Nilit Aquarius are twisted together to create Trinomax AQ using the company's exclusive LincSpun technology. The resulting yarn can regulate body temperature, is strong, supple, and wicks moisture. The manufacturer states that performance is long-lasting and stands up to numerous washings. It was designed for a variety of products, including activity wear, socks, and sportswear (Performance and apparel markets, 2011)

9. CONCLUSIONS

Since the beginning of civilization, it has been widely documented that natural fibres are essential for meeting the basic needs of humans, including clothing and shelter. However, with the introduction of synthetic fibres and the subsequent rise in their appeal and demand, the global. The use of natural fibres has gone out of style. Despite this, there is a worldwide uproar. promoting eco-friendly and sustainable methods in the textile production chain and the depletion of Petroleum resources have encouraged the use of natural fibres, substituting synthetic ones. Sustainable natural fibres mixed with synthetic fibres.

When it comes to textile applications, cotton dominates the market. The fibre, however, cannot be regarded as sustainable due to the extensive use of water. Hazardous chemicals, insecticides, and fertilisers, resulting in environmental and economic difficulty Besides cotton, some fabrics that conserve resources include hemp, flax, organic cotton, bamboo, jute, kenaf, ramie, sisal, coir are replacing cotton in varied textile applications and for development of polymer composites on account of their biodegradability, high performance profile, sustainable attributes, lightweight and economic viability.

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Measurement of Subjective Clothing Comfort and Potential to Develop Standards

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ABSTRACT

Clothing comfort is a qualitative phenomenon, so its measurement is difficult. The human body has many stimuli that result in deciding whether a particular clothing is comfortable or not. The level of comfort is largely decided by the various features of clothing. The constructional parameters of fabric and garment can influence properties responsible for providing comfort. However, one clothing system may not be perceived as equally comfortable by all. Many variables are associated with the human body and mind, such as age, gender, skin characteristics, metabolic behaviour and health conditions. These variables influence human sensitivities and as a result, the level of comfort felt is not the same for all individuals. The formulation of clothing comfort and physiology are discussed in this paper. The variables associated with the human body, clothing and the interface between these two decide the comfort felt by an individual for a particular clothing system. This paper is a study of the scope and limitations of developing standards for the measurement of clothing comfort.

Keywords: Clothing comfort, Rating scale, Measurement., Standardisation, Subjective measurement

1. INTRODUCTION

Clothing comfort is a state in which the wearer has no complaints against his clothing system for feeling hot or cold and unease in movement. The interface between the clothing system and the human body sensitizes different stimuli leading to sensory responses. These responses are processed by the brain and a perception of comfort or absence of it is formed. This process of forming a perception has three phases, physical, physiological and psychological. The absence of clothing comfort creates clothing distress.

Clothing comfort is an essential feature that clothing manufacturers are required to take care of, to sustain in the competitive market. Consumers have some expectations while buying a clothing system for comfort. For a consumer, clothing systems have very little information on their labels regarding the level of comfort a clothing system can offer. Generally, information about only constituent fibres is available. Hence purchase decisions by consumers take place based on their assumptions rather than the facts related to clothing comfort. This reality may be compared with practices followed for other consumer goods. Many consumer items come with detailed information on packaging regarding ingredients and mention the effect of constituent materials on them. This suggests information about the level of comfort offered by a clothing system can be introduced on clothing labels. With the advent of bio-sensory science, it is exposed that though many objective tests are available for various body-related parameters, every parameter involves some subjectivity. Heartbeat is associated with physical and neurological stimuli; temperature is associated with metabolic behaviour.

Clothing comfort is a neurophysiologic phenomenon, hence it can be studied and standardized like many medical parameters related to the human body and mind. Researchers in the field of medicine have data in abundance to establish the standard range of parameters for the human body, such as blood pressure, metabolic heat, etc.

Despite so many influencing variables, medical science is progressing and making well-being possible for many. The role of clothing is described in many medical studies.

Apart from the basic need to provide cover to the human body, clothing plays a vital role in the well-being of an individual. An adequate clothing system offers comfort and facilitates ease of living while an inadequate clothing system causes clothing distress.

The measurement of clothing comfort is necessary to judge a clothing system for its suitability for different wearers and occasions. The rating scales are popularly used by many garments manufacturers and retailers for different reasons including feedback on the comfort aspect of a clothing system. The items of rating scales do very with variables like the profile of respondents.

2. DISCUSSION

Comfort feeling is a neurophysiological phenomenon, objective and subjective tests are performed for the measurement of comfort. The fabric properties which influence the comfort characteristics of a clothing system can be measured by objective tests but anticipating the level of comfort for every individual wearer of a particular clothing system is difficult.

There are instruments to measure transmittance properties. With the advent of technology, instruments became precise and affordable, thus objective measurement and analysis of different transmittance properties are possible. Newest et al. (2017) observed the role of material on transmittance properties.

The comfort perception for a clothing system can be gauged only by analysis of the experiences of wearers. The experiences of wearers can be recorded using feedback, survey questionnaires etc. The uncertainty for thermal comfort measurement highlights the subjective nature of thermophysiological comfort. There is a need for appropriate weighing of all variables for the correct measurement of subjective comfort (Wang, J., et al.,2018).

Bouskill et al., 2002 found a relationship between clothing ventilation and thermal insulation. Choi et al.,.2022 explained the effects of thermal comfort-driven control based on real-time clothing insulation estimated using an image-processing model.

Comfort is governed by the subjective perception of sensations which may be physiological or psychological.

Clothing comfort is a complex phenomenon and scholars can exert the possibility for measurement of clothing comfort level for a clothing unit. Thermophysiological comfort is about the thermal balance between wearers and their ambience. Hardy et al. (1955) studied the scope of thermal balance prediction based on the physical data of the fabrics. The type and activities do affect the comfort requirements of clothing, Jiang et al., (2022) explained the possibilities of prediction of comfort level based on a fuzzy comprehensive evaluation.

Liu et al. (2022) this study observed the relationship between thermal comfort and metabolic behaviour. The results of such studies can be collectively analysed to infer possibilities to develop a clothing system of known comfort level.

The formulation of clothing comfort is presented in figure 1, and the role of different stimuli and sensory responses is shown. Stimuli do vary from person to person and responses to the stimuli also vary among individuals, this leads to subjectivity in the level of comfort felt. Hollies, et al. (1979) explained the subjective nature of clothing comfort, they also highlighted that though perception is subjective yet overall comfort behaviour of a clothing system can be anticipated for the group of people. The subjective comfort of a clothing system can be studied and summarized based on the attitude of wearers toward that clothing system.

Psychological studies defined an attitude as an enduring organization of cognitive, affective and behavioural components and processes concerning some aspect of the individual's world. A person's beliefs or information about the object is the cognitive component of attitude. A person's feeling of like or dislike concerning the objects is the affective component, and a person's action tendencies or predisposition towards the object is the behavioural component of attitude. Rating scales can be used for the estimation of comfort for a clothing system, And the analysis of responses may enable scholars to quantify the level of comfort that the clothing system can offer. There are many rating scales which allow the wearer to rate his perception of comfort. Hollies proposed two scales of comfort rating, one is a 4-point and another is a 5-point rating for analysis of subjective comfort. In these scales, a lower rating depicts a lower level of comfort. Hollies 4-point scale has the same limitation as 4 points Likert scale. Comfort is a neurophysiological process. This process is dependently regarded as a measurement of attitudes.

Karasawa et al. (2022), explained the possibilities of prediction of the clothing comfort sensation of an undershirt using artificial neural networks with psychophysiological responses as input data. This study concluded that wearers do have differences regarding their psycho-physical sensitivities.

These studies attempt to analyze the different influences on aspects; comfort temperature; individual comfort model and personal comfort systems in buildings and environments. The opinion about clothing comfort is

recorded by categorizing subjects based on age group, gender, and level of activity. The metabolic rate is a very important factor for thermophysiological comfort and while studying a certain group of the same gender, level of activity, age group and metabolic status should be considered.

The social psychology associated with clothing has been studied and the aspect of symbolic appearance also got attention from scholars.

Clothing is also associated with social psychology and personal adornment, it is much more than using clothing for its basic functions, Kaiser, S. B. (1985&1990), formation and study of standards for social variables is not in the scope of this paper.

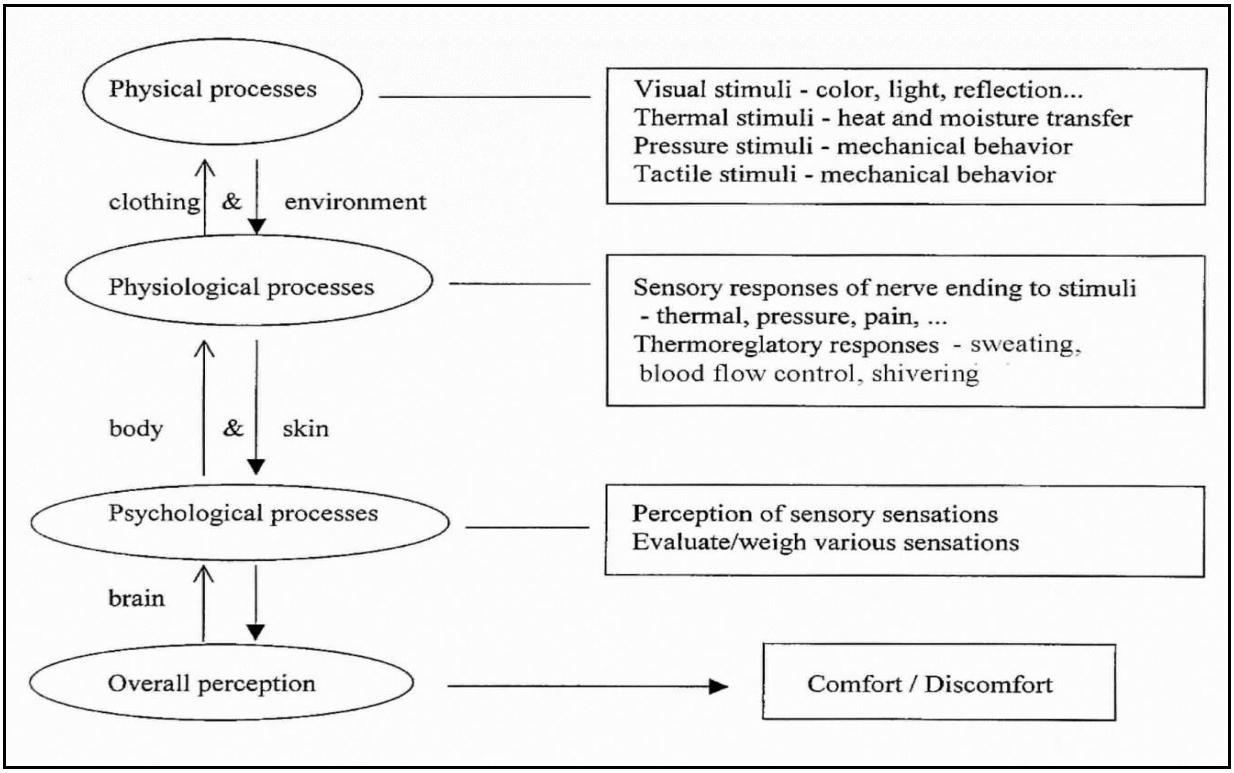

Fig. 1. Formulation of comfort

Havenith et al. (2015) provided a direction for preparing data base for clothing comfort. They studied thermal insulation and moisture vapour permeability values in non-western clothing systems.

There have been many studies on the subjective comfort of clothing. The conclusion of such studies can be analysed collectively with appropriate categorization based on different variables.

3. CONCLUSION

Objective measurement and subjective measurement are two ways to measure clothing comfort.

Objective measurement is quantifying the physical parameters and characteristics of fabric and garment. The selection of clothing is largely governed by the level of comfort a clothing system can offer. The scope for the measurement of subjective comfort is discussed. This paper focused on the thermophysiological aspects of comfort, the study can also be extended to tactile comfort. Thermophysiological comfort is influenced by many variables. The interaction among variables also affects the level of comfort. Large-scale surveys are required to overcome the data deficit, and the data collected may be accessible to scholars in the field. The rating scale may be developed to acquire information on clothing comfort concerning the physical attributes of the clothing system. The task of standardisation of subjective comfort is not easy and small. This is possible through the cooperation of fabric and garment manufacturers and the hard work of research scholars in the field.

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Skill Development for the Fashion Industry

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ABSTRACT

As an academician, the priority to create employability is at the helm for any professional program. Scaling the pyramid from basic education, to professional knowledge acquisition, the education manifesto followed by universities cover curricula that pan foundation studies, to graduation projects, with a holistic mix of classroom learnings, as well as internships and live projects.

My paper will cover topics such as the importance of skill identification and advanced development of these unique skillsets at the grassroot level, at the learning phase itself. The paper will further unravel the need of the industry joining hands with academia to indicate key performance areas that it requires. This will have a substantial impact on effective course design and curriculum development, leading to an increase in renewed knowledge and thus a considerable jump in employability and contemporariness.

Upgraded curricula is the need of the hour as some curricula are defunct or obsolete. Effective hours should be engaged in impactful learning of current changes in the fashion industry in textile, business practices, new markets and newer ways of tapping the right clientele, who are today making informed decisions through newer information gathered from media and even social media. Virtual UI and UX experiences have made it easier to gain theoretical knowledge though, and a relook at the standard curriculum is imperative. Adding AI, 3D and other novel methods of learning and enhancing the learning curve will be considered as a tool to skill development.

This Paper will also stress upon the inevitability of working professionals going back to the classroom in any mode, to brush up, upgrade or acquaint themselves with the aforesaid industry changes. We will delve into Universities and Fashion Schools that offer short term and long-term skill upgradation programs and their patronage and numbers in skill upgrading. It begs to answer two questions – 'Is there a need?' 'Does the requirement assuage the want?'

Additionally, the paper will probe the comparison of newly-trained freshers v/s experienced professionals who upgrade their skills – though self-learning and courses, either online or in person; or through company training programs for particular skill enhancement; it will also look at assistance and monetary aid given by employers in the acquisition of new skills either while on the job, or through sabbaticals. This tackles the mindset and vision of the industry. It also adds fresh impetus into the teaching methodology updating teaching professionals with actual on-the-job field experience, complementing research from online sources, peer reviews and other methods.

The Research Methodology will connect with a quick Survey with industry professionals in HR, Design, Production and Sales and Marketing. This includes Designer Houses, Retail Brands, Retail Chains, among other individuals connected to drafting curriculum and professional studies.

Keywords: Fashion, Curriculum, Skill Development, Knowledge, Performance, Employability, Upgradation

1. INTRODUCTION

Understanding the Fashion Industry is deep learning about the nuances in 'fashion' as the industry and is not merely learning about fashion designers and what made them unique to forge a path forward. The art of fashion design lies in the skill of designing a garment and the accoutrements that are necessary, functional and at times irrelevant to a fault, that makes it a distinctive irreplaceable part of the design.

In focusing on skill development as an integral part of the core curriculum of industry it behoves that fashion schools impart the exact knowledge of 'skill' to their fashion design students in a thorough manner befitting a world-class designer. Skill development is an art; the industry relies on new and creative design thoughts. The curriculum needs to be upgraded to meet the demands of the industry and to empower students with thoughts to ideate. Faculty need to be updated with relevant and current data and trends. Constant upgrade leads to a more informed and incisive tomorrow.

Statista Research Inc. puts the Indian market value of the Textile and Apparel sector FY2021 as US$80 billion and is estimated to touch US$190 billion by 2026, the fashion industry comes under it. Globally, the industry revenue for the Fashion segment is projected to reach US$19.69 billion in 2022.

India is the world's second largest textile and clothing exporter with a steady growth forecast in this market. With a growing organized apparel sector and rising income levels, and talent to boot, India is set to lead in the Fashion segment to rival any other country. What the industry needs is better coordination with fashion schools for better viability and ensuing profits.

1 Organizations and their association with the Fashion Industry

Often organizations develop their internal operating systems that govern retail operations predominantly, which eventually boils down to product analysis, product placement and people movement. The knowledge of these internal OS systems isn't available to Institutions due to IP and confidentiality. These are often introduced at an internship or when a candidate is placed in the organization as an employee.

Should Industry be willing to bring these systems to the classrooms, it will enhance the Business Studies curriculum and the benefit to the employer is a candidate who is equipped with the specific knowledge of what is expected as a fresher to efficiently acclimatize to the nuances of the work place and lower the learning curve.

Alternately, a Business of Fashion Conclave that invites members of the industry to conduct primary level training to learners will open up avenues of employment for candidates who wish to diversify their skillsets with versatility and immediacy. This could include Designers, Design houses, Retail conglomerates, Digital Platform leaders and other key influencers of POS in the marketplace.

This synchronicity corporates in the industry and Fashion Schools will help in direct skill development.

2 The role of Human Resources and people management

Human Resources and Talent Management provides basic information on what employers look in a candidate. The landscape has changed' no longer is the merit of the candidate's possession of academically or professionally focused singular skills sufficient. It is now the dynamism of professional skills, people skills, and a cumulative professional practice efficiency that employers seek today.

The Information Technology (IT) sector, for example, employs people from design background who have not had the exact skills of IT or BFSI but their invaluable contribution to a team is the aesthetics and experiential facets they can add to a project that would otherwise be banal in primary essence.

Human Resource teams that can hold mock interviews on campus prior to recruitment drives, trainings in people and team skills as are relevant today will help in the development of a primary skill; ***'Personality'*** that is what one looks for before evaluating skill sets. One tends to dwell on whether a person will fit in to a team as an individual who will blend in, develop professional camaraderie thus leading to effective contribution to professional goals and outcomes. Understanding the emotional quotient (EQ) is as important as their intelligence quotient (IQ). And some software companies do read through handwriting analysis, psychological profiling to search a diverse and a 'people person' fit.

3 Importance of Live Industry Projects:

Design and/or business projects initiated by the industry that coincide with a deliverable of a specific semester or term will acquaint a design aspirant early on about designing within a set parameter and meeting standards set by the industry whether in design, commercial viability, customer profiling, design docket generation, replete with tech packs and other required documentation.

Live industry projects, and even associating with an industry partner is a beneficial exercise for the fashion school and the industry partner. For the school it provides key learnings on designing for a specific audience with a follow up of research methodology, analysis and forecasting sell throughs to name a few. For the Industry partner, it provides a fresh think tank of young minds with undiluted creative thought process that can we wielded in and applied as per the discretion of the partner who holds the IP rights to the project outcomes.

4 FACULTY and the teaching industry.

Teachers are an inevitable asset in the industry. A faculty pool of specialists who teach with passion and upgraded knowledge of the subject and can provide adept learning opportunities by infusing the relevance of the most archaic curriculum that leads the learner to an understanding of how to see its presence in real time.
It is not unusual to see some faculty to be sometimes set

in their ways but infusing a sense of newness to teaching is necessary. Some of the importance factors to the faculty

1) Openness to fresh perspective – of teaching methodology and industry updation and current information
2) Co- teaching – can be an asset as a combination brings an unexpected perspective. Of course personal biases needs to be taken care of.
3) Skill upgradation – an imperative factor as industry is ever changing
4) Peer-to-Peer feedback, review and knowledge sharing is a necessity
5) Blended learning of topics leading to common outcomes as a way to share skills and knowledge.

Skill enhancement programs on and off campus helps the tutor upgrade skills required to deploy effective classroom experiences.

Keeping trends and forecasts as the key driving point since the learner today comes with a "WHY?" that precedes the "HOW?" Adapting to this generational shift is imperative.

Delving into primary level psychoanalysis of the contemporary learner makes classroom discussions a two-way flow of information. This could be provided by the institution via counsellors and therapists who will help in a better and holistic understanding.

Faculty that stays updated, relevant and current on topics and trends makes for a better student, a well-honed future employee or an intrepid entrepreneur.

5 Upgradation

New entrants v/s trained experienced personnel. The crucial element is upgradation. Knowledge is on a distinct upward curve and relevancy is essential. Social Media has seen an upward surge and the aim to showcase their products or even innate talent. The aim to garner eyeballs and followers, leading to monetizing the site.

It is inevitable that working professionals go back to the classroom in any mode, to brush up, upgrade or acquaint themselves with the aforesaid industry changes. Many Universities and Fashion Schools offer short term and long-term skill upgradation programs and their patronage and numbers in skill upgrading has seen an upward rise. It begs to answer two questions – 'Is there a need?' 'Does the requirement assuage the want?'

Additionally, newly-trained freshers v/s experienced professionals who upgrade their skills – though self-learning and courses, either online or in person; or through company training programs for particular skill enhancement just underlines the point that skilling is a vital necessity.

Alternately, assistance and monetary aid given by employers in the acquisition of new skills either while on the job, or through sabbaticals tackles the mindset and vision of the industry for students and faculty. This adds fresh impetus into the teaching methodology, updating teaching professionals with actual on-the-job field experience, complementing research from online sources, peer reviews and other methods.

6 The Future: is the Fashion Industry ready in terms of education?

An emphatic yes!

Since March 2009, governmental thrust under the aegis of The Indian Design Council (IDC), there has been a national design direction, with coordination other government agencies, the design community, fashion industry and education institutions to promote design developing design excellence in business, society and public services. What this impetus has done for the industry is the absolute flourish in the fashion education sector. Fashion is now seen as a career option.

Why does the Indian market succeed so well? One can speculate that Indians per se have a work ethic that is stoic. Secondly, India's rich culture and craft tradition, rituals, practices and festivals are all actually design manifestations and these accentuate and are the backdrop and inspiration to understanding modern design. Beyond aesthetics, design has the power to bring change in the lives of people and be an integrator of values, aspirations and culture. And Indian heritage across the land have an absolutely glowing design history and this has been an inspiration and motivation to design students and thus design education, with a visual motif culminate in quality designers that are unparalleled and are basically incomparable.

The market for design in India was INR 188.32 billion (2020). The number of design institutions have grown and there are approximately 7,000 qualified designers in the country and approximately 5,000 students in design education. While the quality of training and designers is relatively of a superior level, the recruitment sector for designers is positive as the key driver for recruitment is actual and anticipated growth in business. 67% of the industry respondents confirm that they have recruited

designers in the last three years and plan to recruit more. 58% of the respondents feel that design graduates come with requisite skills to the workplace and are work ready.

2. CONCLUSION

With relevant and adequate training, creativity can be an innate trait, but skill development is an art that needs to be honed and we in India are on the right track.

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POSTER PRESENTATION

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A Study on Women Consumers for Indian Ethnic Wear from Functionality Aspect

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ABSTRACT

Functional clothing in Women's Indian Ethnic Wear is a relatively new and exciting segment. All clothing is known to perform multiple functions – from aesthetic to basic protection from the elements. 'Functional clothing' can therefore be defined as a generic term that includes all such types of clothing or assemblies that are specifically engineered to deliver a pre-defined performance or functionality to the user. Traditional Indian garments have always been functional as per the need at that point of time. But in today's time, as the lifestyle has changed, the working style has changed in the same way the functionality in garments has been lost. In today's time, most of the garments are just aesthetically appealing but completely lack comfort and functionality as per the user's need.

So, this research focuses on understanding the functional aspects of Indian ethnic wear garments for women. For this research, the primary data has been collected through two rounds of a consumer survey to understand the functional need and preferences of Indian ethnic wear clothing also the primary data has been collected by interviewing three experts from the domain. the secondary data has been collected from various sources like books, general articles, research reports, etc. the primary and secondary data are subjective to analysis. and findings suggest that there is a huge gap in terms of the availability of functional wear clothing in Indian ethnic women wear. And today's consumers are definitely looking towards garments that are not just aesthetically appealing but also functional in nature.

Keywords: Functionality, Indian ethnic, Consumer behavior, Silhouette.

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Artificial Intelligence and the Future of Fashion: An Oxymoron?

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ABSTRACT

Fashion is a progressive phenomenon that adopts emerging technologies for its advancements. In the contemporary world, Artificial Intelligence (AI) is one of such significant technologies that influence every aspect of fashion design, production and consumption practices. The past decade has observed fashion professionals utilising AI to analyse and forecast trends. The application of AI has also pushed the fashion industry forward into the Industry 4.0 digitalisation era. With automatically curated trends and generated designs, AI technology eliminates the need for the human touch in the design process, consequently allowing fast fashion to flourish. Hence, a section of fashion practitioners expresses their concerns about the long-term social, cultural, economic, and environmental impact of such technological interventions. The future of fashion enabled by AI, thus, has anticipated sustainability concerns as much as its exciting perks. Our proposed poster presents both sides of the coin by explicitly reviewing the current utilisation of AI in the highly creative and competitive fashion industry.

Keywords: Artificial intelligence, Fashion industry, future of fashion, sustainability

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Data Analytics: A Catalyst in Transforming Fashion Retail Industry

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ABSTRACT

Big Fat Data is the food for all the major industries across the world. The Fashion Retail Industry has been a fast mover in capitalizing itself with the benefits of the Data Analytics. Fashion Retailers have been relying upon various types of data to establish brand position, improve sales, forecast the upcoming trends, and also to sustainably manufacture the garments. The study intends to overview the role of Data Analytics, its major applications, and significance in the Fashion Retail industry. The paper also discusses the latest advancements in AI Technology, Machine Learning, and MIS systems that allows fashion retailers in data-driven decision making process. Data Analytics have proven to be very important in Design processes, Merchandising, and developing Marketing Strategies for the brands, the importance is such that Brands, *especially*, Fashion Retailers hugely rely upon hefty amount of Data. This study focuses on describing the necessity of Data Analytics in development of fashion retail industry in an out-right manner. The developments caused due to the technological, data-driven advancements that have occurred in the Fashion Retail Industry has been widely discussed in the study. To conclude the study, a descriptive overview on the road ahead has been discussed with respect to the power and importance of Data and the significant reasons on reasons of success of Fashion Retail Industry through Data Analytics.

Keywords: AI, Analytics, Data, Information Systems, Industry, Management, MIS, Retail.

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Haptic Technology: Innovation in Wearable Haptics Replacing the Physical Human

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ABSTRACT

The greater shift of consumers towards digital technologies like smart wearables and smart clothing are being currently witnessed. The incorporation of sensors and communication devices in clothing which collect and share information and interact with each other, has received attention in today's world. Industries these days' focus on consumer driven strategies rather than product driven strategy. So, this increasing consumer demand gave immense motivation to the companies to invest in the manufacture of technical textile on a larger scale and paving the way for massive innovation. The integration of smart functionality into clothing and other textile products will radically change the culture surrounding these products.

Interactive set of textiles shows how clothes and textiles interfaces themselves, able to sense, react on external stimuli in expressive ways. These are majorly used in haptics, emotion regulation, medical and fitness category.

This research paper briefly describes about smart textiles and recent innovation history, and studies various types of wearable haptics and the implementation of haptics in various forms to assist users in feeling the sensation of touch for a variety of purposes This paper also discusses the use, benefits, and challenges of wearable haptics.

Keywords: Smart wearables, Haptic technology, Physical good touch, Smart textiles

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Need for Specific Clothing for Anchondroplastic Dwarf

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ABSTRACT

Clothing is an expression of one self, it provides physical safeguards to the body. Individual establish their sense of oneself as well as their place in the society through clothing. Wearing right size of clothing is the best thing a person can do as wearing clothes that aren't right for your body shape, you may feel the urge to restrict and lose weight. Feeling comfortable in your garments permits you to pay attention to what your body desires without the distraction of feeling squeezed or out of breath. Dwarf people face difficulties in finding right size clothes. Achondroplastic dwarfs are members of a minority group of visibly handicapped persons. In 1968 it was estimated by a group of geneticists from Johns Hopkins Hospital that one person in every 10, 000 to 20, 000 will be a dwarf. Clothes worn by dwarfs require substantial tailoring before a proper fit is possible. Currently India has a population of nearly 2 lakh dwarfs yet no brand catering their needs Whereas the countries dwarf athletes continues to score high in Paralympic games there is serious need for well fitting specific clothing for dwarfs.

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A Study on Consumer Needs and Preferences towards Fashionable Convertible Bags

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ABSTRACT

Bags are one of the most essential commodities for women. Women can easily carry her important personal belongings along with her. Women handbags are considered as a fashion statement that can either break or make style. Women want their bags to match their outfits and the style to make themselves look confident and beautiful. But always buying new bags to match their outfits can be inconvenient and expensive affair. This paper mainly focuses on consumer behavior towards fashionable convertible bags. It is seen that there is a great rise for multipurpose bags that can be used on different occasions. Increasingly consumers prefer to invest in luxury products that can be used for multiple occasions. Therefore, several luxury brands have introduced convertible handbags with several conversion features. These bags can be used as a handbag, shoulder bag, backpack or a fanny bag.

The purpose of this paper is to understand the market of convertible bags, needs and preferences of consumer for convertible bags. The primary data for this research has been collected from two rounds of questioner survey and three experts interview and secondary data is collected from books, article, research papers to understand the topic from biggest aspect. The data collected from primary and secondary research suggests that due to changing lifestyle of women consumers in India they want to look fashionable at the same time they want to find a budget friendly fashionable option, so convertible bags can be one of the option which are meant for multiple occasions and multiple usage.

Keywords: convertible bags, multipurpose bags, fashionable convertible bags, multiple occasions, consumer behaviour

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Sustainable Textile and Fashion Design: An Approach for Upcycling your Wardrobe

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ABSTRACT

Sustainable textile and fashion is an approach to eliminate negative environmental impact through skilful, sensitive design. It aims to use natural resources to meet the needs of the present without compromising future needs. The goal is to address the whole process of production, consumption, and disposal of clothing by increasing the value of timeless clothing and reducing waste. Fair and ethical fashion, thrift shopping, on-demand and custom clothing, clean and green fashion, and repair, redesign and upcycle fashion are the ways to make textile and fashion sustainable. Upcycle fashion is a circular clothing practice in which old and unwanted clothes are taken and transformed into new. It is also known as "creative reuse," which refers to repurposing textiles into something else. It communicates the value of materials, encourages creativity, supports local businesses, and is pocket-friendly. This work aims to educate people about environmentally friendly consumption by promoting "green consumers." Upcycling a garment includes techniques such as dyeing, embroidering, patchwork, eco-printing, and cutting. These are the easiest things a person can contribute towards sustaining the environment, and these small steps will lead to remarkable change. A pulse of the fashion industry report found that fashion generates 4% of the world's waste each year, contributing a whopping 92 million tons annually. Most of the clothes that are produced by fast fashion are inorganic and synthetic. It implies ethics and reuse of products in the new field of "sustainable fashion", which can increase the value and price of local products and even play a crucial role in improving the life of fashion or textile materials.

Keywords: Sustainability, Upcycle, Eco-friendly, Timeless Clothing, Green Consumers

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The Future of AR/VR in Fashion/Textile industry

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ABSTRACT

In the Fashion/textile industry, it is a complex procedure, a miracle—to take a product from the deepest of your mind and bring it to reality. The production procedure and the quality of the products might significantly improve once a brand unlocks the secrets of the newest cutting-edge technology. The competitive world of fashion retail is proving to be one where intelligent use of technology is the key to success. Retailers can use technological advancements to better understand and engage with their customers, personalised products, and shopping experiences. Instead of viewing AR and VR as trendy fads, the industry is beginning to realise the value of employing these technologies to address the identified issues in fashion retail. An attempt is being made to understand how the pandemic is changing customer behaviour and creating new possibilities for fashion firms. Fashion firms are progressively adopting virtual and augmented reality technology as a necessary element of their digital initiatives as a result of the current pandemic, which is limiting physical connections. Technology, primarily virtual and augmented reality, has the potential to revolutionise the way the fashion industry creates, produces, and sells clothing, footwear, accessories, and cosmetics. This research paper aims to analyse how the future of the fashion business will be shaped by AR/VR technology.

Keywords: Augmented reality, Virtual reality, Fashion, Digital, Textiles, industry, brands, products, future fashion.

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To Study Consumer Behaviour Towards Customisation of Denims

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ABSTRACT

It's increasingly challenging to purchase denim because we can't always locate the proper size, especially with more people purchasing online. If different brands offer customisation of denims, it will certainly aid and lessen this issue. In order to understand the growing trend of customisation in clothing for denims this study was conducted. Two Surveys and three expert interviews were used to conduct the primary study, while secondary literature was gathered from books, articles, research papers, journals, and other sources, including internet articles. The data is analysed and further inferred, and the results show that there is undoubtedly a trend towards customisation of denim. There is also likely scope for denim customisation to become a market where, in the future, every brand supplying denims enters.

Keywords: customisation, customisation of denims, denims, denim supply

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The Study of Gen-Z Consumer Behaviour towards Western Ready to Wear Business Outfits

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ABSTRACT

Businesswear is an ever evolving concept, it is essentially a western dress code for the corporate world. Western Businesswear include blazers, jackets or trousers. It is an appropriate attire for office or business environment and it changes from region to region or company to company.

Post Covid pandemic of 2020, people have started working from office once again and there is a surge of western business wear garment purchases like suits, blazer jackets and trousers. With changing trends, it can be observed that people are actively looking for employment and the ones that are already employed are looking to stand out professionally. This paper dives into the details of western business wear attire and its importance and significance in the work place, especially for women.

This paper studies recent changes in women's business identities as they present an opportunity to explore the social meanings conveyed by business wear in a specific and changing context. The way they dress for work is part of their identity that they want to actively convey to their counterparts.

It looks into the behaviour of Gen-Z, the new generation of employees and business owners getting into the work force as they come of age, and their styles and trends and outlook towards the corporate life. With that, this research also takes a deeper dive into the consumer behaviour of Indians, and India as a fashion market, in general. It discusses the opportunity and the challenges in context with India's growing fashion industry.

This paper aims to explore the consumer need and preference towards western businesses wear attire. The primary data is collected from 2 surveys and 3 expert interviews and secondary data is collected from published books, journal articles, research papers in the field of study, and other internet sources. The findings suggests that there is a growth and demand of western ready to wear Business outfits.

Keywords: Gen-Z, Western Business wear, Business casuals, Corporate Trends, Blazers

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To Study Women's Consumer Behaviour Towards Premium Power Dressing

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ABSTRACT

Power dressing is frequently described as the delicate art of projecting expertise and power through a piece of clothing. It establishes authority at the physical level, making a statement about women and their careers while also addressing self-worth and confidence.

Women are once again embracing the art of power dressing and putting away their casual clothes in the wake of the Covid 19 Pandemic. The change in the work environment has led for the consumers to stand out and yet blend in. This paper explains the history, application, and significance of power dressing for women in the workplace.

Having women proven themselves in the dynamic business environment the style has changed from being just the feminized version of the men's suit to having more structured silhouettes that enhances and embraces their femininity and leadership. This paper examines the current developments in power dressing and how women present themselves in the workplace and in daily life.

The paper delves deeply into Indian consumer behavior, the Indian fashion industry, the dynamics of the Indian workplace, and the country's rapidly expanding fashion market. It attempts to investigate consumer preferences and needs for high-end power dressing. The primary data is collected from 2 surveys and 3 expert interviews and secondary data is collected from published books, journal articles, research papers in the field of study, and other internet sources.

***Keywords**:* Power Dressing, Development in Power Dressing, Corporate trends.

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To Understand Consumer behavior towards Plus-Size Loungewear

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ABSTRACT

Clothes are used not only for body protection and covering but they also have social and emotional implications. It is very important that they must have a proper fit while remaining fashionable and aesthetically pleasing to the eye. Nowadays, there is a greater emphasis on inclusivity in society, and many people are becoming aware of it. The demand for plus size clothing is growing, and consumers want well-fitting clothes but are dissatisfied with their available options.

During the period of covid-19 people have become confined to their homes and they began to work from home, so they require comfortable but presentable clothing. As a result, the market for loungewear has grown. There are numerous brands that launch loungewear, but sizes for plus size consumers are not available. The brand offers sizes ranging from xs to 2xl. Due to that Plus-size customers have a difficult time to find comfortable loungewear. There are fewer brands that specialize in plus size loungewear. However, because of the lack of awareness and various other reason, people are unaware of it.

This paper aims to explore the consumer need and preference towards plus-size loungewear. The primary data is collected from 2 surveys and 3 expert interviews and secondary data is collected from published books, journal articles, research papers in the field of study, and other internet sources. The study suggests the need of plus-size loungewear and helps the researcher understand it from various perspectives like design, silhouette, fit, fabric etc.

Keywords: Plus size, loungewear, plus size loungewear, inclusivity, consumer, consumer behaviour.