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Sustainable and environmental friendly production practices among the Indian apparel designers

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Abstract

This study's goal is to ascertain the methods used by various fashion designer's about environmental friendly, sustainability and incorporates it into their design and production practices, as apparel industry is the world's second most polluted industry(WEF, Jan 2020). The following research questions serve as a framework for the study: (1) Is there a substantial difference between environmentally friendly, sustainability and production practices in apparel industry and to propose an environment friendly strategic framework for the apparel industry,(2)what is the extent of current designer's environmental friendly and sustainability knowledge? (3) How effectively are designers implementing their sustainability knowledge in their design and production practice? The present study linked the 63 designers in Delhi and NCR ,sustainable design concerns, to the product lifecycle and design processes, to acquire a better picture of their expertise towards fashion sustainability.

Subject Classification: *0002.*

Keywords: *Sustainability, Apparel industry, Production practices, Environmental friendly, Challenges.*

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An outline of Indian Apparel Industry

India is a developing country with a large human capital base. Out of 75 million workers in the apparel business worldwide, roughly 45 million are employed in India, including 3.5 million handloom workers (Report: Indian Ministry of Textiles 2020). India is well-equipped to provide the garment industry with all of the significant resources it necessitates .India produces the second-largest paramount of textiles and garments in the world. It is also the world's sixth largest exporter of textiles, including clothes, home furnishings, and technical goods. With a strong raw material and manufacturing base, India was ranked as the world's second largest exporter of clothing (World Trade Statistical Review, WTSR, 2018). Unfortunately, the garment industry is the world's second-most polluting industry; it is the world's third-largest water consumer. According to International Union for Conservation of Nature annual report (IUCN 2017), the laundering of synthetic textiles like polyester accounts for 35% of all micro plastics in the ocean.. More than twenty percent of all global waste water is produced by the garment sector. Cotton farming is responsible for 24% of insecticides and 11 % of pesticides, yet accounting for only 3% of the world's arable area. One kg of cotton requires 20,000 gallons of water to produce. As per Alliance for Sustainable Fashion at the United Nations, Clothing and textiles are the world's second-largest polluters, trailing after oil.

Quantis 2018 Report – Measuring Fashion Environment, Environmental Impact Study of the clothing industries stated that the fashion industry emitted 2.1 billion tones of CO2eq. This is equal to 4% of global carbon emissions, Quantis estimates that four procedures account for almost 90% of clothing emissions: dyeing and finishing, fabric preparation, yarn preparation, and fiber production. From fiber production/material extraction to end-of-life, and incorporates five different environmental indicators: human health, ecosystem quality, freshwater loss, and climate change (Table 1.1). Garment business involving agriculture, fiber production, thread production, fabric preparation, dyeing and wet processing, finishing treatment, material manufacturing, retail and service sectors, second-hand markets, waste management till end of its life (BCG Quantis Report 2018).

Impact category results by life-cycle stage

Table 1.1

Source-" Quantis Report 2018"(Note – Additionally, outcomes are shown for each parameter in percentage terms in relation to overall impact.)

Impact Category	Unit	Total	Fiber Production	Yarn Preparation	Fabric Production	Dyeing & Finishing	Assembly	Distribution
Climate Change	Gigatons CO2eq	3.29 100%	0.51 15%	0.93 28%	0.39 12%	1.18 36%	0.22 7%	0.04 1%
Human health	106 DALY	2.25 100%	0.48 21%	0.59 26%	0.25 11%	0.73 32%	0.17 7%	0.03 1%
Ecosystem quality	109 PDF. m2 .y	1,020 100%	309 30%	211 21%	90.2 9%	304 30%	94.2 9%	8.81 1%
Resources	109 MJ	40,900 100%	7,250 18%	10,300 25%	4,280 10%	15,700 38%	2,800 7%	624 2%
Freshwater with-drawal	10 m3	215 100%	67.7 31%	49.2 23%	23.1 11%	58.4 27%	16.2 8%	0.25 0%

Data Collection and Analysis

The Convenient Random method is applied to get an insight of 63 designer's knowledge, by way of adopting questionnaire approach including closed ended study guide on a five point likert scale, and an observational method. Under two parameters, that is environmental friendly & sustainability and Sustainable design & production Practices, the designers were asked twenty questions. After analyzing the data collected, the said study is explained accordingly. A content analysis was utilised to detect correlations between dependent and independent variables once the data had been recorded. The link between **independent variable i.e. sustainable design and production practices, influenced by dependent variable i.e. environmental friendly and sustainability factors**, studied, using Multiple Regression Analysis. Following that, the codes were categorised based on data relationships, and comparisons with other categories were made.

Description of the "Designers" as Respondents

The designers in this study came from a diverse set of demographics. They came from a variety of backgrounds, including age, gender, income, and previous expertise in the apparel sector (Table 1.2). According to a research, (see table 1.1) the majority of designers are between the ages of 31 and 45, with female designers accounting for the majority of those seeking to move more towards sustainable design approaches, if any, followed by one-third of male responses. According to a poll of 63 designers, the most of them had at least ten years of expertise in the clothing sector and that almost half of them made more than 10 lakh rupees annually.

Table 1.2

Showing the frequency for different demographic characteristics of 63 respondents

Age	Frequency	Gender	Frequency	Income per annum	Frequency	No. of years	Frequency
Between 21-30 years	15	Male	22	Below 5 Lacs	14	less than 3 years	13
Between 31 -45 years	36	Female	41	5-10 Lacs	16	3-5 years	13
Between 46 -60 years	11			Above 10 lacs	33	5-10 years	9
above 60 years	1					above 10 years	28
Total	63		63		63		63

Result and Dicsussion

The majority of Indian apparel designers are concerned about pollution and waste (M = 3.79), but they have either zero or very limited implementation of sustainable design and production practices, with a mean of 3 on a 5-point Likert scale, indicating that SDPP adoption by the Indian apparel designer industry is still in its early stages (**see Table 1.2).** Additionally, it was shown that most of the designers in this survey do not employ SDP methods to a sufficient degree. The study's conclusions show that Indian clothing designers have a lot of room to increase their use of SDPP strategies. Designers have negligible environmental considerations while choosing raw materials from suppliers, such as organic thread, unbleached material, and environmentally friendly buttons (M=3.37).

Designer practices mean ratings revealed that they strive for minimal waste, believe in waste reduction, and reuse the waste cloth, to save their material expenses, but they are unwilling to pay it towards recycling the same. Consequently, designers rarely opt for the practice of recycled packaging (M=3.24), they don't make use of substitute materials, which are evaluated as nontoxic and non-polluting materials. To save the environment from pollution (M=3.02).After analyzing the study, it is apparent that the usage of organic, biodegradable materials, and renewable resources is considerably low in comparison to the awareness that is already there among the designers. (M=2.86)The designers expressed their willingness to reduce and, if possible, eliminate material wastage during the production stage, but still, completely opting for sustainable manufacturing processes is a farfetched goal, that is still in its primary stage (Table 1.3).

Table 1.3

Sustainable Design And Production Practices	(B) Mean
Concerned about the environment/pollution/wastage	3.79
Do you Consider environmental issues to select raw material from supplier (organic thread, unbleached material, eco friendly buttons)	3.37
Organisation do implementation of technologies to minimize consumption of inventory, stock (like Just in time, kaizen, zero inventory technique etc.)	3.17
Adoption of resource-saving technique/technology in production process like faster and energy efficient machinery	3.65
possibilities of packaging recycling are assessed	3.24
Substitution of materials by non toxic specially in dyeing and non polluting material assessed	3.02
Reducing the use of packages are considered (Reduce/Reuse packaging)	3.08
The organic, biodegradable materials and renewable resources are assessed in usage	2.86
Reduce the generation of cloth waste and the amount of emission	3.68
Company plans to recycle overproduction	3.05

Table 1.3 (A) Level of Acceptance of sustainable design and production practices by the Indian apparel designers; (B) average mean of the practices accepted by the Indian apparel designers. Following all accepted national and international safety and environmental regulations, Designers sporadically adhere to worker and consumer protection measures, such as recycling materials and repurposing scraps for various

postproduction activities M=3.40), With F values ranging from 2.17 to 2.95, The most recent study, which discovered that designers were less likely to adhere to ES policies, with implementation ranging from fair to nonexistent, reinforced this tendency (Table 1.4). The majority of designers provide their suppliers their production junk or waste so they can sell it (M=2.94). Designers are not inclined to follow ES policies, value excellent materials, but do not purchase environmentally friendly materials from vendors, and are willing to save electricity and water consumption, but not opt for alternative power resources.

Table 1.4

(A) Level of Indian clothes designers' acceptance of environmental protection; (B) Mean of Indian apparel designers' acceptance of environmental sustainability

(A) Environmental Friendly And Sustainability	Mean (B)
• Comply with all current international and national safety and environmental regulations.	3.40
• Using recyclable and readily available materials when creating clothing	3.27
• Lending recyclable materials to merchants for future use, such as used clothing, manufacturing waste, and waste cotton made from organic farming.	2.94
• To ensure sustainability, enter new environmental markets (such as switching to fabrics made of sustainable materials or organic cotton, which use less water).	2.75
• Efforts to create products in a sustainable way, such as designing garments to avoid or minimise the use of hazardous materials or manufacturing processes.	2.86
• Include a green factor (GOTS, WRAP, Sedex, etc./certified) in the supplier selection criteria.	2.17
• Conduct an internal environmental audit of the supplier.	2.37
• Take steps to minimise the energy consumption used in our facilities, such as using energy-efficient lighting, solar or wind power, etc.	2.44
• Use environmentally friendly dyes, chemicals, and other processes (such as using peroxide bleach because it's less damaging to textiles).	2.95
• Making utilization of spare stuff for further post production chores (disposed wastewater from production house utilised for horticulture, utilising textile trash for producing bags, beds stuffing etc.)	3.51

Finding and Conclusion

According to this study of 63 designers, the fashion industry, which is still relatively small, is at a tipping point for a gradual shift towards systemic change. The findings of this study have a number of theoretical and practical contributions and implications: first, from a researcher's theoretical standpoint, suggesting to bring sustainability; second, from an industrial standpoint for designers, sustainability in the apparel industry is on an urgent need; third, from an educational standpoint for higher education in the area of Indian clothing manufacture; the value and requirement of sustainability should be taught from school and colleges; and fourth, in reducing the distance between SDPP and ES between current practices. According to Table 1.5, there is a moderate to strong link between a number of variables connected to understanding the opportunities and difficulties associated with sustainable development and production practices (SDPP) and environmental sustainability (ES) in the Indian textile business.

Table 1.5

Correlation between various factors in acceptance of SDPP and ES practices by the Indian apparel designers

		SDPPMEAN	ESMEAN
SDPPMEAN	Pearson Correlation	1	.756**
	Sig. (2-tailed)		.000
	N	63	63
ESMEAN	Pearson Correlation	.756**	1
	Sig. (2-tailed)	.000	
	N	63	63

."Life on this planet was absolutely perfect when there were no plastic packages;. So in order to make fashion sustainable, our future should reflect the legacy that was gifted to us. Together, meetings should be held to do the same and save our mother, «Earth."

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