



Research Paper

Sustainable Approach: Upcycled Clothing Inspired from Japanese Boro Technique

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ABSTRACT

“Waste isn’t waste until we waste it” – Will.I.Am, Musician. The fashion industry is responsible for 10% of the world’s annual carbon emissions. According to the Ellen MacArthur Foundation, which is focused on the Isle of Wight, one truck load of textiles is land filled or burned every second somewhere on the planet.. Sustainable fashion is an approach towards minimizing the impacts on the environment. Not just big companies, but even small boutiques discard waste which eventually ends up in the landfill. How can we bring change? The answer is to upcycle the waste into something useful. The project aims in developing an upcycled clothing collection of quilted reversible overcoats for women for the season autumn/winter 2021 inspired from Japanese boro technique. The collection was developed from using the scrap material from boutique which are otherwise waste and were discarded into the landfills. Japanese boro is the practice of making garments which are stitched or re-woven together with sashiko stitches to create an often many-layered material used for warm and practical clothing. The acceptability of the developed products among the stakeholders [consumers, boutique managers and designers] were studied through a questionnaire. Among the developed products, reversible jacket with front wide opening is most preferred by the customers due to its cost and neatness, reversible sleeveless overlapped jacket is most preferred by designers due to its design, colour combination, print and cost; reversible overlapped cropped jacket is most preferred by the boutique managers due to its design, colour combination, print and aesthetic appearance. The study on upcycling using boro technique will help the designers as well as manufacturers to develop innovative sustainable products with less time consumption and price.

KEY WORDS: Sustainability, Upcycling, Japanese culture, Japanese boro boro, Sashiko embroidery

Received 14 June, 2021; Revised: 27 June, 2021; Accepted 29 June, 2021 © The author(s) 2021.
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I. INTRODUCTION

It was During the Edo period [1603 -1867], when fine silk and high quality cotton fabrics were reserved for the upper classes due to the simple factor of cost and since silk fabrics were unsuitable for working clothes, most practical clothing was designed with the goal of practical wear in mind. As peasant farmers and fishermen could not afford to wear expensive clothing for work or work comfortably while wearing silk fabrics, Boro developed out of need for inexpensive clothing. Many people in the working class grew, spun, dyed, and woven their own clothes. All of their clothing would mostly be dyed using indigo dyestuff as it was grown and processed by the peasant class themselves. It also added a layer of protection due to its moth- repelling properties.^[1]

1.1. Japanese Boro

The Japanese word boro describes the condition of items that have been used, destroyed, or worn to tatters, extensively repaired and often used well past their intended life cycle. These humble cloths are tangible remnants of stories lived by the common people like farmers and fishermen.^[2] These textiles are used by peasant farmers and fishermen that have been stitched or re-woven together with sashiko stitches to create an often many-layered material used for warm, practical clothing. The ‘boro’ technique was used by Japanese women to

repair clothing and other items so they could be used from generation to generation. ^[3]The Jacket made out of boro technique is shown in Figure 1.



Figure 1: Boro Jacket (source: Helmn)

1.2. Sustainable Fashion

Sustainable fashion is an approach to sourcing, producing, and designing clothing that maximises industry and societal benefits while minimising environmental impacts. ^[4] It is a concept and a cycle aimed at bringing more ecological honesty and social justice to fashion items and the fashion system. Fashion textiles and accessories are just one aspect of sustainable fashion. It entails discussing the entire fashion system. This involves dealing with social, cultural, ecological, and financial processes that are all interdependent. ^[5]

1.2.1. Upcycled Clothing

Upcycled clothing also referred to as repurposed clothing, reused clothing and recycled clothing is the method of taking old, worn out or damaged materials and transforming them into brand new pieces. ^[6] Upcycling is reusing discarded objects or materials to create a product. It not only helps us to clean up the mess but also helps in waste management system and reduces carbon footprints. Upcycling can be popularly understood as creative reuse. It is the method of converting by-products and waste materials from goods that would otherwise be useless or unwanted into new materials or higher-quality products or for better environmental value. We eliminate the need to manufacture fresh raw materials by upcycling. By reducing this need, we can cut down on air pollution, water pollution, landfill use, and even greenhouse gas emissions. ^[7]

Keeping the traditional Japanese boro technique in mind, as a part of upcycled clothing quilted reversible jackets were designed and developed for women for the season autumn/winter 2021. It was imperative to develop the products in low cost with faster technique to attract the customers. Keeping these facts in mind the project was conducted with the following objectives:

1. To study about the amount of scrap material discarded out of the boutique.
2. To study about Japanese boro textiles.
3. To develop clothing from scrap fabric material inspired from boro technique.
4. To find the acceptability of the developed range of products.

II. METHODOLOGY

The project was carried out in two stages. The first stage was to attain a complete insight about Japanese boro technique. The study reviewed about the technique, raw material required, colours and designs used for boro technique. The second stage focused on developing products inspired from boro technique using waste materials discarded out of the boutique.

2.1. Selection of Japanese Boro Technique

Design research is what makes our approach to gain more insight on Japanese boro technique. The information about Japanese boro technique was collected using primary and secondary data. Already existing research papers were studied to gain knowledge about the craft. Data regarding the origin, technique, material used, colour and design of the boro technique was collected through the books, journals and web sources.

2.2. Development of Boro Inspired Products

In the second stage, an internship was undertaken in a boutique called studio-A located in Coimbatore, Tamil Nadu. The boutique is owned by Ms Aparna Sunku who is also the design head. The project was carried out in the boutique and the idea was to use the waste discarded out of that particular boutique and convert it into some useful products. The idea of patch working was selected to minimize the time in converting the waste fabric into meters of fabric for the development of the garment. The traditional motifs inspired from sashiko stitches and colours were used to buy the printed fabric for the reverse side of the garment. The developed products were different from the usual range of traditional boro products. Consumer preferences and acceptability of developed boro inspired products were studied. The developed products were assessed using rating scale. A five point rating scale was used to assess the consumer preferences and acceptability of the products (Excellent-5; very good-4; good-3; fair -2; average-1). The attributes on which the evaluation of products was done were based on design, neatness, colour combinations, aesthetic appearance and cost of the product.

III. Results And Discussion

3.1. FINDINGS OF THE STAGE 1 STUDY

3.1.1. History of Boro

Between 1850 and 1950, boro was common in rural Japan. The technique was invented by peasant farmers in the 1800s to keep warm during times of severe cold and hunger.^[8]

Textiles were less prevalent than they are now, so stitches were used to bind, preserve, and extend the lives of household and wearable textiles. This practice is encompassed in boro, which is defined by the Victoria and Albert museum as the “practice of reworking and repairing textiles.”^[9]

3.1.2. Boro Technique

It was absolutely important for Edo-period Japanese peasants to get the most wear and use out of their textiles, so no scrap of cloth was ever thrown away. Japanese peasants didn't have access to sturdy cotton cloth at that time, so they had to make with homespun hemp fabric, which was more likely to show signs of wear. As and when the garment show signs of tearing, a scrape fabric would be used to patch and conceal the hole. Garments were repaired and passed down through the generations using fabric scraps dyed with indigo or brown earthy tones. The evolution of patterns and motifs in the reinforcement stitching (sashiko) gave these garments a lovely decorative touch.^[10]

3.1.3. Sashiko Stitches

The sewing of one or more layers of cloth with a simple running stitch is known as sashiko, and it also refer to the finished fabric.^[11] Sashiko is the noun of the verb *sasu*, meaning to Pierce.^[11] Sashiko was a darning technique (Figure 2), an economic necessity in extending the life of a garment or cloth and was not done for decorative purposes.^[11] It was commonly used to reinforce already-patched clothing around points of wear, but would also be used to attach patches to clothing, making the fabric ultimately stronger. It may also be used to produce warmth by layering thin fabrics. Clouds, rippling water or waves, trees, and leaves are popular sources of inspiration for traditional sashiko designs. Designs can also be very geometric featuring interlocking lines, stars, squares, triangles, and circles.^[12]



Figure 2: Sashiko (Source: The Spruce Crafts)

3.1.4. Motifs

Traditionally sashiko stitches were not done for decorative purpose. The main idea was to reinforce the patched fabric. But in modern times there are no rules when it comes to Boro patch-working or Sashiko stitching. Most of the garments were patched with running stitches earlier but in the modern times to give it a decorative touch a lot of different motifs like crosses, fish scales and wavy lines were also used as shown in Figure 3.

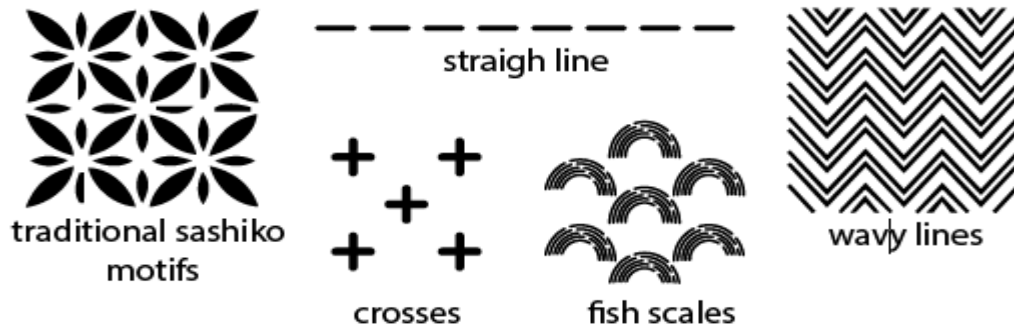


Figure 3: Motifs (Source: Good sport shop)

3.1.5. Materials Used

Boro is usually made up of two layers of even-weave fabric, such as linen or cotton, or linen blends that are thicker than broadcloth. Traditional Japanese sashiko utilises sashiko yarn, which is a tightly twisted heavy-weight cotton thread. Stranded cotton embroidery thread is the most popular. Sashiko needles have a wide oval eye and are usually very long. The fabrics, thread and needle used are shown in Figure 4, 5 and 6 respectively.



Figure 4: Cotton/Linen fabrics



Figure 5: Heavy-weight Cotton thread



Figure 6: Needle-large oval eye

3.1.6. Colours

The boro clothing would mostly be dyed using indigo dyestuff as it was grown and processed by the peasant class themselves. Few earthy tones like brown and grey can also be seen in the clothing. The colours in traditional boro are shown in Figure 7.



Figure 7: Colours in Traditional Boro Garments

(Source: Gerrie Congdon)

3.2. Stage 2 – DEVELOPMENT OF BORO INSPIRED UPCYCLED JACKETS

3.2.1. Market research to understand the customer requirement

A survey was conducted to study the market and analyse the survey results to understand the market requirement. The sample size of the survey was 20 respondents and was conducted through online using Google Forms. The results of the survey are shown in Table 1.

Table 1: Market Research

S.NO.	Questions	Options	Results
1.	Age group	<ul style="list-style-type: none"> 18 - 21 yrs. 22 - 29 yrs. 30 - 45 yrs. 45 and above 	50% of women fall under the age group of 22-29 years 30% of women fall under 30-45 years, 15% of women fall under 18-21 years 5% of women fall under 45 years and above
2.	Have you heard of the term 'Sustainable Fashion'?	<ul style="list-style-type: none"> Yes No 	100% of women are aware of the term "sustainable fashion".
3.	What do you think 'sustainable clothing' means?	<ul style="list-style-type: none"> Over priced Durable and long lasting Reused/ Recycled fabrics Reduction in chemicals used 	100% of women agree that sustainable clothing is made out of reused / recycled fabrics. 60% of women agree that the garments are durable and long lasting. 40% of women think that there is reduction in the chemicals used. 10% of women think that sustainable clothes are overpriced.
4.	If your favourite store sold a new line of sustainable, upcycled/recycled apparel, would you buy it?	<ul style="list-style-type: none"> Yes No Maybe 	50% of women would buy sustainable apparel 50% might buy it.
5.	If you buy upcycled/recycled apparel, at what price you would like to buy?	<ul style="list-style-type: none"> Below Rs.1000 Rs.1000-Rs.2500 Rs.2500-Rs.5000 More than Rs.5000 	70% of women would buy sustainable clothes if it is priced between the range of Rs.1000- Rs.2500 30% of women would buy if the garments are below Rs.1000.
6.	What type of designs would you like if it is made from tailoring	<ul style="list-style-type: none"> Dresses Jackets 	95% of women would like jackets made out of tailored waste.

	waste? [patch worked]	<ul style="list-style-type: none"> • Pants • Tops 	
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3.2.2. Four main elements inspired from boro

- **Boro** -refers to the practice of reworking and repairing textiles through piecing, patching and stitching, in order to extend their use.
- **Motifs and Prints** - Motifs, prints and colour are inspired from the boro fabrics.
- **Sashiko Darning** - The torn area is been patched with a small piece of fabric using darning stitches called sashiko stitches.
- **Patch working** - Upcycling tailored waste and converting it into patch worked fabric.

3.2.3. Materials used

The material used in traditional boro and the materials used for the upcycled boro are shown in Table 2.

Table 2: Material Differentiation

Materials	Traditional boro	Upcycled boro
Fabrics	Cotton, linen hemp materials	1. Waste materials from the boutique. Combination of materials (cotton, synthetic fabrics, busy lizzy, cotton silk) 2. Indigo printed fabric for the reverse side. Print inspired form sashiko stitches.
Trims	Cotton thread for sashiko stitches	1. Cotton embroidery thread for sashiko stitches. 2. Sponge batting for quilting.

3.2.4. Segregation of waste

The garment designed and produced in the boutique are mostly made of fabrics such as cotton, silk, satin, brocade, net, etc. with a variety of colors. Keeping boro in mind, fabrics such as net, brocade satin were avoided to bring out a better look. Fabrics like cotton, cotton/silk, synthetic fabrics like busy lizzy were selected. The waste collected from the boutique is shown in Figure 8 and 9 respectively.

(a) Fabrics of bigger bits were selected that can be utilized for patch working.

(b) Fabrics of small bits and pieces: keeping sustainability in mind, the fabric of smaller bits was used to make trims like fabric buttons.

The waste materials collected were all effectively utilized. Around 1.7 kg of waste fabric was utilized to make the jackets (Figure 10).



Figure 8: Waste Fabrics



Figure 9: Selection of convertible waste



Figure 10: 1.7 kg of fabric selected for patchwork

3.2.5. Patchwork

The clothing waste in the boutique consists of wide variety of fabrics and colors. The availability of fabric of same color was inadequate. The available color of fabrics was utilized for patch working. The fabrics were precut into 5.5 inches of square and were patched together into 4.5 meters of fabric as shown in Figure 11 and 12.



Figure 11: 5.5 inches of square for patchwork



Figure 12: 4.5 meters of fabric

3.2.6. Sashiko stitches

Most of the garments were usually patched with running stitches but in the modern time to give it a decorative touch a lot of different motifs like crosses, fish scales and wavy lines were also used. Stitches like crosses, wavy line were inspired form boro and were applied in a different way to the patch work garment. The stitches done on the patch work fabric with cross wave stitch is shown in Figure 13; combination of straight and wave stitch in Figure 14 and with v-stitches is shown in Figure 15.



Figure 13: Wavy line inspired cross wave stitch



Figure 14: Combination of straight stitch and wave stitch



Figure 15: V- Stitches

3.2.7. Quilted reversible jackets

3.2.7.1. Reversible overlapped cropped jacket

An overlapped cropped jacket shown in Figure 16 has short sleeves, v- neck in the front and high round neck at the back. The material used for the design is the patch worked fabric from the waste discarded out of the boutique and fish scale inspired indigo printed cotton fabric for the reverse side of the garment. It has a button closure at the bottom left waistline which is also made out of waste fabric material. The patch work side of the garment is been given a decorative touch with sashiko inspired stitches. Sponge batting material is used for quilting. The tech pack of the garment with costing is shown in Figure 16(a).



Figure 16: Reversible overlapped cropped jacket

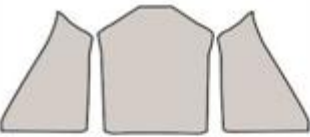
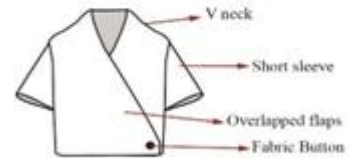
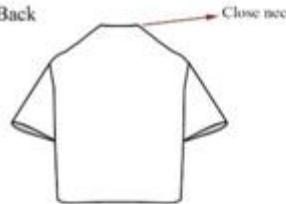









<i>Garment Specification Sheet</i>																									
Style No : 01		Date :20/2/2021																							
Category : Women Jackets		Size : M																							
Season :A/W 20/21		Designers Name : Swetha Ranka																							
Description of Garment : Reversible overlapped crop jacket developed using boro boro technique.																									
S. No	Measurements (in inches)																								
1.	Full length	16																							
2.	Chest circumference	35																							
3.	Neck width	8.5																							
4.	Front neck depth	4																							
5.	Back neck depth	2																							
6.	Shoulder width	14.5																							
7.	Shoulder slope	0.5																							
8.	Armhole circumference	16																							
9.	Sleeve length	6																							
10.	Sleeve opening	13																							
<p style="text-align: center;">JACKET INSIDE</p>  <p style="text-align: center;">NOTE: Reversible jacket. Stitch and turn out.</p>		<p style="text-align: center;">Front</p>  <p style="text-align: center;">Back</p> 																							
Wash Care Instructions		    																							
Fabric / Lining	<p>Fabric 1</p> 	<p>Fabric 2</p> 	<p style="text-align: center;"><i>Costing</i></p> <table border="1"> <thead> <tr> <th>Materials</th> <th>Cost</th> </tr> </thead> <tbody> <tr> <td>Printed fabric(2meter)</td> <td>220 rs</td> </tr> <tr> <td>Batting material(2meter)</td> <td>90 rs</td> </tr> <tr> <td>Fabric button(1 button)</td> <td>0.5 rs</td> </tr> <tr> <td>Total material cost</td> <td>300.5rs</td> </tr> <tr> <td colspan="2" style="text-align: center;">Labour</td> </tr> <tr> <td>Patchworking</td> <td>100 rs</td> </tr> <tr> <td>Embroidery</td> <td>100 rs</td> </tr> <tr> <td>Sewing</td> <td>300 rs</td> </tr> <tr> <td>Total labour cost</td> <td>500 rs</td> </tr> <tr> <td>Total cost of the garment</td> <td>800 rs</td> </tr> </tbody> </table>	Materials	Cost	Printed fabric(2meter)	220 rs	Batting material(2meter)	90 rs	Fabric button(1 button)	0.5 rs	Total material cost	300.5rs	Labour		Patchworking	100 rs	Embroidery	100 rs	Sewing	300 rs	Total labour cost	500 rs	Total cost of the garment	800 rs
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Fabric Description :	Patchworked fabric	100% Cotton																							
Trims and Accessories :	 fabric button	 Batting material																							

Figure 16(a): Reversible overlapped cropped jacket Tech-pack

3.2.7.2. Reversible sleeveless overlapped jacket

A sleeveless overlapped cropped jacket was designed with v neck and a diagonal opening the front and high round neck at the back (Figure 17). The material used for the design is the patch worked fabric from the waste discarded out of the boutique and traditional round boro motif with indigo printed cotton fabric for the reverse side of the garment. It has a button closure at the center front made out of waste fabric material. The patch work side of the garment is been given a decorative touch with sashiko inspired stitches. Sponge batting material is used for quilting. The tech pack of the garment with costing is shown in Figure 17(a).



Figure 17: Reversible sleeveless overlapped

Garment Specification Sheet																														
Style No : 02		Date :20/2/2021																												
Category : Women Jackets		Size : M																												
Season :A/W 20/21		Designers Name : Swetha Ranka																												
Description of Garment : Reversible sleeveless overlapped crop jacket developed using boro boro technique.																														
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Figure 17(a): Reversible sleeveless overlapped jacket Tech-

3.2.7.3. Reversible drawstring jacket

A sleeveless drawstring jacket designed with round neck at front and back is shown in Figure 18. The material used for the design is the patch worked fabric from the waste discarded out of the boutique and leaf pattern with indigo printed cotton fabric was used for the reverse side of the garment. It has a drawstring

placket at the front made out of printed fabric material. The patch work side of the garment is given a decorative touch with sashiko inspired stitches. Sponge batting material is used for quilting. The tech pack of the garment with costing is shown in Figure 18(a).



Figure 18: Reversible drawstring jacket

Wash Care Instructions																							
Fabric / Lining	Fabric 1	Fabric 2	Costing <table border="1"> <thead> <tr> <th>Materials</th> <th>Cost</th> </tr> </thead> <tbody> <tr> <td>Printed fabric(2meter)</td> <td>220 rs</td> </tr> <tr> <td>Batting material(2meter)</td> <td>80 rs</td> </tr> <tr> <td>Total material cost</td> <td>300 rs</td> </tr> <tr> <th>Labour</th> <th>Cost</th> </tr> <tr> <td>Patchworking</td> <td>100 rs</td> </tr> <tr> <td>Embroidery</td> <td>100 rs</td> </tr> <tr> <td>Sewing</td> <td>300 rs</td> </tr> <tr> <td>Total labour cost</td> <td>500 rs</td> </tr> <tr> <td>Total cost of the garment</td> <td>800 rs</td> </tr> </tbody> </table>	Materials	Cost	Printed fabric(2meter)	220 rs	Batting material(2meter)	80 rs	Total material cost	300 rs	Labour	Cost	Patchworking	100 rs	Embroidery	100 rs	Sewing	300 rs	Total labour cost	500 rs	Total cost of the garment	800 rs
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Fabric Description :	Patchworked fabric	100% Cotton																					
Trims and Accessories :	Batting material																						

Figure 18(a): Reversible drawstring jacket Tech- pack

3.2.7.4. Reversible long jacket with wide front opening

A half-length sleeved long jacket was designed with curve neck at front and high round neck at the back as shown in Figure 19. The material used for the design is the patch worked fabric from the waste discarded out of the boutique and zig-zag boro motif with indigo printed cotton fabric for the reverse side of the garment. It has a wide front opening. The patch work side of the garment is given a decorative touch with sashiko inspired stitches. Sponge batting material is used for quilting. The tech pack of the garment with costing is shown in Figure 19(a).



Figure 19: Reversible long jacket with wide front opening

<i>Garment Specification Sheet</i>																							
Style No : 04		Date :20/2/2021																					
Category : Women Jackets		Size : M																					
Season :A/W 20/21		Designers Name : Swetha Ranka																					
Description of Garment : Reversible long jacket having wide front opening developed using boro boro technique.																							
S. No	Measurements (in inches)		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;"> <p>Front</p> </div> <div> <p>Back</p> </div> </div>																				
1.	Full length	28																					
2.	Chest circumference	35																					
3.	Neck width	8.5																					
4.	Front neck depth	3.5																					
5.	Back neck depth	1.5																					
6.	Shoulder width	14.5																					
7.	Shoulder slope	0.5																					
8.	Armhole circumference	16																					
9.	Sleeve length	15																					
10.	Sleeve opening	11																					
<p>JACKET INSIDE</p> <p>NOTE: Reversible jacket. Stitch and turn out.</p>																							
Wash Care Instructions																							
Fabric / Lining	<p>Fabric 1</p>	<p>Fabric 2</p>	<p><i>Costing</i></p> <table border="1"> <thead> <tr> <th>Materials</th> <th>Cost</th> </tr> </thead> <tbody> <tr> <td>Printed fabric(2.5meter)</td> <td>280 rs</td> </tr> <tr> <td>Batting material(2meter)</td> <td>80 rs</td> </tr> <tr> <td>Total material cost</td> <td>360 rs</td> </tr> <tr> <th>Labour</th> <th>Cost</th> </tr> <tr> <td>Patchworking</td> <td>150 rs</td> </tr> <tr> <td>Embroidery</td> <td>140 rs</td> </tr> <tr> <td>Sewing</td> <td>350 rs</td> </tr> <tr> <td>Total labour cost</td> <td>640 rs</td> </tr> <tr> <td>Total cost of the garment</td> <td>1000 rs</td> </tr> </tbody> </table>	Materials	Cost	Printed fabric(2.5meter)	280 rs	Batting material(2meter)	80 rs	Total material cost	360 rs	Labour	Cost	Patchworking	150 rs	Embroidery	140 rs	Sewing	350 rs	Total labour cost	640 rs	Total cost of the garment	1000 rs
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Fabric Description :	Patchworked fabric	100% Cotton																					
Trims and Accessories :	<p>Batting material</p>																						

Figure 19(a): Reversible long jacket with wide front opening Tech-pack

IV. Stakeholder's preference towards Upcycled boro garments

A survey was conducted to analyse the acceptability of the developed products. 20 Judges participated in the survey. The judges were as follows, 10 customers, 5 designers and 5 boutique managers. The survey was conducted to analyse the customer preferences as well as what fellow designers and boutique managers think about sustainable products of these type. The survey consisted of subject's age and were asked to give their preferences towards the developed products using rating scale based on the attributes such as design, neatness, colour combinations, aesthetic appearance and cost of the product. Judges were asked to express their rating on a five point response scale from 1(very poor) to 5(excellent).The results show that jacket no 4 which is reversible jacket with front wide opening is most preferred by the customers due to its cost and neatness. Jacket no 2 which is reversible sleeveless overlapped jacket is most preferred by designers due to its design, colour combination, print and cost. Jacket no 1 which is reversible overlapped cropped jacket is most preferred by the boutique managers due to its design, colour combination, print and aesthetic appearance.

Table 3: Survey results of customer

Sl.no	Product	Design	Neatness	Colour combinations	Aesthetic appearance	Cost	Total	Rank
1	Jacket 1	30	23	21	25	24	123	IV
2	Jacket 2	30	30	30	28	30	148	III
3	Jacket 3	37	32	37	34	38	178	II
4	Jacket 4	48	49	48	48	49	242	I

Table 4: Survey results of designer

Sl.no	Product	Design	Neatness	Colour combinations	Aesthetic appearance	Cost	Total	Rank
1	Jacket 1	20	17	20	17	20	94	II
2	Jacket 2	25	22	25	22	25	119	I
3	Jacket 3	15	12	15	12	15	69	III
4	Jacket 4	10	12	10	13	10	55	IV

Table 5: Survey results of boutique manager

Sl.no	Product	Design	Neatness	Colour combinations	Aesthetic appearance	Cost	Total	Rank
1	Jacket 1	25	22	25	25	22	119	I
2	Jacket 2	15	12	15	12	15	69	III
3	Jacket 3	20	17	21	19	20	97	II
4	Jacket 4	10	10	12	12	10	54	IV

V. Conclusions

The Boro technique was created by humble peasant farmers in rural Japan between 1850 and 1950, out of a need to keep warm during times of extreme temperatures and poverty. Traditional boro can be used as a source of inspiration for creating innovative and fashionable products. Today as the world is moving more towards sustainability; fashion industries can also try and implement new techniques towards minimizing the impacts on the environment. An attempt was made in upcycling the waste discarded out of boutique. Totally 4 products were made by implementing 4 main elements inspired from boro technique. Consumer acceptability towards the developed boro products on various parameters was also studied. Among the developed products, reversible jacket with front wide opening is most preferred by the customers due to its cost and neatness, reversible sleeveless overlapped jacket is most preferred by designers due to its design, colour combination and print and cost and reversible overlapped cropped jacket is most preferred by the boutique managers due to its design, colour combination and print and aesthetic appearance. The study on upcycling and boro technique will help the designers as well as manufacturers to develop innovative products with less time consumption and price.

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