

Pattu Weaving: A Sustainable Fabric Manufacturing Technique

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Abstract: Sustainability is the need of the hour and the world is now looking for the environment-friendly options while choosing the materials, techniques, processes and disposal systems. In textiles, handloom weaving is considered as the sustainable way of fabric manufacturing. Many ancient crafts clusters are still existing and re-inventing themselves to create sustainable products. The craft of ‘Pattu weaving’ is one of them which is known as a traditional weaving technique. Pattu weaving is a traditional craft using extra weft weaving technique which is widely practised by the weavers in India. The study has reviewed the materials, tools, techniques and processes used in this craft, along with the challenges and opportunities for the upliftment of the craft. A comparative study of traditional and contemporary materials, colour palette, motifs and product range of the craft are also covered in this paper. Major part of the information and images have been collected during craft research documentation activity while visiting the craft cluster at Bhojasar and Karwa villages in Rajasthan where Pattu craft has been practiced by the weavers since ages. Along with this, secondary research has also been included in this document to strengthen the study.

Keywords: Craft, Extra weft technique, Geometrical motifs, Pattu, Weaving

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1. Introduction

Sustainable manufacturing is considered as a crucial issue for mankind. Consumption of non-renewable resources and non-eco-friendly activities are leading to climate change and scarcity of resources for future generations. The effects of climate change, along with pollution and the depletion of non-renewable natural resources, have given rise to environmental awareness (Douglas, 2006; Acharya, 2014). Since the early 20th century, the average surface temperature of the earth has increased by about 0.8°C (1.4°F), with about two-thirds of the increase occurring since 1980. Researchers indicate that during the 21st century, the global surface temperature is likely to rise by a further 1.1 to 2.9°C (2 to 5.2°F) for the lowest emissions scenario and 2.4 to 6.4°C (4.3 to 11.5°F) for the highest emission scenario (Chattopadhyay, 2015). Researchers, manufacturers and consumers are now focusing on the options with sustainable materials, processes and techniques to prevent further damage to the environment (Adner, 2006). Among other manufacturing industries, textile industries are one

of the industries which are responsible for high water consumption, high energy consumption, chemical loaded waste water generation, and solid waste generation (Diaz, 2012; Caniato, 2015).

To refrain from unsustainable practices, it's important to use natural resources and eco-friendly manufacturing techniques (Sharma, 1995; Bhaskaran, 2014). Ancient handloom and handicraft techniques are one of the ways to tackle these issues. Present paper discusses one such handloom technique Pattu weaving which has been practised by the weavers of Rajasthan, India since ages.

The craft of ‘Pattu weaving’ is known as a traditional weaving technique which is generally practiced in western Rajasthan, Kullu, Andhra Pradesh, some parts of Tamil Nadu in India and northern region of Pakistan (Department of Textile Design, , 2018). This extra weft weaving technique is used in making a wide variety of products such as blankets, shawls, sarees, carpets etc. Present study covers the Pattu weaving of western Rajasthan where it is widely used by the weavers of Jaisalmer, Barmer, Bikaner, Jodhpur, Phalodi and Jalore district among others. It is also said that pattu with designs were specifically woven in Pakistan and Pattu in India

were plain. The weavers of Barmer learnt the intricate designs from the Pakistani weavers (Hayavadana, 2015).

In Rajasthan, weavers belonging to the Meghwal community are mainly involved in this craft along with other hand crafts such as leather work, leather tanning, shoe making etc. It is said that during drought time they were shifted from regular farming activities to these craft practices which have now become a significant part of their livelihood (Department of Textile Design, 2020). The Pattu shawls hold a cultural significance within this community where it is commonly used as a part of local marriage rituals. Pattu is gifted to the bridegroom and also to other elder male relatives by the bride's father and the ceremony is called as Odhavani which is still followed by the community members.

Pattu is derived from the word Patti which means the narrow band of cloth. Originally Pattu fabrics were woven of about two feet wide bands and then two such panels were joined together lengthwise to make a full-width fabric using the interlocking stitch known as Khilan in local language. In this extra weft weaving technique, along with the ground warp and weft yarn, multi-colored extra weft yarns are also used during weaving to give the decorative embroidery-like effect in the fabric (Rustagi, 2020). The intricate motifs of these woven fabrics are used in making women's skirts, shawls or blankets which were initially adorned by only the weaver's own community, the Gujjar community and the Kumhar community but now adorned by all groups of people throughout Rajasthan after commercialization.

As compared to power looms, the craft-based handloom techniques provide the sustainable way of fabric manufacturing with the minimum use of resources, significantly low energy consumption, maximum usage of local material and tools etc. These techniques need to reinvent themselves by understanding the requirements of the present textile market. Selection of contemporary materials, colors, motifs and weaves according to the demand of consumers and providing a wider range of products may pave the way for upliftment of the craft and weavers. Present study covers both the traditional and contemporary approaches to provide the wider perspective of the craft to encourage the sustainable practices in the fabric manufacturing.

2. Materials and methods

The study has reviewed the materials, tools, techniques and processes used in this craft, along with the challenges and opportunities for the upliftment of the craft. A comparative study of traditional and contemporary materials, colour palette, motifs and product range of the craft are also covered in this paper.

3. Results and discussion

3.1. Raw material and tools

Traditionally 'Pattu' weaving was used in making shawls and blankets by using sheep or camel wool in its natural unprocessed was collected using razors (Jaipal, 2020). This collected wool was deep brown or warm white in colour. Pattu made from natural wool was sturdy and thick enough to help people to withstand the hard climatic conditions of the deserted areas. Earlier, to convert the wool fibres into yarn, spinning was done by local communities on spinning wheels known as Charkha which were then woven into fabric by weavers of the Meghwal community. Currently wool is procured from spinning mills and given to the weaver for Pattu weaving. The raw wool used initially has been replaced by cotton, merino wool, or their blends like polycotton, poly wool etc. With the decline in the demand of woollen Pattu and onset of much softer machine-made shawls, weavers switched to cotton which is favourable for all seasons and cost-effective as well. Cotton has been used extensively to make a variety of contemporary products which helps in catering the wider market segments. Figure 1 shows the extra weft yarns used for making motifs in Pattu (Johnson, 2015).



Figure 1: Extra weft yarn used for Pattu weaving

Initially, natural unprocessed wool was used in its natural colours of cream, brown and black without additional colouration. However, with the introduction of synthetic dyes, bright red, saffron, blue, green, pink and orange have been added in the colour palette of Pattu. The yarns are mainly sourced from Bikaner, Jaisalmer, Ludhiana and Delhi. To acquire vibrant hues, dyeing of yarn is generally done at local places using vat dyes, sulphur dyes and naphthol dye for cotton and acid dyes for wool.

Pit loom

The weavers use Pit loom, locally known as Khaddi to weave Pattu. Pit loom is a type of loom which is set by sunken four posters into the ground and with an overhang sley. The artisan sits behind the pit while weaving. The pit includes the treadles used by the artisans to move the heald shafts using their feet. The pit is coated with a mixture of mud and cow dung to make it durable and to prevent the walls of the pit from caving in. Due to the proximity of the loom to the ground, the pit loom is believed to give better results as the ground absorbs the tension and the speed of the loom. The sitting position of Pattu weaver on pit loom is shown in Figure 2 where the legs of weavers are in the dig controlling the treadles for the required movement of heald shaft. Weft insertion and beating process is also done manually where the setting is done above the dig.



Figure 2: Making of Pattu on pit loom showing the sitting position of the weaver

Different parts of the pit loom along with their functions are discussed below to understand the mechanism in detail. The Names of parts are also mentioned in local language wherever possible, to retain the essence of craft.

Warp Beam: Warp beam is a roller which is located at the rear end of the loom that winds the warp yarns during weaving.

DORA (Heald Shaft): Heald shaft is the frame that holds the warp which passes through the heald eyes. These shafts are attached to the treadle located inside the pit to give the movement to the shaft as required. Number of shafts required to weave depends on the design.

PANSAR (Treadles): Treadles are pedals located at the bottom of the loom inside the pit which is shown in the figure 3. Four Treadles, each six inches in length and four inches wide are used to help control the warp shed formation by allowing the up and down movement of the shafts followed by insertion of weft to create the desired pattern.



Figure 3: Treadles inside the dig to give movement to the heald shaft

HATTHA (Reed): Reed is a comb-like device made of shisham or Rosewood that pushes the weft yarn towards the fell of the cloth through beating. The Kangha (dents in

the reed) hold the warp yarns and help to keep them untangled throughout the weaving process.

NAAV (Shuttle): Shuttle is the device used to carry the weft yarn across the width of the fabric. It is generally made of wood and has notches at the end to hold the weft. Gatti is a bobbin used to wound the weft yarn and is located inside the shuttle as shown in the Figure 4.



Figure 4: Shuttle carrying the weft yarn

TUR (Weaver's beam): This is a roller located at the front of the loom which is used to wound the completed fabric into a yardage roll.

3.2. Manufacturing process

Manufacturing process of Pattu involves spinning of yarn, preparatory processes and weaving of the fabric.

Spinning

Charkha is a manually operated spinning wheel which includes a belt and wheel rotating system as shown in figure 5. A spinner takes a handful of fibres, teases it and holds it in one hand while using the other hand to twist the fibres that results in the formation of the yarn. A continuous twisting and pulling motion are carried out to make the yarns longer and longer to acquire necessary thickness. The charkha is rotated in a clockwise direction, which helps control the release of the quantity of fibre required for spinning. The amount of twist required can be controlled by the size of the wheel used. Traditionally camel or sheep wool was locally collected and was hand spun into yarns by the women of the house. However today, already spun and dyed cotton or wool yarn is provided to the weavers by the NGO 'Urmul' that is associated with the craft.



Figure 5: Charkha for yarn spinning

Preparatory process

The objective of preparatory process is to prepare both the warp and weft yarns to make them ready for the weaving and to transfer yarn from the yarn package to a weaver's beam that can be placed behind a loom for weaving. The Pre-weaving stages are mentioned in detail.

Weft yarn winding

Weft yarn is wound on a metal cylinder from the hank while ensuring dense packing of weft. The extra weft yarn is wound on a small stick, locally called as Nali.

Warping

The warp is prepared in a large open space. A number of lease rods are planted in pairs according to the length of the warp required for fabric weaving. The warping starts from the iron lease rod at one end and is taken to the small lease rod at the other end, passing criss-cross in between all the pairs. Figure 6 shows the warping process done in an open space in the traditional way.



Figure 6: Warping process done in a traditional manner

Sizing

Sizing is done to increase the strength of warp yarn so that it can withstand the stresses while weaving. A sizing paste is made with a mixture of wheat and water with less viscosity. This dilute paste is poured over the bundled warp threads which are kept on the ground still held intact using the lease rods. The paste is constantly squeezed by hand while applying so that it penetrates deeply into the warp. Warp threads are then removed from the lease rods, taken out into sunlight to dry for an hour and stretched between temporary poles. The half-wet yarns are then combed to separate them, remove excess starch and ensure uniform application of paste. (Marks, 1986)

Drafting and Denting

After sizing, the threads are wound onto the warp beam. All the ends are then tied to a wooden log locally called Khuta. The other ends of the new warp thread are then twisted on healds to connect with the ends of the old warp which has already been passed through the heald and reed. After connecting the warp, it is stretched by pulling the tension rope and is then tied to another roller made of

wooden log at the front of the loom which acts as a cloth beam (Gokarneshan, 2004).

Weaving

The weaver sits on their seat situated behind the pit. Keeping his legs inside the pit to press the treadles for giving movements to attached heald frames and make shed as per the requirement of weave followed by weft insertion. Then, reed is used to beat the weft towards the fell of the cloth to tighten and secure the weft in the completed fabric. The extra weft yarns wound on Nali are used to create different geometrical motifs as per the design as shown in figure 7. The extra weft yarns passed between a minimum of two and a maximum of twelve picks during weaving to avoid larger floats. Warp yarns are lifted manually to place an extra weft for interlacement. Process of making Pattu fabrics requires patience, persistence and close attention to details. Different colors and weaves are used to create varieties of Pattu. Generally plain or twill weaves are used as a ground weave to form the base cloth and motifs are made by using extra weft yarns of contrasting colours as compared to plain background of fabric (Marks, 1986).



Figure 7: Making of Pattu on pit loom with insertion of extra weft for creating motifs

3.3. Motifs

Pattu is known for its geometric shape motifs having a combination of triangle, rectangles, diamonds etc made with bright coloured yarns. In regular Pattu, Horizontal stripes, weft-dominated thin lines run along the borders on both the sides of the Pattu fabrics. The motifs of Pattu are generally inspired by the objects in the surrounding such as trees, birds and household articles. Some of the motifs used are Machli (fish), Burdi (hut), Tataiya (wasp), Chatri (triangular shade), Chida (bird), trees etc. Figure 8 shows the traditional motifs used for making Pattu fabrics.

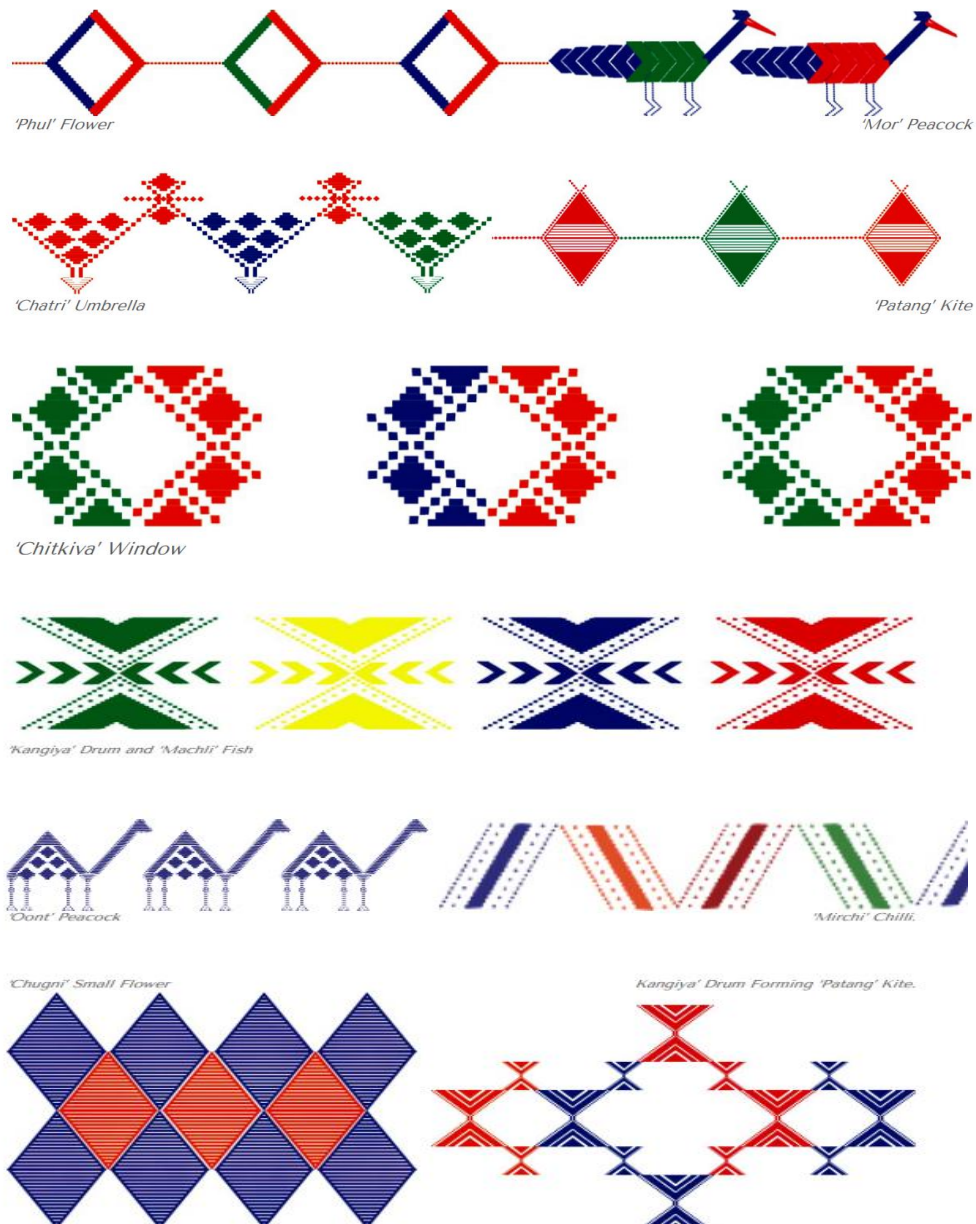


Figure 8: Traditional geometrical motifs of Pattu woven fabrics

3.4. Types of pattu

Pattu is often characterised on the basis of motifs and colors used on the fabric. The most widely used varieties of Pattu are Hiravalli Pattu, Bardi check, Bhojasari Pattu, Malani Pattu, Chatri-Kangsia Pattus and Bakla Pattu along with the Simple Pattu (Department of Textile Design, , 2018).

Simple Pattu: Simple Pattus are usually made with a plain base along with coloured borders that run along the length of the fabric. Generally, there is no weaved motif used in the body but sometimes embroidery is done after weaving for ornamentation purposes.

Malani Pattu: These Barmer region-based Pattu have fish motifs that run along with multi-colors stripes to give decorative effect in the fabric.

Bhojasari Pattu: Motif of these Jaisalmer region-based Pattu is dominated by triangular motifs with horizontal stripes in the border.

Hiravali Pattu: Similar to Simple Pattu, these Hiravali pattus generally do not have any motifs in the body and these are characterised by the sets of multi-colored triple lines running along the length of the fabric.

Chatri-Kangsia Pattu: Chatri-Kangsia are also known as kashida pattu as the motifs give embroidery-like effect in weaving. These Pattus have temple motifs represented with motifs that form two pillars with a dome, and kangsia motifs which refer to damru (pellet-drum).

Lunkar Pattu: Lunkar Pattus are red-coloured Pattus made specially for women and are smaller in size compared to other traditional Pattus. It has traditional weft patterning bars in its borders.

Bardi Pattu: Bardi has a distinctively chequered pattern. Traditionally, the checks were made with black and white coloured yarns but now it is available in different colour combinations. Borders along the length of fabric are kept plain whereas borders along the width are ornamented with rib weave based stripes using bright coloured yarns.

Other than these, some other types of Pattus are also made with different motifs and color combinations. Such as, Chitra Pattu which follows a specific pattern and has a red border at both ends, Ek phulwala Pattu that is made with an interesting colour combination with a similar pattern on both sides. These Pattus are initially made as per the traditional rituals and now made as per the demand by the consumers (Shruti Sudha Mishra, 2019).

3.5. Product range

Initially Products such as lois/Chaddar, Durries, Blankets, Shawls were made using the Pattu craft. With the commercialization of the craft, Pattu can be seen in various segments of apparel and accessories such as Sarees, kurtas, dupattas, skirts, jackets, cushion covers, table cloth, duffle bags, tote bags, pouches etc. Figure 9 shows the various contemporary products made by Pattu weaving.

3.6. SWOT analysis

Strength

Pattu is known as an ancient form of traditional craft which holds a cultural and historical significance. This is a sustainable way of fabric manufacturing without using any power-driven machines or techniques and based on the natural fibres like cotton and wool. Low capital investment is required in this craft due to the availability of skilled weavers, inexpensive tools and equipment. The weaves can easily work from their home and have flexible working hours. Involvement of women is also witnessed in bobbin winding and other related work whenever required. Raw material is also easily available as Pattu is majorly done on cotton and wool which is abundantly available in India. Scope for exploration in terms of colors, motifs and product range is also very wide which may further help in the growth of this craft.

Weakness

Weavers still work on traditional pit looms instead of improved fly shuttle looms resulting in limitations of productivity and efficiency. Limited infrastructure facilities are another weakness of this craft which needs to be improved. Lack of awareness of Indian as well as international market trends, new technological advances and marketing and promotional activities is also restraining the Pattu woven fabrics to cater to the wider market. Pattu craft is majorly confined to rural areas, small cities and untapped markets. Large communication gap between the weavers and consumers also needs to be

improved. Due to lack of earnings, weavers have been shifted to farming activities which results in almost zero productivity during the rainy season. Lack of earning from the craft also resulted in declining interest of the younger generation of weaver's community to continue the legacy of this craft.

Opportunities

The Government of India is constantly working towards the upliftment of handloom and handicraft. The Ministry of Textiles, India and a few fashion designers are working to showcase the Pattu craft on the wider platforms like exhibitions/fairs etc. to cater the national and international markets. An NGO named Urmul Marusthali Bunkar Vikas Samiti is working for the welfare of the weavers by initiating various programs for the social and economic development of the weavers and their families. NIFT being the premier Design education institute of India is also working towards upliftment of the craft by providing contemporary designs suitable as per the fashion forecasting and started initiatives such as artisan awareness workshop, craft bazaar and other craft cluster activities to expand the reach of the craft and increase awareness among the consumers.

Threats

There is decline in the number of artisans willing to continue the craft as due to its long working hours and low economic outcome. Due to lack of awareness and higher cost of the handloom and handicraft products, the consumers are ignorant towards the magnificent textiles and other crafts of the country. New Printing technology has made it easier to recreate any designs digitally including the patterns of woven Pattu at a fairly low cost. Power looms are also a major threat to these handloom-based craft that results in duplicity of handloom fabrics which are sold at relatively lower cost. The covid 19 pandemic and precautions imposed such as lockdown have affected the demand and sale of the craft.

3.7. Current scenario

The artisans have inherited the craft from their ancestors and are hoping to carry forward their legacy. Though, advancement in weaving technology, rural to urban migration and unfair profit margins are some of the reasons that the craft of Pattu weaving is losing its identity and is struggling to survive. With the initiatives of the Government for the upliftment of artisans and revival of the crafts, designers are taking interest in making fabrics using this age-old technology which is now considered as a treasured handloom technique.

The Pattu craft hasn't undergone many changes with respect to its appeal or construction however at the same time it has adopted new efficient ways to suit the fashion of current times. The changes have been done in the use of raw materials and catering to wider product categories. Cotton and other fibre blends are also used now along with the traditional wool. Synthetic dyes consisting of bright and vivid hues are being used to cater to the current market demands. Due to the increased production using

power looms, artisans are facing scarcity for the demand of craft and there is insufficient availability of financial support. The younger generation is shifting to alternative occupations which has led to creating disinterest about the craft practices and has reduced the number of active artisans with Pattu weaving skill.

Adding to the scenario, the covid-19 pandemic has severely affected the reach of the craft and is adding to the decline of the craft. Since the artisans are associated with Urmul and only sell through exhibitions or to export houses, the demand for the product has decreased rapidly as there are no exhibitions being held and the export houses and brands are themselves struggling to sell their previous stock and maintain their financial stability. There are very few orders being placed and even fewer products are sold.

4. Conclusion

Adoption of sustainable ways of manufacturing practices becomes a necessity to conserve the natural resources on earth for current and future generations. Using the age-old eco-friendly techniques and natural materials wherever possible could become a solution to the issues emerging due to unsustainable materials, process and techniques. Using handloom-based products such as Pattu weaving may contribute efficiently in tackling the situation. The craft is struggling to survive because of several issues such as consumer unawareness towards the craft, lack of design solutions according to the current trends, low monetary gain to the weavers and lack of infrastructure facilities. With the initiatives driven by the government, interest taken by the designers and fashion institutes and the advent of social media, the craft may revive itself to continue its inheritance to conserve both the craft and environment.

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