

# Digital Art Fabric Prints: The Bridge Between Art and Design

Dr. Tripti Singh

Media Design Fellow/School of Humanities and Social Sciences  
Indian Institute of Technology Mandi, India

**Abstract**—Digital tools, merging boundaries of different mediums as artists [1] are exploring new areas. Digital fabric printing has motivated artists to create prints by combining images acquired by photograph, scanned images, computer graphics and microscopic imaginary etc to name a few, with traditional media such as hand drawing, weaving, hand printed patterns, printing making techniques and so on. It has opened a whole new world of possibilities for artists to search, research and combine old and contemporary mediums for their unique art prints. As an artistic medium digital art fabrics have aesthetic values which have impact and influence on not only a personality, but also interiors of a living or work space. In this way it can be worn, as a fashion statement and also an interior decoration.

Digital art, fabric prints give opportunity to print almost everything on a variety of fabric with long lasting print quality [2]. Single edition and limited editions are possible for maintaining scarcity and uniqueness of an art form. These fabric prints will fulfill today's need, as they are eco friendly in nature and they produce less wastage compared to other fabric printing techniques. These fabric prints can be used to make unique and customised curtains, quilts, clothes, bags, furniture, dolls, pillows, framed artwork, costumes, banners and much, much more. Future prediction for digital fabric prints is full of possibilities as it is growing day by day [3].

This paper will explore the procedure, process, and progress techniques of digital art, fabric printing in depth with suitable pictorial examples.

**Index terms:** Digital Art, Fabric Printing, Digital Fabric Printing, Fabric Design.

## I. INTRODUCTION

1. Digital Fabric Printing [4]: I had worked as, Head of design and market development of an Hi fashion company so in this paper I will share my observation about the technology, design process and possibilities.
2. Digital fabric printing is a very new technology with varied applications. Most available printed fabrics are rotary screen printed, single print run is several thousand yards. Therefore it involves high cost, due to time required to prepare screens, as each color in a design requires a separate screen. But digital printing has advantage as it has the ability to do very small as well as large volume runs of every design (may be even less than 1 yard or more than 100 yards) because screens are not needed. Digital printing was first patented in 1968, in the 1990s, inkjet printers mostly been used for paper printing applications. The development in technology has now specialised wide-format printers which can handle a

variety of substrates – everything from paper to vinyl to canvas and fabrics also.

3. Fabrics: The words cloth [5] and fabric are used in textile [6] assembly trades as synonyms for textile. Cloth may be used synonymously with fabric, but often refers to a finished piece of fabric used for a specific purpose (e.g., table cloth). Fabric refers to any material made through knitting, weaving, crocheting, bonding, or spreading that may be used in the production of further goods (garments, etc.). However, specialised usage of term textile refers to any material made of interlacing fibres.

### 2.1. Natural fabrics:

Natural fabrics derived from the fibres of animal, plant, stems and leaves, and silkworm cocoons. They are breathable, soft and less discolouration. There are many natural fabrics but some are mentioned here as they are best fabrics for digital fabric printing.



2.1.1. Cotton is one of the best natural fabrics. Cotton is strong, soft, unlikely to cause allergy. It is easy to wash and flame retardant. And it is the most popular natural fabric used in making clothing.

2.1.2. The silk is the strongest natural fabric in the world, it is obtained from the cocoons of silk worms. Silk is beautiful, luxurious. It is warm in the cold or cool in the heat. Silk is used in clothing, home furnishings and medical textiles.

2.1.3. Linen is protective against sun radiation and does not cause an allergic reaction. It is comfortable and luxurious. It is good absorbent of water as it can absorb up to 20 times its own weight in liquid and it is strong. Linen is obtained

from the flax plant. It is used for apparel, painting canvases and rugs etc.

2.1.4. Ramie is stronger than linen or cotton. It is obtained from the ramie plant. Ramie is strong, absorbent and can be dyed easily. Its uses include clothing, pillow cases, tablecloths, sacks and cable insulation etc.

2.2. Poly based fabrics: The synthetic fibres, polyester [7] fibres, are long chained polymers derived from water, coal, air and petroleum. They are formed through chemical reaction between an alcohol and acid. In this reaction, two or more than two molecules combine to make a large molecule whose structure repeats throughout its length. These molecules are very stable and strong. Fabric blends are made of different types of fibres twisted together. This can result in an item that is, care for or more comfortable and easier to clean.

2.2.1. Types of Polyester

The polyester fibres are generally available in two varieties- PCDT (poly-1, 4-cyclohexylene-dimethylene terephthalate) and PET (polyethylene terephthalate). PCDT has more elasticity and resilience and PET is the most common production. It is stronger than PCDT. PET can be used alone or blended with other fabrics for making stain resistant and wrinkle free clothing.

2.2.2. Polyester viscose [8] is a blend of viscose, it is a form of rayon, mixed with polyester, which increases the viscose's wet strength and durability to handle washing and drying by machine. The blend makes the fabric stronger, but it retains feel of standard viscose rayon and the same drape.



2.2.3. Cotton comes from a naturally grown plant were as polyester is a synthetic material. Cotton that provides good moisture absorption and is a very soft material, while polyester is a more durable material that when combined with cotton, allows for the production of more durable clothes, linens, undergarments and other industrial fabrics.

2.2.4. Silk can be blended with wool to result in a subtle texture, for example in making ties.

2.2.5. Ramie blended with acrylic results in a soft fabric which is easy to care.

2.3. Width and length of the textile bolts: The length is usually either 100 or 40 garden, but it may varies depending on the fabric being referred to, e.g., a bolt of cotton is traditionally 39 garden. The width of a bolt is usually 60 or 45 inches, but it may vary from fabric to fabric according to need.

2.4. Shrinkage: When fabric reduces the size than its original size is called shrinkage. Shrinkage happens due to high tension during preparation of fabric which result in excess stretch or squeeze of the size of the yarn. Two types of shrinkage are lengthwise and widthwise. Digital printing process include washing, drying and padding etc. which results the shrinkage

Shrinkage is determined as:  $\text{Shrinkage Length \%} = \frac{(\text{length of fabric before wash}) - (\text{length of fabric after wash})}{(\text{length of fabric after wash})} * 100$

Normally shrinkage is acceptable less than 5% but there is a difference in shrinkage between natural fabric and poly-based fabric. For natural fabrics shrinkage is higher around 10% and for poly-based it is around 5%. The shrinkage ratio also differs by the length and the width of the fabric.

3.1.Design Process:

Designs can be created by using graphic design software such as Photoshop and Illustrator as these softwares are the most popular. Artwork, photographs and designs can be scanned and then can be digitally manipulated to make a pattern. Designs are seamless pattern that is repeated across the fabric.

Patterns [9]:

Patterns are ideas which merge difference techniques and different skills. Artistic patterns are unique through it can be driven and can be improved according to artist's taste. Some of the popular patterns are mentioned here.

- - 
  - Anthemion: A classical motif based on a stylised honeysuckle plant or a radiating, fan-shaped palm leaf (palmette) commonly found in Greek, Egyptian, Assyrian, and other ancient art.
1. **Arabesque:** An elaborate ornamental design of intertwined curvilinear floral or geometric motifs. Commonly comes from (or inspired by) Islamic art or architecture [10].
  2. **Art Deco:** A style of decorative art typical of the 1920s and 1930s. The name was derived from the 1925 International Exhibition in Paris that showed "des Arts Decoratifs."
  3. **Art Nouveau:** A design style of the late 19th century characterised by dynamic, flowing curves suggesting foliate motifs.
  4. **Cartouche:** An oblong decorative figure resembling a frame, tablet, shield, or scroll bearing an inscription or emphasising a design element. Used as a standalone or as part of a pattern's motif. On ancient Egyptian monuments, an enclosure for royal and divine names.
  5. **Celtic Knot:** A knot formed by interfaced ribbons that lead seamlessly into one another. Same as everlasting knot.

6. **Diaper:** A small-scale geometric pattern in a set layout of interlocking or closely aligned forms. Also a weave forming a diamond (diagonal) pattern.



7. **Ethnic Art:** typical of a specific nationality or a design based on folk art.

8. **Foulard:** A small-scale pattern with basic block repeat, also called a set pattern or a tailored pattern. Originally, the term foulard referred to a soft, lightweight silk cloth. Classic foulards are small-scale, regular-shaped geometrics, usually in set layouts.

9. **Greek Key Pattern:** A plane geometric pattern or a border interlocking that consists of lines

that meet at right angles. Also known as fret pattern. Often used as an ornamental border design.

10. **Optical Art:** An abstract artwork that creates the illusion of movement, vibrating effects, moiré (moiré) patterns, an exaggerated sense of depth, or other visual effects.

11. **Palmette:** A classical motif based on a stylised radiating, fan-shaped palm leaf commonly found in Greek, Egyptian, Assyrian, and other ancient art.

12. **Tracery:**The ornamental framework of interlacing stone, wood, or cast iron ribs supporting (or implying the support of) glass in a Gothic window.

13. **Zillij:** The intricate geometric mosaic tile work created from sets of characteristic shapes, typically cut from enamelled terracotta squares. Used as decorations outside and inside buildings. Another spelling is zalij.

14. **Herati:** A stylized rosette, enclosed in a diamond, with a serrated "acanthus leaf" along each side, often used as a motif in the rug designs from the Caspian region. The "leaf" may actually represent a fish and then the pattern is also called the mahi (fish) design. The name comes from the city of Herat in Northwestern Afghanistan (formerly the Persian empire).

15. **Airbrush:** Imitating effects produced with a painter's spray air gun. Often creates patterns with a light, soft, and modern look.

16. **Stylized:** A design with modified or abstracted elements that give the design a more decorative look.

17. **Awning Stripes:** A pattern of relatively wide, even, usually vertical stripes of solid colour on a lighter ground. Resembles the pattern on awning fabrics.

18. **Bayadere Stripes:** Brightly coloured stripes of various widths laid out horizontally (from side to side on the fabrics). The color effects usually range from lively to startling to bizarre. Often made with black warps and crosswise ribs (plain or twill weave). Mostly produced in India. The name is derived from the Bayadere dancing girl of India, dedicated to a dancing life from birth.

19. **Bead and Reel** A decorative motif consisting of oval or round shapes ("beads") alternating with elongated or cylindrical shapes ("reels").

20. **Barcode:** A stripe pattern consisting of lines of varying width as in a barcode.

21. **Basketweave:** An all-over pattern resembling the structure of a basket or a woven fabric. See also examples in weaving.

22. **Bengal Stripes:** Stripes of apparently the same width and alternating light and dark colours. Bengal stripes are usually wider than candy stripes, but narrower than awning stripes. Commonly used in wallpaper, upholstery, and shirtings. Originated in India and became popular during the Regency era in the United Kingdom. Also called Regency stripes and tiger stripes.

23. **Pencil Stripes:** A stripe pattern produced by lines that are about as thick as ones drawn by pencil. The distance between lines is often wider than the lines.

24. **Chevron:**A traditional, woven or printed design of zigzags in a stripe layout, also called herringbone.

25. **Guilloche:** A decorative repeat of interlacing curved bands, sometimes forming circles.

26. **Hairline Stripe** The thinnest stripe pattern possible, with stripe width of about the diameter of human hair.

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28. **Bird's Eye:** A weave forming small-scale diamond shapes (diaper) each with a dot in the centre, suggestive of the eye of a bird. Also a small-scale (typically geometric) design of a similar shape.

29. **Bull's Eye:** A pattern of concentric circles, often creating optical effects, such as movement or pulsation.



30. **Pheasant's Eye:** A weave forming diamond shapes that are somewhat bigger than bird's eye weaves.

31. **Boteh:**A stylised teardrop-shaped design originally on shawls from Kashmir and mass-produced in Paisley, Scotland.

32. **Botanical:** A pattern design showing realistic representation of herbs, garden plants, and other botanical objects. Also a design based on botanical illustrations.

33. **Liberty Style:** An all-over, small-scale organic (usually floral and other plant-inspired) printed or dyed patterns, characterised by highly stylised, flowing curvilinear forms and subtle, artistic tones of Art Nouveau, developed by Liberty & Co. of London.

34. **Palmette:** A classical motif based on a stylised radiating, fan-shaped palm leaf commonly found in Greek, Egyptian, Assyrian, and other ancient art.
35. **Calico:** A small-scale all-over floral design in bright colours originally from India. Later associated with American country-style.
36. **Tapestry:** A woven textile art with hidden warp (vertical) threads and visible coloured weft (horizontal) threads usually depicting a floral design, geometric pattern, or historic or other pictorial motif. Commonly used for wall hangings, curtains, and upholstery.
37. **Toile De Jouy:** A decorating pattern on a scenic, pastoral, or floral theme usually printed in one colour on a light or white ground. Originated in 18th century France. Often abbreviated to "toile."
38. **Paisley [11]:** A stylised teardrop-shaped design that originally appeared on Kashmir shawls mass-produced in Paisley, Scotland.
39. **Islamic Pattern:** A pattern based on simple geometric shapes that uses symmetry [12] and repeatability to create an impression of the infinite; that emphasises beauty, flow, and unboundedness; with cultural or historic connections to Islamic art.
40. **Ogee:** An onion-shaped motif.
41. **Neats A neat:** Is an all-over, small-scaled, spaced pattern with floral or geometric motifs usually printed in one or two colours on a white or coloured ground. Inexpensive to produce and economical for dressmaking
42. **Basketweave:** An all-over pattern resembling the structure of a basket or a woven fabric. See also examples in weaving.
43. **Coral:** An organic all-over pattern suggestive of coral growth.
44. **Chintz Glazed:** Usually printed in bright florals and stripes, mostly used for drapery and upholstery, but also for apparel.
45. **Madder camouflage:** Patterns are frequently described as belonging to more than one class; for example, an abstract unidirectional all-over madder camouflage pattern, which has the simple shift symmetry [13] and the half-drop layout.
46. **Ditzy A ditzy (ditsie):** Is an all-over design of small buds, circles, zigzags, and other elements that are simple, eccentrically silly, and may be funny.
47. **Dotted Swiss [14]:** A pattern of small, evenly spaced raised dots (usually on a thin, lightweight fabric).
48. **Drybrush:** Employing or imitating effects produced with a brush holding a small to negligible amount of paint. Characterised by a scratchy, textured look.
49. **Batik [15]:** A design with a tie-dyed appearance created by coating the parts of cloth not to be dyed with removable wax. Colours often include indigo, dark brown, and white. Certain patterns have historic meanings and can only be worn by nobility.
50. **Collage:** A collage pattern is one assembled by gluing paper scraps, photographs, cloth, or other objects onto a flat surface. Also an imitation of such a technique. Derived from the French "coller", to glue.
51. **Hound's Tooth:** A pattern of small broken or jagged checks created by four-pointed stars.
52. **Watercolour:** Imitating effects produced by painting with water-colours (aquarelles). Often creates patterns with light, soft, and transparent gradations.
53. **Airbrush:** Imitating effects produced with a painter's spray air gun. Often creates patterns with a light, soft, and modern look.
54. **Eccentrics:** An eccentric is a pattern of thin lines generating an illusion of a distortion or op-art effects. Another spelling is excen-trics. The class is believed to be originated from the Lane's Net pattern.
55. **Pincheck:** A check pattern produced by intersecting pin-sized stripes that are one or two yarns thick.
56. **Gingham Check:** Fabrics woven in a block or check effect. An all-over pattern of solid-colour squares made by overlapping stripes of the same width.
57. **Ikat Pattern:** A pattern design created by tie-dyeing either warp or weft threads prior to weaving the fabric, or a design simulating such a technique.
58. **Pincheck:** A check pattern produced by intersecting pin-sized stripes that are one or two yarns thick.
59. **Windowpane Check:** A widely spaced check pattern resembling panes in a window. Commonly used on suits, shirtings, and accessories.
60. **Shepherd's Check:** The simplest of the district check patterns consisting of small, even-sized checks of two colours. Resembles the Gingham check. Was also known as "Spongebag."
61. **Stylised:** A design with modified or abstracted elements that give the design a more decorative look.
62. **Seamless Patterns:** Repeating patterns without visible boundaries between motifs. Created by elements of the motif that appear in a regular manner (as in set layout) or artfully extend beyond geometric boundaries of the repeating region (as in interlocking patterns). Blending of neighbouring units is another way to achieve seamless repeats.
63. **Twill Weave:** A weave in which each weft thread passes over two (or more) warps and then under the same number of warps to produce diagonal ridges. Compare with plain and satin weaves.
64. **Fractals[16]:** Some mathematical rule-patterns can be visualised, and among these are those that explain patterns in nature including the mathematics [17] of symmetry [18], waves, meanders, and fractals. Fractals are mathematical patterns that are scale invariant. This means that the shape of the pattern does not depend on how closely you look at it. Self-similarity is found in fractals.
65. **Composite Overlay:** Two or more patterns stacked on top of each other. A typical example is patterned background.

- 66. **Composite Repeat:** A combination of two or more symmetry types in one pattern. For example, rotational medallions put in a drop repeat. In Artlandia SymmetryWorks, created with replicas.
- 67. Contemporary A design with simple, extremely stylised motifs.
- 68. **Croquis:** A fully painted design that is not in repeat; same as sketch.
- 69. **Irregular Repeat:** A design based on the same principles as the half-drop and brick layout repeats, but in which consecutive units are not always moved by a fraction of the repeat size

**4. Process for creating digital art fabric design:**

**4.1. Garments :** Garments and clothes have historical roots often goes thousands of years back. Many common garment types throughout the world have different variations, different names and in different places.



**Classification of garments [19]** e.g. through layers, e.g. from inner to outer; through body areas they aim to cloth, cover, or, sometimes to reveal; through fabrics that are used; through purposes and events they are designed to serve; through ease of fabrication; by country; by culture; by ease of fabrication; by family, and so on.

**4.2. Home Furnishing and Measurements:** Types of possibilities in home furnishing.

**Bed Covers1.**

Standard Bed Sheet sizes in inches

Single Bed fitted sheet	36" x 76" + 16"
Single Bed flat sheet	71" x 100"
King Single Bed fitted sheet	42" x 80" + 16"
King Single Bed flat sheet	79" x 106"
Double Bed fitted sheet	54" x 76" + 16"



Double Bed flat sheet	90" x 100"
Queen Size fitted sheet	60" x 80" + 16"
Queen Size flat sheet	97" x 108"
King Size fitted sheet	72" x 80" + 16"
King Size flat sheet	102" x 108"

**Cushion Covers,**

30 x 30	12" x 12"
30 x 50	12" x 20"
40 x 40	16" x 16"
45 x 45	18" x 18"
50 x 50	20" x 20"
65 x 65	26" x 26"
40 x 110	16" x 43"

**Table Covers,**

**Sizing Charts:** The table sizing charts to determine the best table shape and size. The charts below, a standard banquet table height of 30 inches is assumed. Therefore, a drop of 30 inches would indicate a floor-length table linen drop.

Round Table (inches)

**Table 2. Table Diameter**

30	36	42	48	54	60	66
70	20	17	14	11	8	
78	24	21	18	15	12	9
90	30	27	24	21	18	15
108	--	--	--	30	27	24
120	--	--	--	--	--	30
132	--	--	--	--	--	—

**Round Tables**

To find the tablecloth drop (the length tablecloth will hang down from the tabletop), subtract the table diameter from the linen diameter and then divide by two. For instance, for a 60 inch round table and which have a 120 inch round tablecloth. Subtract 60 from 120 (120-60=60) then divide by 2 (60/2= 30 inches). A 120 inch round tablecloth will cover a 60 inch round table and drop 30 inches off the table, all the way to the floor.

To calculate size of table cloth first measure table and length of a drop then, by multiplying the drop length by 2, then adding the table diameter. For example, for a 60 inch table and a 15 inch drop (halfway to the floor), multiply 15 by 2 (15x2=30) then add the table diameter (30+60=90) to get 90 inches, which means it is 90 inch round tablecloth.

Standard sizes for common round tables:

- 48 inch round table: 70 inch cloth
- 60 inch round table: 90 inch cloth for a drop that goes halfway to the floor, 120 inch for a full drop. For the "square-on-round" look, an 85 inch square tablecloth is used on top of a 120 inch round tablecloth.
- 72 inch round table: 120 inch cloth, or a 132 inch for a full drop

**Square Table Linens (inches)**

**Table 3. Table Sides**

34	36	48	54	60	72	
54	10	9	--	--	--	—

70	18	17	11	8	5	—
85	25.5	24.5	18.5	15.5	12.5	6.5

**Square Tables**

To find the tablecloth drop (the length of tablecloth will hang down from the tabletop), simply subtract the table length from the linen size and then divide by two. For instance, for a 48 inch square table and have a 70 inch square tablecloth. Subtract 48 from 70 (70-48=22) then divide by 2 (22/2= 11 inches). This means a 70 inch square tablecloth will cover a 48 inch square table and drop 11 inches off the table, just over a third of the way to the floor.

If the size of the table and length of a drop known, then to find out the tablecloth size by multiplying the drop length by 2, then adding the table length. For example, 36 inch table and a 18 inch drop ( just over halfway to the floor), multiply 18 by 2 (18x2=36) then add the table length (36+36=72) to get 72 inches, which means 72 inch square tablecloth.

**Rectangular**

Rectangular Table Linens (inches)

Table W x L

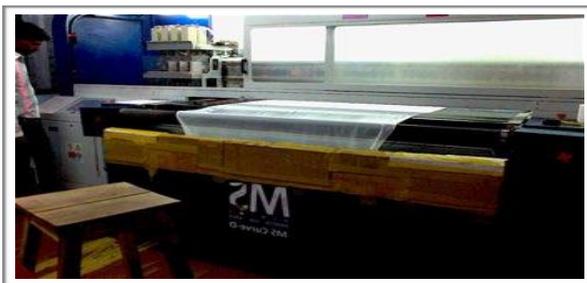
30 x 48 (4 ft)	30 x 72 (6 ft)	30 x 96 (8 ft)
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**Table 4. Rectangular Table Measurements**

60 x 102	15 x 27	15 x 15	—
60 x 126	--	15 x 27	15 x 15
70 x 120	--	20 x 24	20 x 12
90 x 132	--	30 x 30	30 x 18
90 x 156	--	30 x 30	

**Rectangular Tables**

To find the tablecloth drop (the length of tablecloth will hang down from the tabletop), subtract the table length from the linen length and then subtract the table width from the linen width and then divide the differences by 2. For example, a standard 6 foot rectangular table, so the width is 30 inches and the length is 72 inches, and a 70x120 inch rectangular tablecloth. Subtract 30 from 70 to get 40 inches wide (70-30=40) and then subtract 72 from 120 to get 48 inches long (120-72=48). Now divide those numbers by 2, giving a 20 inch drop on widthwise and a 24 inch drop lengthwise (40/2=20 and 48/2=24).



To know the size table and length of a drop needed, then find out the tablecloth size by multiplying the drop length by 2, then adding the table width and length (for a non-uniform drop, individually calculate the widthwise and lengthwise drop lengths). For example, for an 8 foot table (30 inch by 96 inch) and a 15 inch drop (halfway to the floor), multiply 15 by 2 (15x2=30) then individually add the table width and length to get 60 inches wide by 126 inches long (30+30=60 and 30+96=126, respectively), which means a 60x126 rectangular tablecloth to get a uniform tablecloth drop of 15 inches.

Standard tablecloth sizes for rectangular tables:

6 foot rectangular banquet table: 60x102 tablecloth and 90x132 tablecloth

8 foot rectangular banquet table: 60x126 cloth and 90x156 tablecloth

**4. Pillow Covers,**

Standard	19" x 29"
Superking	19" x 36"
Square	26" x 26"
Baby Pillow	12" x 16"



**Curtains** are made to fit these common window lengths:

24", 30", 36", 38", 45", 54", 63", 72", 81" or 84", & 95".

**5. Machine Printing:**

Digital printing [19] is a form of printing in which inkjet [20] printhead's micro-sized droplets of dye placed onto the fabric. The the data supplied in a cadmic\_Textile digital image file interpret by printing system software. The digital image file data control the droplet output so that the colour control and image quality may be achieved. Digital textile printing referred as DTG printing [21], digital garment printing or direct-to-garment printing. It is a process of printing on garments and textiles using specialised inkjet technology. This is the recent development in textile printing industry and it is expanding very fast.

Inkjet printer prints [22] on fabric by using fabric sheets with a removable paper backing. Today, major inkjet technology manufacturers offer specialised services for direct printing on textiles, for sampling and also for bulk production. In early 1990s, inkjet [23] technology developed water-based ink (disperse direct ink or dye-sublimation) made possible to print directly onto polyester fabric. This is mainly related to visual communication in brand promotion and retail e.g. flags, banners etc. Reactive ink used for cellulose based fibers such as linen and cotton. Silk and nylon printed by using acid ink. Inkjet technology in digital textile printing allows, mid-run production, single pieces and even long-run alternatives to screen printed fabric.

Earlier in 1980 fabrics were printed by using dye-sublimation inks on a transfer paper then heat press was applied on fabric. In early 1990s the development of a dye-sublimation printer made it possible to print with low energy sublimation inks and high energy disperse direct inks directly onto textile.



**6. Process of printing and finishing of the fabric:** The use of the fabric is the most important starting point to identify what to produce as an end-product.

Most used fabrics for digital printing is a polyester based fabrics. The printing process should match with type of ink e.g. low energy sublimation (dye-sub), high energy sublimation (also known as disperse direct), reactive, acid and pigment. The ink chemistry should fit the requirements of the fabric (nylon, polyester, silk, cotton). On the bases of choosing fabric and ink combination, the process followed for heat-press sublimation, infra-red fixation or steaming.

Polyester fabric mostly printed with dye-sub or disperse direct ink, solvent inks, latex and UV [24]. The sublimation ink colorants bond with the fibre during fixation or sublimation as the inks are absorbed by the fabrics, then other medium in which the ink remains with the coating and on top of the fabric, as with UV-curable formulations. Many times latex inks on porous textiles suffer crocking or 'rub-off' issues.

**7. Advantages of digital fabric printing:**



Printing with low energy sublimation ink is easier, but the disadvantage is colours fading, it is UV resistance [25], or light-fastness, is less resistant, than equivalents using high energy disperse direct ink. Dye-sub can also suffer from a 'halo' effect which results in less sharp images. The disperse direct ink is a 'stronger' ink than the dye-sub kind, and this is very important factor artwork to last longer.

Benefit of aqueous-based sublimation ink is that there are no hazardous components as it is found in UV-curable, solvent and in latex inks. Direct fabric printing using disperse ink on uncoated fabrics offers maximum advantages. These prints can be seen from both sides of the fabric which is an essential quality of digital printing. These prints get more profit, with an 'eco-friendly' label and with a higher quality. Other fabric and ink combinations cannot allow this.

The biggest advantage of direct printing on fabric is, it reduces waste as method hasn't used transfer paper before calendaring (or heat-pressing). Reducing waste is an ecological and an economical factor in fabric print production [26].

**8. Post-processing:**

The qualities of the printed end product should best as it is the artwork. Longevity is an important factor for an antique print. Post



processing is very important as the printed material should be easily handled, confectioned or applied. Making a decision, if it need washing or if it need a finish (e.g. water repellent, fire retardant). A washed textile does not have coating or ink residues and it will have a better feel. It will be less prone to stains and it will last longer. But digitally printed fabric will fade out with repeated washings, so it should be labeled as "dry cleaning only", and the best way is, washing by hand with cold water or using the washing machine with a gentle cycle and use a mild detergent [27].

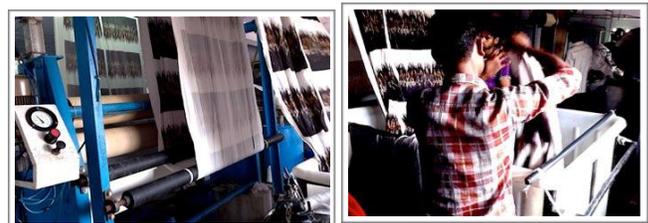
**9. Conclusion:**

Digital art textile printing has immense possibilities to create artworks by combining other mediums. It gives artists' possibilities to make modification and sampling. An artist can stick to single edition prints as well as opt for mass customisation. Digital Printing process produces subtle color tones and fine gradations. It is suitable for small production and it runs at low cost and high speed. This process consist of data files instead of plates used for analog printing. It minimises the environmental burden due to minimal wastage of dyes.

It combines many disciplines contributing to digital textile printing e.g. design, fabric, measurements, ink chemistry, pre and post-treatment of fabric, and lots more. Infact it is a combination of many hired services from different sectors of the digital fabric printing factories [28].

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### Author Profile



**Tripti Singh** earned Ph.D.degree in Visual Arts from Banasthali University, Rajasthan, India, in 2011. Currently she is Media Design Fellow (Faculty) in School of Humanities and Social Sciences, Indian Institute of Technology Mandi, India. She has Stablished her self as Indian Digital Medium Artist and her research interests are in digital art

historical events and process. She has industrial experience in digital fabric printing and she had IIT Kanpur as project scientist in Ganga River Basin Environment Plan (GRBEMP) in 2011-12.