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Adaptation of Indian Folk Paintings for Designing and Digital Printing of Apparels Using Computer Aided Designing

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Abstract
India had always been known as the land that portrayed cultural and traditional vibrancy through its conventional arts and crafts. Every region in India has its own style and folk art which are very ethnic and simple, and yet colorful and vibrant enough to speak volumes about the rich heritage. Folk art in India apparently has a great potential in the international market because of its traditional aesthetic sensibility and authenticity. The two most famous folk painting are *Warli art* of Maharashtra and *Madhubani* art of Mithila.
Traditionally these paintings were done by hand which is time consuming and laborious process, but with technological advancement, these designs can be created directly with the help of CAD and applied on textiles through Digital Printing. It is now possible with CAD and digital printing to go straight from an initial idea to visual representation of fabric showing these designs in combination of colors within minutes. The present study was an attempt to develop fusion designs from these two folk paintings using CAD and adapt them on apparels using digital printing technique. It will be an effort to reveal the unexplored treasures to the world by introducing the newly developed fusion designs from the Plethora of these arts and to open new avenues for artisans to revolutionize the Fashion world and empower them.

Keywords: CAD technology, Fusion Designs, *Madhubani* Painting, *Warli* Painting, Apparels.

Introduction

Textile designing has been an ancient art and perhaps the most ancient craft of India. It is not a new concept and has existed even in the prehistoric cave paintings as evidenced by designs appearing on costumes, tapestries and carpets etc. Gradually designing has become a more intellectual endeavour over a period of time. Textile designing is the most demanding and emerging field as it is full of scope and creativity. Any objects or things we see in our daily routine are possible design sources. These may include nature, temples, famous monuments, furniture, various kinds of toys, folk arts and crafts such as wall paintings, floor paintings, sculptures, carvings etc.

India had always been known as the land that portrayed cultural and traditional vibrancy through its conventional arts and crafts. Every region in India has its own style and pattern of art, which is known as folk art. The folk and tribal arts of India are very ethnic and strongly reveal the skilled abilities of their local artisans and the prosperous cultural heritage of the particular state. These present the religious sentiments and socio- cultural traditions of the region as well as the collective experience of the artists inherited through many generations and expression of the historic events, with which the places are marked.

Some of these folk arts are very simple yet colorful and vibrant enough to speak volumes about the rich heritage. Folk arts in India apparently have a great potential in the international market because of its traditional aesthetic sensibility and authenticity. Some of the most famous folk paintings of India are Patachitra paintings of Orissa, Nirmal paintings of Andhra Pradesh, Mandana Paintings of Madhya Pradesh and Rajasthan, Warli Painting of Maharashtra and Madhubani paintings of Bihar etc.

Perhaps the best-known genre of Indian folk paintings is the Mithila (also called Madhubani) paintings from the Mithila region of Bihar state. The Madhubani in literal translation means

'Forest of Honey' (Madhu-honey, Bans-forest or woods) these paintings are basically religious in nature. The paintings are done by women predominantly at home, in anointed areas like the prayer room. Hindu mythology is the main theme. The main figures in Madhubani paintings are adopted from nature and mythology.

Similarly Warli art is an ancient Indian folk art tradition of painting of a Maharashtrian tribe called Warli. These paintings were mainly done by the women folk. The most important aspect of the painting is that it does not depict mythological characters or images of deities, instead they portray social life that includes images of human being and animals along with scenes from daily life that are created in a loose rhythmic pattern. The trademark of Warli paintings is the use of geometric designs such as triangles, circles, squares, dots and crooked lines. These are used to depict human figures, animal figures, houses, crops etc.

Madhubani and *Warli* paintings, although one of the most intricate art, still governs the entire fashion market. Even today, when the dressing styles and trends are changing continuously, the beauty and charisma of Madhubani and Warli art still captures the heart of people. Traditionally these paintings were done by hand which is tedious, time consuming and laborious process. But in due course of time with technological advancement, these designs directly can be created with the help of various softwares like corel draw, Illustrator, photoshop etc. It is now possible with CAD to go straight from an initial idea to visual representation of fabric showing different types of designs and combination of colors. CAD has lead to better quality and flexibility in design development, increasing the efficiency and shortening the time between the design concept and actual marketing. There is no doubt that every effort is to be taken to preserve the traditional crafts. However to popularize these arts and crafts and to get decent income for craftmen, these crafts have to be incorporated in to contemporary scenario especially through textile designing.

The present study was an attempt to introduce the fusion designs of traditionally restricted folk paintings, to new textile experimentation, using Computer Aided Designing. It will be an effort to reveal to the world the unexplored treasures, the light of the day, by introducing the newly developed fusion designs from the Plethora of collections of *Madhubani* and *Warli* paintings and to open new avenues to revolutionize them to the 'Design-Fashion' world. The study would be a step forward to the integration of designs and art from two distinct areas into textile world and to preserve these designs by developing a repository, which could be accessed as and when needed.

Methodology

Motifs Used

The motifs used in *Madhubani* and *Warli* Paintings were collected from the available literatures, Paintings and from web for the designing of Apparels. The collected motifs are shown in Plates 1-2.

Development of Fusion designs for apparels

The motifs and designs of *Madhubani* and *Warli* paintings were modified and used for the development of fusion designs. The designing was done through CAD softwares ie. Coral draw and Adobe photoshop. Corel Draw is a comprehensive vector based, also called object –oriented or draw images programme. The vector based images are resolution independent while Photoshop is a raster or paint images programme. The raster images are made of individual dots, called "pixels" that are arranged and coloured differently to form a pattern.

A total of 9 designs, three each for apparels including sarees, dress materials and kurties were developed. The fusion designs were developed either by using the entire design or by using the component motifs. The motifs with low resolution were created with the help of "Corel draw" while the high resolution motifs were imported and used directly using "Adobe Photoshop".

Evaluation of the developed designs

The developed designs were evaluated by a panel of 30 judges including staff members, boutiques owners/ shopkeepers, housewives and students for the selection of two most preferred designs in each category of the developed designs to apply them on apparels. The attributes for evaluation were arrangement of motif or designs, colour combinations, appropriateness or suitability of designs for particular product and extent of relation of developed designs to *Madhubani* and *Warli* designs. A five point ranking proforma was used for this purpose. The designs were scored as 1, 2, 3, 4 and 5 corresponding to poor, fair, good, very good and excellent respectively.

Development of products and their cost determination

All the selected designs were applied on apparels using Digital printing technique and cost of each prepared products was calculated on the basis of money spent on raw materials including fashion fabric, lining materials and trimmings used, Digital printing of the fabric, design conversion charges and stitching etc. A total of 25 percent profit margin was added in the calculated cost for getting sale price. The cost of each article was calculated separately. The cost of designing done through computer was not included in the actual cost.

Acceptability of the printed products

All the prepared products were further subjected to visual evaluation by the same panel of judges to assess the acceptability of the developed products. The parameters used for the evaluation of the prepared products were suitability of the fabric used, colour combination, neatness and clarity of the designs, economic feasibility and Overall appearance. The acceptability of prepared products was assessed within the group and overall as well.

A five point ranking Performa was used for this purpose. The products were scored as 1, 2, 3, 4 and 5 corresponding to poor, fair, good, very good and excellent respectively.

Results and Discussion

Table 1: Visual Evaluation scores of developed designs for selection of designs

Design No.	Arrangement of motifs	Appropriateness of design for particular product	Colour combination	Extent of relation to *Madhubani* and *Warli* designs	Overall appearance	Average scores
Saries						
Sari I	4.2	4.1	4.33	4.4	3.96	4.19
Sari II	4.6	4.6	4.6	4.6	4.4	4.56**
Sari III	4.86	4.66	4.63	4.86	4.86	4.77*
Dress materials						
Dress material I	4.8	4.7	4.8	4.7	4.8	4.76*
Dress material II	4.7	4.6	4.5	4.6	4.6	4.6**
Dress material III	4.5	4.4	4.6	4.3	4.5	4.46
Kurties						
Kurti I	4.4	4.46	4.6	4.5	4.2	4.43**
Kurti II	3.9	4.06	4.16	4.03	3.9	4.01
Kurti III	4.6	4.4	4.5	4.5	4.56	4.5*

1st Preferred Design **2nd Preferred Design**

It was observed from the table that among the developed designs for saries, sari III got highest score (4.77) due to the arrangement of motifs, extent of relation to *madhubani* and *warli* design, followed by sari II. In case of dress materials, design I scored highest marks followed by design II, however among kurties design no. III and I got first and second preference hence these designs were used for the printing of apparels and the prepared products are shown in Plates 3-5.

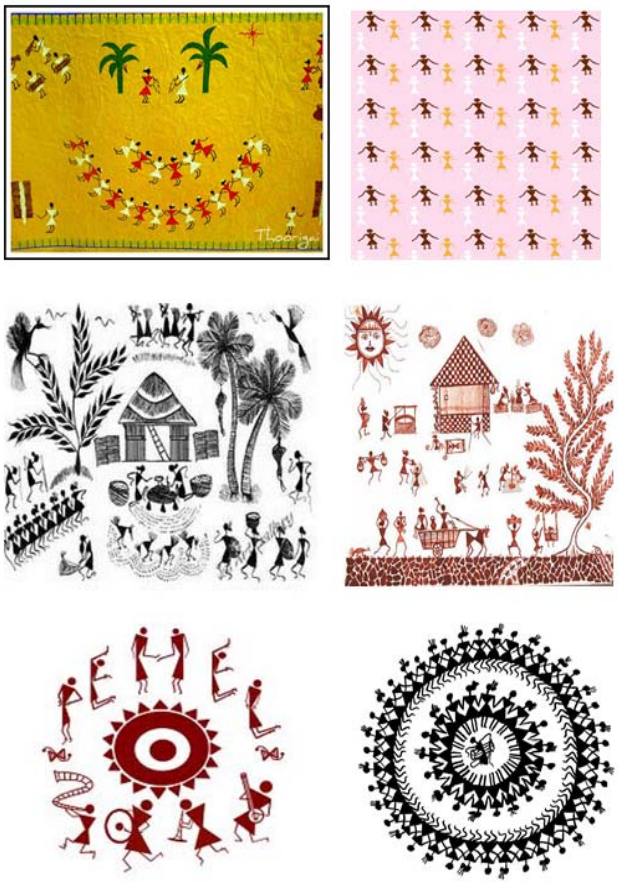


Plate 1: Warli Motifs Used For Designing

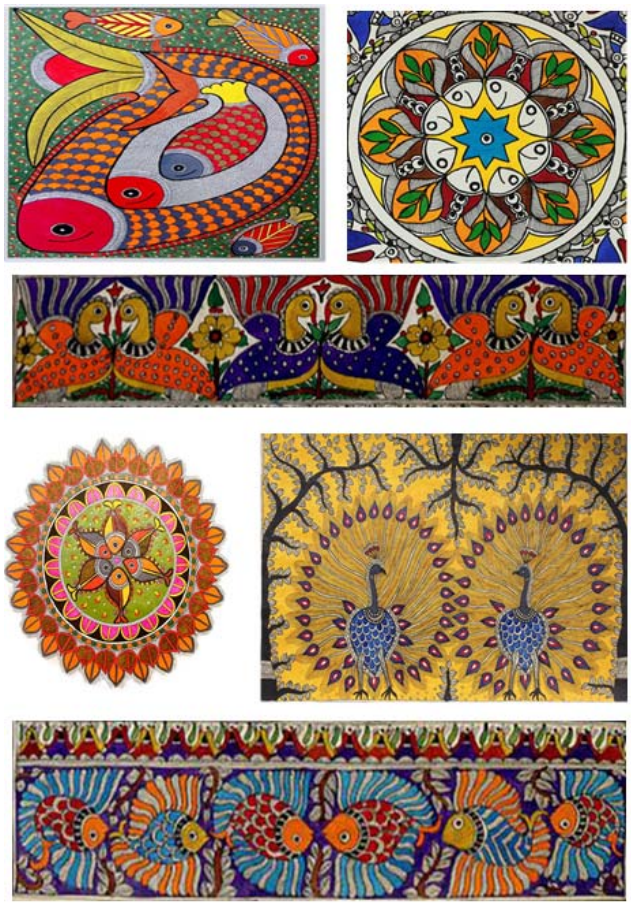
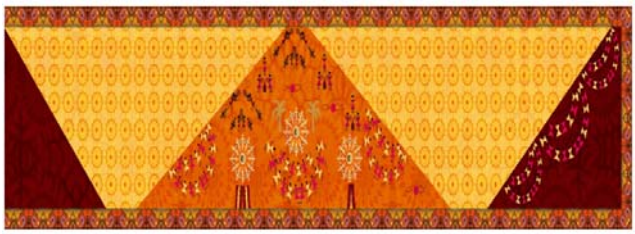
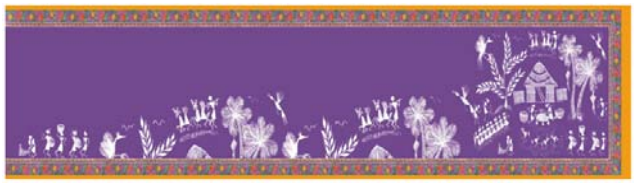


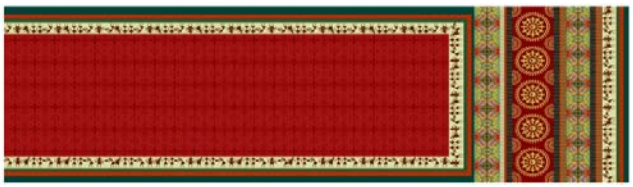
Plate 2: Madhubani Motifs Used For Designing



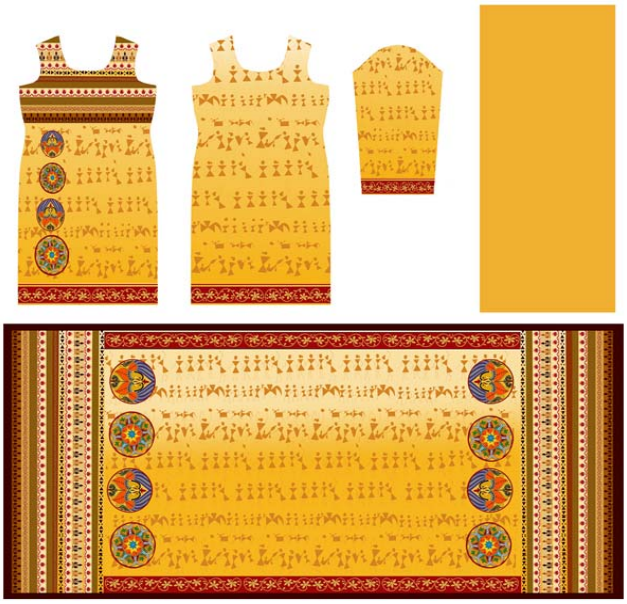
Developed Design for Sari I



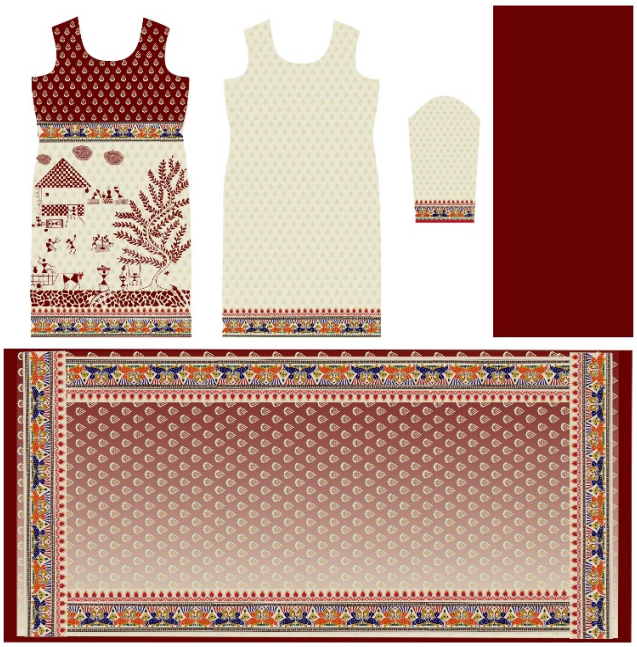
Developed Design for Sari Ii



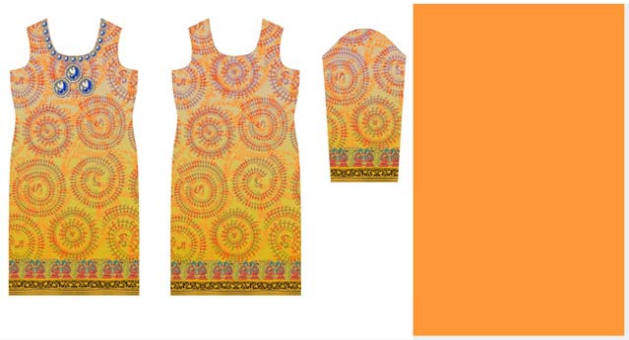
Developed Design for Sari Iii

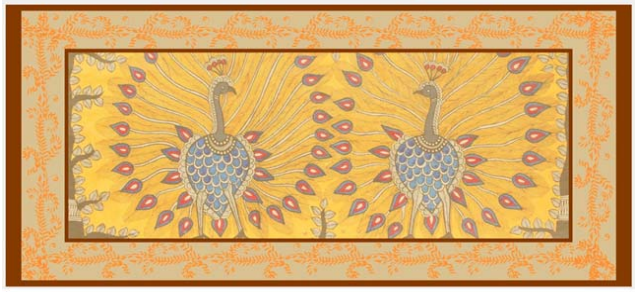


Developed Design for Dress Material I

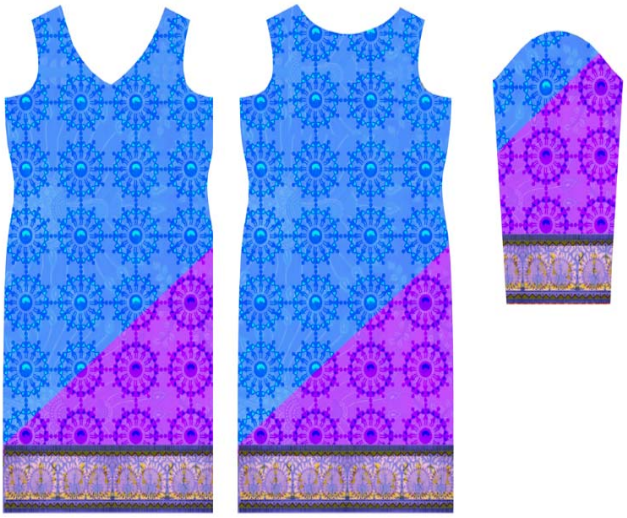


Developed Design for Dress Material Ii

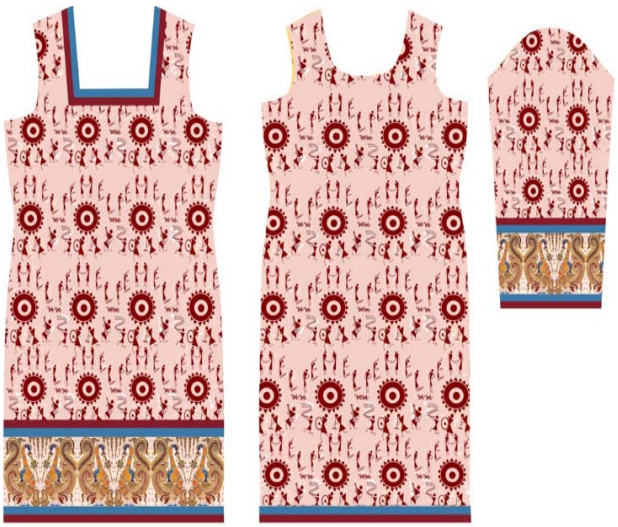




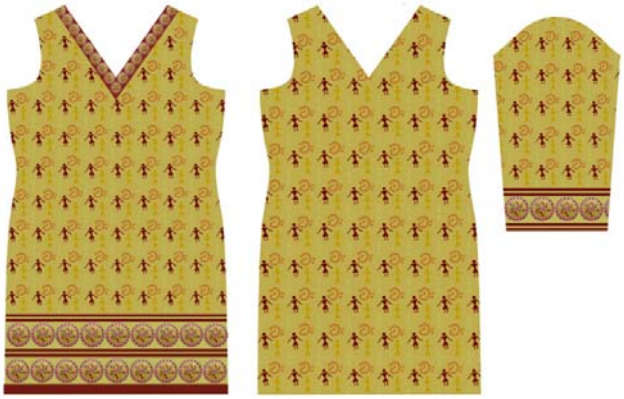
Developed Design for Dress Material Iii



Developed Design for Kurti I



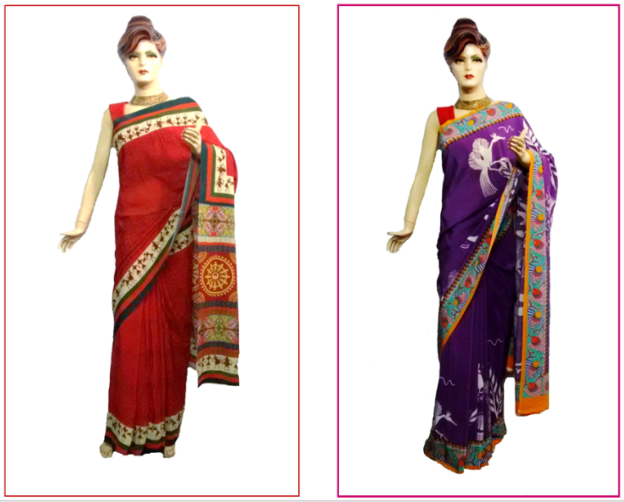
Developed Design for Kurti Ii



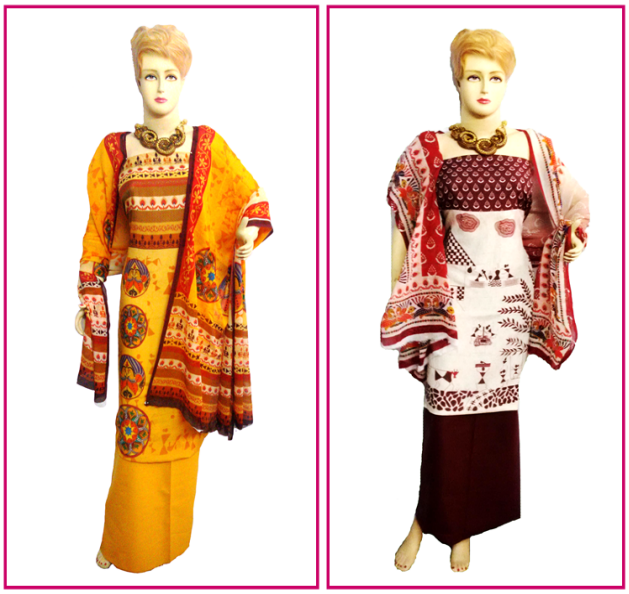
Developed Design for Kurti Iii

Cost of the prepared products

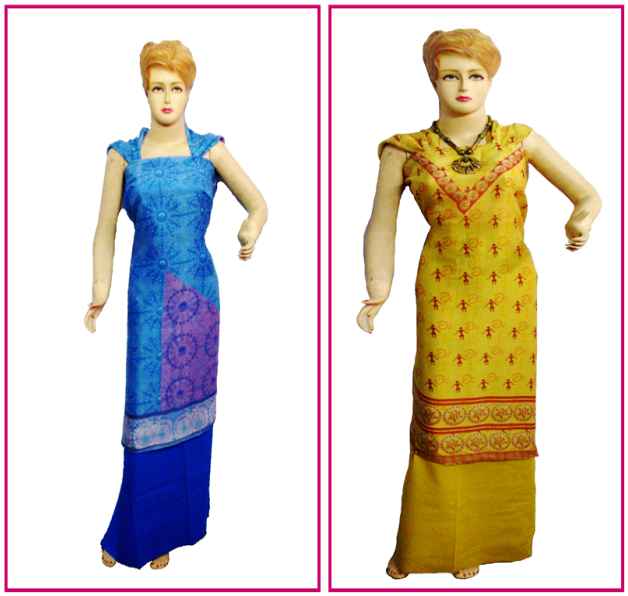
The cost of prepared apparels are shown in Table 2 – 4. It was observed that the cost of preparing single product in each category were quite high due to the design conversion charges and printing charges but this cost will be reduced if the fabric would have been mass printed digitally. Further the design conversion charges would also be divided in to the total number of the products prepare, thereby could be reduced to negligible.



Printed Saries



Printed Dress Materials



Printed Kurties

Table 2: Cost of printed Saries

Items	Sari I (Red colour)			Sari II (Purple colour)		
	Consumption	Rate (₹)	Value (₹)	Consumption	Rate (₹)	Value (₹)
Cut length of Pure Crepe Fabric (60 gm)	6 meter	700/ meter	4,200/-	6 meter	700/ meter	4,200/-
Design conversion charges for printing	-	-	1,300/-	-	-	1,000/-
Digital Printing charges	5.5 meter	650/ meter	3,575/-	5.5 meter	650/meter	3,575/-
Actual Cost			9,075/-			8,775/-
Profit (25%)			2,268.75			2,193.75
Sale price			11,343.75			10,968.75

The above table indicates that the sale price of printed red sari I was higher (₹ 11,343.75) than the purple sari II (₹ 10,968.75). The only reason for this was the difference in design conversion charges as the whole design of sari I was converted into vector graphic to make it into printable form and to bring clarity in design after printing. It is evident that the printing charges for both the saries were same due to the use of similar fabric ie. Pure crepe.

Table 2: Cost of printed Dress Materials

Items	Dress Material I (Golden Yellow colour)			Dress Material II (Off-white and Maroon colour)		
	Consumption	Rate (₹)	Value (₹)	Consumption	Rate (₹)	Value (₹)
Cotton silk fabric for Kurta	2.75 meter	350/ meter	962.5	2.5 meter	350/ meter	875/-
Lining Mateiral for Kurta	2.25 meter	80/ meter	180/-	2.25 meter	80/ meter	180/-
Cotton silk fabric for Salwar/ Churidar	2.25 meter	120/ meter	270/-	2.25 meter	120/ meter	270/-
Pure Chiffon Dupatta (42" width)	2.5 meter	300/ meter	750/-	2.5 meter	300/ meter	750/-
Design conversion charges for printing	-	-	1,200/-	-	-	1,000/-
Digital Printing charges for Kurta	2.25 meter	600/ meter	1,350/-	2.1 meter	600/ meter	1260/-
Digital Printing charges for Dupatta	2.4 meter	650/ meter	1,560/-	2.3 meter	650/ meter	1,495/-
Actual Cost			6,272.5			5,830/-
Profit (25%)			1,568/-			1,457.5
Sale Price			7,840.6			7,287.5

The above table clearly indicates that the cost of Dress material I (Golden yellow colour) was higher (₹ 7,840.6) than the Dress material II (Off- white and maroon) (₹ 7,287.55) due to the higher consumption of fabric and thereby the higher printing charges. Further the design conversion charges for dress material were also more than the dress material II that also contributed to the higher sale price of dress material I.

Table 3: Cost of printed Kurties

Items	Kurti I (Mehndi colour)			Kurti II (Blue colour)		
	Consumption	Rate (₹)	Value (₹)	Consumption	Rate (₹)	Value (₹)
Cut length of Chanderi Cotton fabric	2.5 meter	250/ meter	625/-	2.5 meter	250/ meter	625/-
Cut length of cotton fabric for lining	2.25 meter	80/ meter	180/-	2.25 meter	80/ meter	180/-
Design conversion charges	-	-	700/-	-	-	800/-
Digital Printing Charges	2.25 meter	600/ meter	1,350/-	2.30 meter	600/ meter	1,380/-
Actual Cost			2,855/-			2,985/-
Profit (25%)			713.75			746.25
Sale price			3,568.75			3,731.25

Similarly the cost of printed kurti II (Blue colour) was slightly higher (₹ 2,985/-) than the kurti I (₹ 2,855) (Mehndi colour) only due to the difference in design conversion charges. The design conversion charges of Kurti II (Blue colour) was higher (₹ 800) than the Kurti I (₹ 700) as it had more no. of motifs and used two colours in the background. Other variables such as type of the fabric used, consumption of the fashion fabric and lining material and printing charges were same for both the kurties.

Acceptability of the printed products

Among the prepared apparel articles, it was found that red sari, green kurti and yellow dress material were given first preference in their respective categories. However all the printed products were appreciated and well accepted with regards to colour combination and cost effectiveness. (Table 4)

Table 4: Acceptability of the printed Apparel Products

Products	Articles	Suitability of fabric used	Color combination	Neatness and clarity of the design	Economic feasibility	Overall appearance	Acceptability scores	Rank within group
Sarees	Red sari	5	5	5	4.5	5	4.9	I
	Purple sari	5	4.7	4.7	4.6	4.8	4.76	II
Kurties	Green kurti	4.6	4.6	4.7	4.8	4.7	4.68	I
	Blue kurti	4.6	4.4	4.2	4.2	4.6	4.40	II
Dress materials	Golden Yellow dress material	4.6	4.8	4.9	4.6	4.8	4.74	I
	Marron Dress material	4.5	4.5	4.6	4.7	4.7	4.60	II

Conclusion

The fusion designs prepared by CAD were successfully applied on various apparels items using digital printing and all the prepared articles were highly appreciated. The present study was an initial step in the direction of creating fusion designs of these two folk arts using CAD technology which can open the avenues for the designers to fulfill the ever changing demands of consumers especially for those who hunt for the ethnic motifs and designs in their attire and other textile products and to preserve these designs by developing a repository, which could be accessed as and when needed. The adaptation of the prepared designs on the apparels using digital printing techniques further facilitates the faster production with high accuracy within less time span. The use of advance digital printing technique produces vibrant and even coloration on textiles with no release of effluents; thereby reducing the load on environment and its degradation. It also facilitates faster product development, so commercialization and economic gain is better.

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