



## **REPRODUCTION OF SOME DIGITALLY PRINTED FABRICS WITH ADIRE DESIGNS USING STUDIO METHOD**

**OLAOYE O. OYINMIEEBI AND ADIJI E. BOLAJOKO**

*Industrial Design Department, Federal University of Technology, Akure*

### **Abstract**

*The purpose of the study is to investigate the difference between digital textile printing method of the Yoruba traditional designs and the Yoruba traditional method of producing these designs with the view to looking at the limitations involved in reproducing some selected designs and the uniqueness in each method of production. The objective is to: reproduce digitally printed Yoruba textile designs using the traditional dyeing method. The research employed the use of experimental research method to reproduce selected adire designs that are digitally printed using studio method of producing fabrics. The study showed some digitally printed fabrics with adire designs, these designs were observed to be available on different textures which includes cotton, silk, and chiffon. The results show how to reproduce digitally printed fabrics with adire designs using adire eleko and adire alabere method of producing fabrics, designs reproduced using this method were different from the digitally produced ones which implied that it is easier to digitally reproduce fabrics with adire designs that are produced traditionally. The study revealed that imitating digitally printed fabrics with adire designs traditionally will only change the designs or means losing out on most of the details, the study also revealed the limitations encountered in the process of reproduction.*

**Keywords:** *Digital textile printing, adire, adire alabere, adire eleko, digital printing technology*

### **Introduction**

Rapid evolving technology of digital printing opens new opportunity for many markets, one of them is the printed fabric market where printing companies as well as clients benefit from new printing methods. Textile printing has its roots

from ancient crafts, and it has been developed over the centuries. However, it has remained a technological complex process and so far only specialized factories have been able to produce proper printed fabrics with the use of technologies such as rotary screen printing, in the past decade textile printing technology has changed all that. By adapting the technology from digital printing on paper, it is now possible to reduce the sampling time to few hours (Nielsen, 2007).

*Adire* textiles are special fabrics with intricate patterns, which is the result of hand-painted work done on fabrics during production, all patterns on *Adire* fabrics connote a meaning which tells a story or historical events. The designs and motifs are well represented in various forms and shapes over time. The designs however tell a story of a particular culture or event from the very past but could have changed due to the influence of other cultures and colonial era, the patterns are in form of stylized representation of animals, plants, abstract patterns and everyday objects.

### **Statement of the Problem**

Yoruba traditional textiles is witnessing a new trend in production method, while the common method of producing Yoruba traditional fabrics is the tie and dye method (*adire*), digital textile printing has been introduced to the market, this method has so much helped in the production of fabrics with better image quality and better colour fastness.

Although it is undisputable that the *adire* method of fabric production is a unique method of producing fabrics among the Yoruba people of Nigeria, according to (Adeloye, 2016) “the beauty of African print fabrics goes beyond aesthetics; the beauty is in the Africanism concept inherent in the designs”. As trend changes and consumers’ quest for new production technique concepts are increasing, *adire* fabrics are gradually losing the treasured characteristics because of the production technique. There is a need for designers to revive this Africanism concept in motifs used for *adire* Fabrics.

The researcher is of the opinion that digital textile printing method of producing fabrics help to produce fabrics with good image quality and colour fastness and could also help to sustain the culture of the Yoruba people by being able to produce traditional designs on different textures and in large quantity within a short period of time, and also in different sizes. This will in turn increase its

availability in the market and also make it affordable for all class of clients as there will be different textures of fabrics with different price range. It is therefore important to compare traditional and digital textile printing methods of producing Yoruba textile designs.

### **Digital Textile Printing Technology**

Digital textile printing technology are methods of textile production that involves the use of advance technology for textile printing with increased speed and quality.

### **Overview of Digital Textile Printing**

Nowadays markets are changing rapidly and the only way for producers to survive is to follow customers' needs. Consumers of textile industry are expecting a great variety of patterns and colors. However, conventional printing methods cannot fulfill the new requirements, and printers are pushed to search for new ways to satisfy the customers' demands without increasing costs and waste. Originally designed for printing on papers, inkjet printing technology is now utilized in the fabric printing market more and more often, as it meets the demands of the new textile market. Brooks, (2002) According to InfoTrends and Fespa's worldwide survey, the fastest growing application in wide-format digital printing is textiles with 93 % of printers polled stating that they expect to see growth in this market (Gbadamosi, 2010). According to a producer of digital printers, (Xennia, Philips, 2010), the key market drivers for shifting towards digital textile printing are a need for economic short print runs, fast and frequent design changes, increased demand for personalization and increased number of niche products. Furthermore, the turnover for the digitally printed fabric is steadily increasing and it is predicted to increase in the coming years (Brooks, 2002). As with any industry, different areas are influenced by particular technologies, regarding digital textile printing, I.T. Strategies (Gbadamosi, 2010) marks out three major markets of application, which are sampling, strike-off and mass customization. New technology is beneficial not only for big printers and companies, but also artists and designers without special knowledge in textile printing can now produce their fabrics through the use of service bureaus (Bowels, 2009).

## Yoruba Traditional Textiles, Motifs and Meaning

The Yoruba of South-West Nigeria are renowned for their vibrant cultural environment where Adire textile has been a lucrative clothing styles over time in their festivals and ceremonial events. *Adire* textiles are special fabrics with intricate patterns, which is the result of hand-painted work done on fabrics during production, all patterns on *Adire* fabrics connote a meaning which tells a story or historical events. The designs however tell a story of a particular culture or event from the very past but could have changed due to the influence of other cultures and colonial era. The patterns are in form of stylized representation of animals, plants, abstract patterns and everyday objects. However, the motifs and designs of adire tradition are classified into five Adeyemi, (2019) namely; Letters, Geometric, Figural, Celestiomorphic, and Skewmorphic.

- 1) The geometric motifs are dots, lines (such as straight, spiral, hatching lines), and circles, semi- circles, squares, triangles, and rectangles. For instance the motifs below are combinations of shapes.



Figure 1: *Egungun Eja* (Fish Bone)  
Man's Knee)

Source: (Areo, 2013)

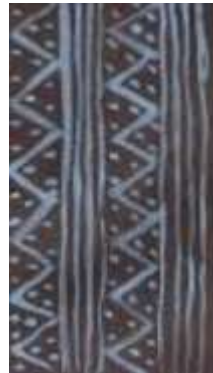


Figure 2: *Orokun Aro* (Lame  
Man's Knee)

Source: (Areo, 2013)

- 2) The letters are the alphabets of the Yoruba language, cities, names and proverbs.
- 3) The figural motifs are two sub-types: Zoomorphic and floral. The zoomorphic motifs are of sub-groups: avian (such as *Adaba*: Dove, *Agbufnn*: Crowned Crane, *Opeere*: Brown – eared bulbul, *pepeye*: Duck and *Tolotolo*: Turkey), reptilian (such as *Ejo*: Snake) and mammalian species, arthropod, annelids, Mollusca, pieces and amphibians.

The floral motifs are *Ewe Ege*: Cassava leaf, *Ogede Agbagba*: Plantain, *koko*: Coca pod, *Odan*: Fig tree, *Fulawa*: Petals, *koro Owu*: Cotton seed. The Figural motifs also comes in Human form such as Kings and Queens as shown in the motifs below.



Figure 3: *Oga*, (Chameleon)  
Source: Areo, (2013)



Figure 4: *Alangba*, (lizard)  
Source: Areo, (2013)

- 4) The celestiomorphic motifs are based on celestial bodies or planets such as *Irawo*: Stars and *Osupa*: Moon.
- 5) The Skewmorphic motifs are the representation of man-made objects and tools such as *Opon Ifa*: Ifa Divination Tray, *Yeti*: Earring, *Ileke Bebe*: Waist beads, *Amuga*: Scissors, *Sekere*: Gourd rattle, *Akete*: Straw Hat, *Agogo Owo*: wrist Watch, *Ade oba*: Crown, *opa ase*: Staff, *Owo ide*: Cowries, and *Ilu Gangan*: The talking drum.

## Methodology

This study is an experimental research, *adire eleko* and *adire alabere* methods of producing fabrics among the Yoruba people of South West Nigeria was used to produce some digitally printed fabrics with *adire* designs and observations and limitations encountered during the experiment was recorded.

## Findings and discussion

### Reproduction of some digitally printed textile designs using studio dyeing method.

Experimental process was used in the course of this research work. Five designs were reproduced using *adire eleko* (starch resist) and *adire alabere* (tritik/stitching) methods of producing fabrics traditionally, all these was done at the university studio.

## Materials Used

### 1. Some selected digitally printed fabrics with *adire* designs

Some designs were considered and selected for the purpose of reproduction for the purpose of this research, some of which are printed on cotton and one of them is printed on silk this selection was done considering two textile companies (NICHEMTEX and Ayanski Fabrics) that were sampled, the selection was done based on the following criteria:

- i. Colour quality: these designs were selected based on the quality of the colours used for printing, the colours were considered because they look like the colours used for production of *adire* fabrics in South-West Nigeria. Colours like purple, navy blue, green and lilac were considered.
- ii. Availability of colours in dyes: the colours used for the production of these fabrics were considered because they are available in dyes and can be gotten around from local dyers.
- iii. The designs: the designs of these fabrics were considered and chosen for reproduction because they can easily be related to *adire* designs produced in South-West Nigeria among traditional dyers.
- iv. Texture of the fabrics: digitally printed fabrics on cotton textures were considered for reproduction because the reproduction was done on cotton textures as well, this will make comparison easy and one of the designs on silk texture was also chosen because the second company sampled prints on silk and other textures aside cotton, this was done to help the researcher get a good result for her findings.
- v. Market availability: the designs chosen were designs that were readily available in the market and consumers were aware of them, this was done so that it will be easy to compare both with the designers and consumers of the fabrics.



Plate 1: Indigo 001

Source: (Researcher's Fieldwork, 2021)



Plate 2: Indigo 002

Source: (Researcher's Fieldwork, 2021)



Plate 3: Indigo 003

Source: (Researcher's Fieldwork, 2021)



Plate 4: Indigo 004

Source: (Researcher's Fieldwork, 2021)



Plate 5: Ayanski 001

Source: (Researcher's Fieldwork, 2021)

### **Zinc plate**

These are used lithography plates that are cut into stencil and used to transfer the designs on fabrics before dying. With the use of carbon paper designs are traced on the plates and then transferred on fabric with *lafun* as the resist paste.

### **Lafun (cassava flour)**

This is used as resist paste to resist dye from penetrating some parts of the designs, this is used by mixing the flour in boiling water containing a large quantity of alum and then pressed through the zinc stencil with the use of squeegee, this in turn imprints the design on the stencil onto the fabrics and the fabric is then allowed to dry and then dyed in highly concentrated dye solution.

### **Cutting knife**

This is a stationary knife that is protected all round with plastic leaving only the tip of the blade out and a control rotor to check the level of the blade that is

exposed for safety, the knife was used to cut out the traced designs on the zinc plates before it was transferred on fabrics.

### **White coton fabric**

This is also reffered to as grey fabric, the fabric is 100% cotton an it is used for reproduction of the selected designs, this fabric has to be desized to allow eaasy absortion of dye.

### **Dye of different colours**

Dye of differeent colours ws used for reproductio of the fabric, colours like navy blue, gren, black, ash, pink and lemon were used to achieve a good result in the course of this rsearch.

### **Chemicals for dyeing**

Two chemicals were used as additives for dyeing thee fabric reproduced, the chemicals includes:

- i. Hydrosulphide: hydrosulphide was added to the dye to allow the dye used to stick into the fabrics properly.
- ii. Caustic Soda: caustic soda was added to the dye to allow the fabric pores to open properly and allow absorption of dye used so that it can enhance dye fixing into the fabric properly.

### **Hand Gloves**

This is a pair of rubber gloves that are used to avoid penetration of dye solution into the skin of the user.

### **Needle and Thread**

Sewing needle and sewing thread of different colours were used to stich some parts of the fabrics to resist dye from penetrating so as to form a design , this method of tie and dye is called tritiking.

### **Reproduction process**

This discuss the step by step process involved in reproducing these selected designs, two different method of reproduction was used which includes *adire eleko* method and *adire alabere* methods.



### *Adire eleko method*

This method of reproduction involves the application of starch paste made from cassava flour '*lafun*'. This paste resist the dye from penetrating through some selected parts of the fabric. The selected designs were transferred to printable form on Corel draw and then printed on paper before it is then traced on a zinc stencil and the details are then cut out and with the use of *lafun* as the resist paste the designs are transferred to the fabric before it is then dipped inside dye solution. Three designs out of the selected designs were reproduced with *adire eleko* method these designs are indigo 002, indigo 004 and Ayanski 001 designs. The following steps were followed reproducing some designs using *adire eleko* method;

**1. Extracting designs from printed fabrics using Corel Draw:** during this process the fabrics are snapped with the aid of a good camera and then transferred to the system using the Corel Draw designing software to extract a repeatable pattern from the snapped fabric, it is then printed on an A3 paper so that it can be easily traced on the zinc plate before it is the cut to details.

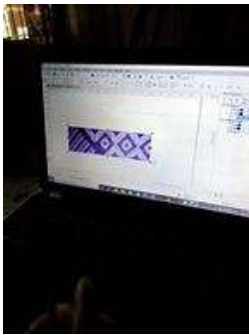


Plate 6: Extracting Indigo 004 on Corel Draw  
Source: (Researcher's fieldwork, 2021)



Plate 7: Printed Indigo 004  
Source: (Researcher's fieldwork, 2021)



Plate 8: Printed Indigo 004  
Source: (Researcher's fieldwork, 2021)



Plate 9: Printed Indigo 003  
Source: (Researcher's fieldwork, 2021)



Plate 10: Printed Ayanski 001

Source: (Researcher's fieldwork, 2021)

**2. Tracing designs on zinc plate:** after extracting a repeatable pattern from the fabric and printing them on A3 papers, the designs were then traced on zinc plates to be cut out to details and then used as stencil for transferring the designs on the fabric before they were then dyed to different colours.



Plate 11: Printed out indigo 001 set out on board to be traced

Source :( Researcher's fieldwork, 2021)

**3. Cutting out zinc plate:** designs that are already traced out on zinc plates are then carefully cut out to details with the use of a stationary cutting knife.



Plate 12: Cutting out indigo 002 on zinc plate

Source :( Researcher's fieldwork, 2021)



Plate 13 : Cut out stencil for indigo 004

Source : (Researcher's fieldwork, 2021 )

**4. Mixing *lafun* in boiling water:** *lafun* is cassavav paste that was used as resist paste for reproducing these fabrics, this paste was mixed in boiling water that contained a large quantity of alum, alum was included in this mixture so as to retain the quality of the colour that was used to dye the fabrics to get the end result. *Lafun* was used so that the dye that was used to dye the fabrics will not penetrate into the seprated portions which will at the end bring out the intended design on the fabrics.



Plate 14: Mixing *lafun* in boiling water  
Source : ( Researcher's fieldwork, 2021 )

**5. Preparing background of fabric before transferring each design:** two out of the three designs reproduced have some effects on the background that was not included in the stencil, so the background was done first before the main design was transferred to the fabric using the prepared stencil.



Plate 15 : Background effect for indigo 002  
Source: ( Researcher's fieldwork, 2021)



Plate 16 : Dying the background of Ayanski 001  
Source: ( Researcher's fieldwork, 2021)

The fabric with indigo 002 design has an effect with half of the fabric as white and the other half as lilac, the used was dyed half way lilac before the stencil was then used to transfer the design on it after it had fully dried. The fabric for Ayanski 001 design too also has line effects with two different colours

interchanging at the background, the fabric used was also dyed in other before the design was then transferred after it has dried.

**6. Transferring designs on fabrics:** with the help of the cut out stencils each designs were transferred on white guinea fabrics using *lafun* as the transferring paste which in turn served as the resist paste to avoid dye from penetrating into the covered portions on the fabric. The fabrics with the paste is then spread out and allowed to dry before dyeing them, the spreading is done so that the paste will not wash while dyeing and then expose the portions that is supposed to be covered to dye penetration.



Plate 17 :Transferring indigo 002 on fabric  
Source: ( Researcher,s fieldwork, 2021 )



Plate 18:Transferring Ayanski 001 on fabric  
Source: ( Researcher,s fieldwork, 2021 )



Plate 19: Transferring Indigo 004 on fabric  
Source: ( Researcher's fieldwork, 2021 )



Plate 20: Transferred design set out to dry  
Source: ( Researcher's fieldwork, 2021 )

**7. Mixing dye with chemicals to be used for dyeing:** after the fabric is exposed to air and the *lafun* paste has dried on the fabric, dye solution was then mixed to insert the fabrics before washing off the paste. the dye solution was prepared with warm water, good quantity of hydrosulphide with small quantity of caustic

soda with desired colour of dye and little quantity of warm water. Caustic soda is used in addition to the dye solution so that it will help in opening the pores of the fibres of the fabrics used and hydrosulphide is used so that the dye can penetrate well into the opened pores and the colours will be retained on the fabric better and warm water is used so that it can hasten the chemical reactions between the caustic soda and the hydrosulphide to enable the dye to penetrate into the fabric faster and better.



Plate 51: Mixing dye for one of the fabrics  
Source: ( Researcher,s fieldwork, 2021 )

**8. Dying fabrics with desired colour:** the dry fabrics are dipped inside the dye solution and mixed thoroughly and fast so that the same concentration of dye can go all round the fabric, and the fabric is then removed from the solution within five minutes and allowed to oxidize before washing off the paste on the fabric, by this time the paste is very soft and most of them are falling off already so if allowed to stay too long in the dye solution the portions that are supposed to be resisted from dye penetration will now be exposed to dye and since it will not enter with the same concentration with the other parts of the fabrics it looks washed off as if the dye was not good enough.

The fabric to be dyed was sprinkled with water so as to reduce the level of breakage in the lafun.



Plate 53: Dry fabric with Indigo 002 design ready to be in dyed  
Source: ( Researcher's fieldwork, 2021 )



Plate 55: Dipping fabric into dye solution  
Source: ( Researcher’s fieldwork, 2021 )



Plate 56 : Dyed fabric dried out to oxidize  
Source: ( Researcher’s fieldwork, 2021 )

**9. Washing off the *lafun* to show the reproduced design:** once the fabric has been aired and allowed to oxidize the real colour of the dye comes out after which the fabric is taken to be washed with water, at this stage the paste is very soft which makes it very easy to wash and makes it fall off easily and then the reproduced designs are shown after washing the fabric and excess dye are also washed off from the fabric.



Plate 57 and 58 : washing off paste from dyed fabric.  
Source: (Researcher’s fieldwork, 2021)

**10. Starching, ironing , and packaging finished work:** after washing off the paste from the fabrics each fabric was starched in hot water starch, ironed and then packed in a packaging nylon for proper finishing.



Plate 59 : Prepared starch ready to be used for fabric.  
Source : ( Researcher's fieldwork, 2021)



Plate 60 : Starched fabric waiting to dry  
Source : ( Researcher's fieldwork, 2021)



Plate 61 : Ironed fabric packed inside package nylon  
Source : ( Researcher's fieldwork, 2021)

### ***Adire Alabere* Method of Reproducing Fabrics.**

This method is also known as the tritik method of fabric production popularly called *adire alabere* among Yoruba traditional producers. This method of fabric reproduction involves the use of needle and thread for stitching designated parts of a fabric and then dragging it together before dyeing the fabric. These stitched parts that are tightly dragged together and tied parts serves as the parts that dye are not allowed to penetrate while the thread used in tying serve as the resistance for dye penetration. The stitching can either be done by using sewing machine by running loose stitches on fabrics before dyeing or by using needle and thread. Two out of the five selected designs were reproduced using *adire alabere* method of production; indigo 003 and indigo 001 designs, the following steps were followed :

**1. Extracting designs from printed fabrics using Corel Draw:** during this process the fabrics are snapped with the aid of a good camera and then transferred to the system using the Corel Draw designing software to extract a repeatable pattern from the snapped fabric, these designs were printed on A3 size of paper before it was then traced on the fabric.



Plate 62: Printed Indigo 001 design  
Source: (Researcher's fieldwork, 2021)



Plate 63: Printed Indigo 002 design  
Source: (Researcher's fieldwork, 2021)

**2. Tracing designs on fabrics:** after extracting a repeatable pattern from the fabric and it was then printed on A3 paper, the design was then traced on the fabric; the tracing was done on the fabric by placing carbon paper in between the paper and the fabric and then it was carefully attached onto the fabric and then traced out and repeated till the tracing was don on the surface of the fabric before it was then stitched.



Plate 64 and 65: Tracing Indigo 001 on fabric  
Source: (Researcher's fieldwork, 2021)

**3. Stitching the traced design using needle and thread:** sewing thread of different colour with a sewing needle was used to stitch the fabric following the traced out designs accordingly, this is done with small intervals between the stiches and afterwards the end of the thread is secured by knotting the thread used.



Plate 66 and 67 : Stitching Indigo 001 and 002 designs on fabric  
Source : ( Researcher's fieldwork, 2021)



**4. Pulling the thread and tying firmly:** after stitching all the designs on the fabric it is sprinkled with water and the threads are pulled and tied together at both ends so that it does not loose back. The fabric is sprinkled with water so that the thread does not cut while pulling the thread because with water in the fabric it becomes softer and allow tight tying of the pulled thread which in turn serve as a resistance for dye penetration.



Plate 68 and 69: Pulling and tying thread on indigo 001 and indigo 002  
Source: (Researcher's fieldwork, 2021)



Plate 70: Tied Indigo 001 design  
Source: (Researcher's fieldwork, 2021)



Plate 71: Tied Indigo 002 design  
Source: (Researcher's fieldwork, 2021)

**5. Dying tied fabric:** the two designs that were chosen for these production method have two colours the first was dyed by dipping the tied fabric directly inside the dye solution containing dye of the two colours for the fabrics, the fabrics were then aired and allowed to oxidize and dry before it is then dyed the second colour by pouring dye solution of the second colour on some parts of the designs which gave the marbling effect after the thread was cut.



Plate 74 : Dying tied fabric

Source : ( Researcher's fieldwork, 2021 )

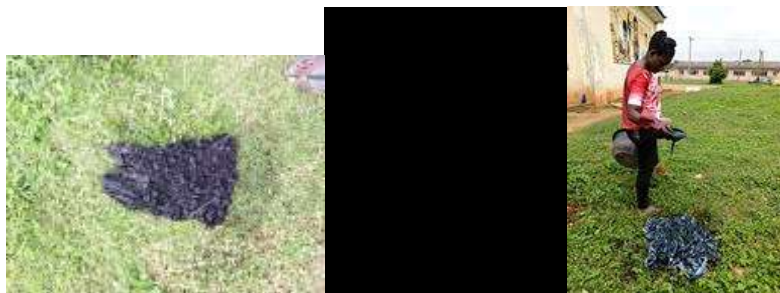


Plate 75 : Dyed fabric aired to oxidize fabric

Plate 77: dyeing second colour of fabric

Source :( Researcher's fieldwork, 2021 )

Source : ( Researcher's fieldwork, 2021 )

**6. Cutting out the thread on the dyed fabrics:** after dyeing the fabrics it is then allowed to oxidize to show the real colour of the dye used, and washed in cold water after oxidizing the fabric is washed so as to remove the excess water and also stop the reaction of the chemicals used afterwards. The tread used to tie the designs are then cut loose to show the resisted parts.



Plate 78 : cutting out the thread on dyed fabric.

Source : ( Researcher's fieldwork, 2021)

**7. starching, ironing and packaging :** after the thread was cut out the dyed fabrics were then starched and allowed to dry and ironed and then packed in packaging nylon.



Plate 79 : Starched fabric after dyeing.

Source : ( Researcher's fieldwork, 2021 )



Plate 80: Ironed fabric packed inside package nylon

Source : ( Researcher's fieldwork, 2021)

### **Observations and findings from the experiment**

From the experiments carried out during the course of this research the following observations were made in the course of the experiment;

1. The production technique assumed for the digitally produced fabrics might bring out a different design entirely if done with traditional method.
2. The available dye colours might not be an exact match with the colours used for the digital production.
3. The fabric used for production might have different cotton content percentage which might cause difference in absorption rate which in turn might result to different end point.
4. In the process of transferring the chemicals, it might be kept exposed to air which might cause the chemicals' potency to reduce which might in turn not allow proper absorption of dye during traditional dyeing method.

### **Limitations**

From the experiments carried out during the course of this research the following were limitations encountered during the research

1. Difference in colours of the local dye available and the ink colours used for the digitally printed fabrics used
2. Difference in cotton percentage of fabrics used for both methods of production.
3. Inavailability of means or device to check the potency of the chemicals used during reproduction of the designs.

### **Conclusion**

The result of the study reaffirms some of the findings in earlier research that is associated with digital textile printing and *adire* fabrics. Findings in this study indicate the need to improve in production of *adire* fabrics among Yoruba people. This is to help increase the durability of the fabrics for end users and in turn improve the financial aspect of the production.

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