

# Sustainability and textile ideas implementation

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## Abstract

The textile industries in the Kingdom of Saudi Arabia are considered one of the important industries in which the produced parts are linked to the consumer who may choose them later to buy them. The culture of preserving fabric sustainability in the living room is not intended to retain the history of fabric. Therefore, it was necessary to think of more sustainable ways of implementing and manufacturing textiles by involving consumers in the manufacturing processes. The production of textile pieces in a way that meets his needs and fulfills his own desires and inclinations is the reason for creating that link between them, which makes him aware of the importance of each piece and thus the necessity of preserving it and striving for its sustainability by creating that sense of responsibility towards it. Among them, the aim of the research was to search for the most important different methods of implementing textile manufacturing in internal spaces and highlighting them through a comparison of five different methods. The research followed the analytical and comparative methodology, whereby each method was studied separately and analysed, then a comparison was made between the five different methods. After that, a set of important points were drawn up in the form of research recommendations in the process of sustaining industrial implementation.

**Keywords:** interior design; production of textile; preserving fabric; textile industries

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## 1 INTRODUCTION

Many people describe the 21st century as the era of speed. It seems short and full of shifts and changes that took place in the life of people. The sooner a change appeared in a weaving structure, a piece of furniture, a design of any product or a technological development another more advanced changes happen.

In this context, different stages like the boom and oil phases, the various economic developments have already influenced the consumer behavior and culture of the Saudi Arabian society [1]. They as well have affected the main features of the upcoming world, which in turn have its great impact on our future thought, security and stability. They even have raised some questions about the way we live and the way we might furnish our homes and interior spaces today, and how that would sustain the future in the shadow of growing economy and the evolving rational thought. The accelerating technological development has also led to the emergence of new needs that impact the nature of human life, psy-

chology and activities. It is obviously evident that people need to change the shape, design, weaving structures and texture of their home furnishings to achieve the conditions of sustainability [2].

The culture of preserving fabric sustainability in the living room is not intended to retain the history of fabric, to use the historic fabric or to preserve it. It is, however, meant to think of ways to ensure its survival in a lively and harmonious way that achieves sustainability through sustaining the design, color and fabric used. The industrialized countries' concerns have changed today towards satisfying consumers' wishes and claims based primarily on sustainability [3]. The increasingly improved consumer culture and the degraded level of their living gave way to the production of different high-quality products that encouraged trade openness and high-level competition among the global industrial companies producing sustainability-related quality products [4].

The research aims to review some methods of implementing textile design ideas, noting the important role of involving the consumer in the implementation of pieces of furniture and choos-

ing the appropriate method for his taste, desires and capabilities, and the effect of this in creating a link and identity for a piece of furniture, for example with the consumer who coexists with it and the effect of this in creating a sustainable environment in the field of fabric manufacturing from the first. The idea of design usually goes back to the stage of implementation and coexistence with the pieces.

The city of Riyadh is one of the fastest-growing cities in the world, with a population of five million people in 2005 and a currently developed area of 200 square kilometers. Population projections indicate that the population growth rate if it continues as it is, the population will reach 17 million in 2022 [5]. This reminds us that the population of Saudi Arabia is doubled two and a half times between 1940 and 1980, with an annual increase of 52% [6].

It is also clearly evident that Islamic heritage had an impact on the design of the living room, its style, furnishing, colors, type and the weaving structure of fabric used [7]. The design concept, in addition, differs from region to region in Saudi Arabia in connection with the region's history and culture. The areas such as Najd and Al Wosta are affected by the desert environment, and the simple furniture is influenced by the simple weaving structure, endurance, warm color and the strength of its straight design lines.

In relation to the topic of Extraordinary Textiles Technology, Kylie Wroblaski said that the reason behind the evolution of textiles is the need to manufacture fabrics and strong anti-bacterial tissues that do not damage easily with time and use [8]. To this, silver and copper ions were added to the manufactured textile yarn, where the ions worked towards increasing the durability, strength and resistance of textiles. In the era of 'sustainable fabrics in 2013', Angela Fedele also talked about the damage caused by the fabrics containing many colors and harmful industrial substances on human health and life [9]. Scientists, therefore, replace such textile materials with ones that contain hygienic colors and environmentally friendly textiles that can be recycled later. Scientists have found that cotton is one of the best and most solid tissues at all. In this sense, and with respect to the concept of sustainable materials in interior design, some factories started to manufacture environmentally friendly organic pigments, and paints that are less toxic have greater sustainability. This paradigm shift has occurred as a result of high toxic dyes affecting the lives of individuals and society. On the other hand, emphasizing the idea of the positive impact of the arts in healthcare facilities, Kristen Avis focused on the positive effect of textiles colors used in health care facilities and the extent to which this positive effect has on the morale of patients and the creation of comfortable home atmospheres [10].

## 2 RESEARCH METHODOLOGY

The research methodology is based on reviewing and analysing the method of implementing the design idea, which is one of the most important criteria for the sustainability of textile design, as it reviews its impact on the main factors of textile sustainability. Then an analysis of five application models is made to implement

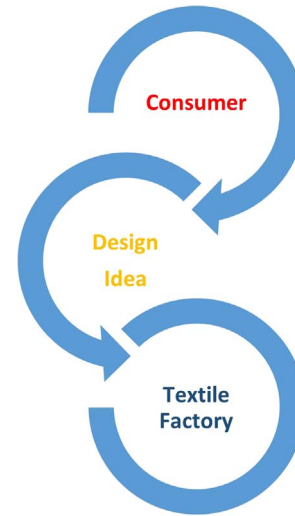


Figure 1. Main factors of textile sustainability.

the design idea and deduce the defects and characteristics of each of them. The research ends with a set of points that represent an extract. The research, which indicates the diversity of the methods of implementing textile designs, the consumer interaction with it and its role in setting his vision in implementing his desires according to the various alternatives to the methods of implementation and creating a sustainable environment for fencing in which the person interacts with the pieces of furniture with which he lives.

The method of implementing the idea of sustainable design is the most important criterion for design sustainability of fabric and its impact on the main factors of textile sustainability: (consumer, textile factory and design idea), especially with consumer communities that use traditional methods of implementation. The textile factory and the design idea interfere as main factors in forming their determinants, as shown in Figure 1.

Therefore, the idea of this experimental research came from the consumer's need for a high-quality textile that satisfies his/her desire through interacting with it and feeling it. This means that the consumer plays the role of the factory and involves in the process of making his/her textile. Textile pieces made this way become a real part of the person's life in terms of shape, color, line and texture, without the need to change it continuously. The way such ideas are constructed depends on the following stages:

- Establishing a lasting intimate relationship with the piece.
- Establishing a strong relationship between the product and the consumer based on the consultation of the consumer in the areas of production that have to do with ideas and creative lines favored by the consumer who is attracted by it not.

However, the idea of attracting the consumer depends on the following stages:

- A. The stage of sustaining the idea by color:** In this stage, the consumer chooses three earthy and neutral colors that offer the owner the freedom to create and innovate designs without distracting him from the desired image.

- B. **The stage of sustaining the idea by texture:** the consumer selects three different textures that have historical reference and decorative patterns that do not lose value through time, such as the Islamic, Lotus and Akintos motifs.
- C. **The stage of sustaining the idea by technique:** it is a stage that can be achieved through unlimited technical ideas in categories such as:
1. **Purchasing:** offering the product in an electronic catalog that allows the consumer to deduce many unlimited ideas of the design.
  2. **Communication:** it encourages the consumer to generate ideas and suggestions that satisfy the wishful thought.
  3. **Marketing:** it depends on selling the idea and communicating the mechanism of assembly in a simple and easy way to the consumer.
  4. **Post-purchase:** it is achieved by establishing an electronic connection and follow up with the client. The main purpose is to help clients redesigning or reworking their ideas toward achieving textile sustainability simply and easily.

This way, the main idea of sustaining textiles in the living rooms in Saudi Arabia depends on promoting individual options of the living room textile designs to the level of heritage through the following strategies:

- Provide appropriate opportunities for consumers' involvement in the design process through the strengthening of their involvement in both buying and design processes. This is a design trend that started to take place in the areas of product design with the advent of digital technology and design software programs. This enables the individual to exercise his options in the design process and thus enable it to purchase reflecting their wishes. This kind of participation works to create a sense of individual ownership and sense of accomplishment and fulfillment and product care and sustainability. Such technical developments enabled individuals to perform their options in the design process, then be ready to buy what they desire. This kind of involvement and cooperation stimulates the sense of ownership, the real feeling of accomplishment, and self-fulfillment, that lead to product care and its sustainability.
- Creating transferable, changeable or modifiable designs by the individual person. This concept can be applied to a variety of techniques to provide materials that encourage the individual to buy the desired fabric, control its designs and keep changing them to improve sustainability.

### 3 MECHANISM OF SELECTING THE EXECUTION METHOD OF SUSTAINABLE TEXTILE IDEA:

#### 3.1 The goal of sustainability

The goal is to create a system that can be supported indefinitely to protect the environment and be socially responsible towards it. Sustainability is an effective fad today; it is spreading wider

and wider to involve and support sustainable design. This way, products can be made with respect to their environmental and social impacts during their full life cycle.

#### 3.2 Sustainability system

The sustainability system involves three basic integral principles (Consumer, Textile Factory and Design Idea). The factory makes the textile product that the consumer buys then tries to work on the design idea in order to develop it. The developed idea by the consumer may inspire the factory again to proceed with a chain of further development that involves the creative efforts of consumers.

#### 3.3 Mechanism of selecting the execution method of sustainable textile idea

It is an important stage in making a textile sustainability project because it is used to define a set of parameters and criteria governing the type of technology used in making the fabric according to the proposed idea. The selection mechanism is linked to the way engineering decisions support appropriate and preferable methods by analysing the design, the construction techniques used and their application method. It is made of a sequence of stages related to the fabric used in the making of sustainable design with respect to the ecological dimensions (design power, used technique and textile materials).

Choosing the appropriate method that suits the idea of sustainable textile and achieves the integration between the design and its implementation technique must go through the following stages:

1. Studying and analysing the decision-making process of selecting the implementation style of the optimum solution
2. Studying the most useful factors, limitations and types used in the production of the idea.
3. Studying the relationship between the implementation type, shape, ornamentation, color, design sustainability of textiles, proper location (wall, floor, ceiling or furniture) and the interchangeable effects among and within each of them.
4. Comparing and prioritizing implementation types and design sustainability of the executed shape.
5. Choosing the mechanism of selecting the execution type appropriate to the proposed shape and idea with respect to the construction method, design quality and strength within the selected location (wall, floor, ceiling or furniture) and the desired outcome. The purpose is to achieve artistic integration and technical skill in the making of proposed ideas.

### 4 TOWARDS A SUSTAINABLE STYLE OF IMPLEMENTATION:

#### 4.1 Proposed implementation styles

The selection of implementation style mechanism depends on the level of appropriateness of the design idea to its location and the

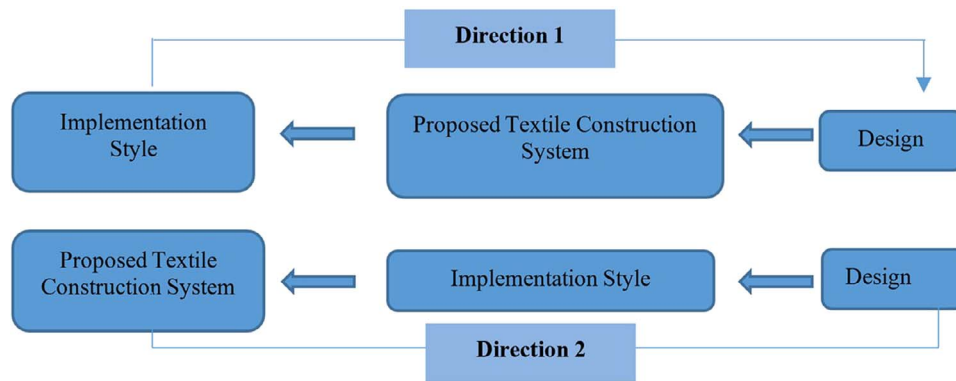


Figure 2. Directions of implementation mechanism.

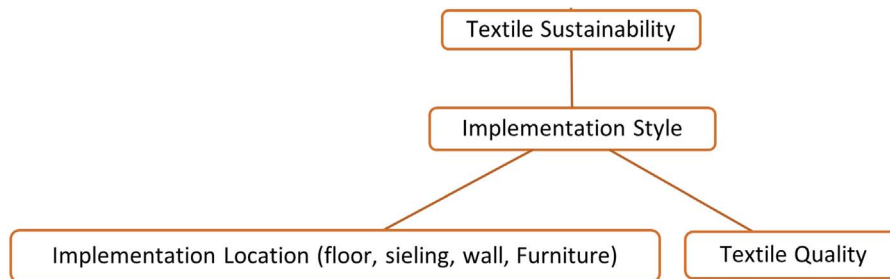


Figure 3. Style implementation components.

quality of textile pieces. The idea can be implemented according to one of the following directions shown in Figure 2.

In both directions, the best implementation style and the best sustainability system must be achieved.

#### 4.2 Implementation stages

1. Studying and analysing the stages of designing the textile idea and the decision of selecting the implementation style in respect to the best location (wall, floor or furniture).
2. Studying the factors and determinatives of the design sustainability of the idea and the way of achieving it interactively through design elements and principles.
3. Studying the compatibility among the implementation style, quality of textile and their interrelatedness.
4. Prioritizing the styles of implementation that are compatible with the intellectual sustainability of the proposed textile design.
5. Inferring the execution-style selection mechanism that is compatible with the idea in relation to the quality of the chosen textile materials, the selection mechanism of line, color, texture and the criteria of execution quality.

#### 4.3 Style implementation components

It is the implementation style used to transform the textile design idea into a real physical product using elements such as the fabric itself, the design, color, texture and ornamentation motif. The role and function of such elements change according to the

implementation style used (Figure 3). Basic components of style implementation can be identified as follows:

1. Textile materials appropriate to the idea in terms of construction, durability and thickness.
2. Manufacturing method
3. Sustainable design idea
4. Production machines, production line and complete operation
5. Professional marketing based on post-purchase services and sustainable textile design through ideas

Production size and manufacturing rates of textile and idea implementation depend on the quality of production. Marketing depends on the size and ratio of change. It also needs different levels of decision-making in the chosen implementation mechanism with respect to the type of design, construction of the sustainable textile design idea and its proper location. Trial and error methodology is very effective in realizing the proposed idea.

## 5 THE ANALYSIS OF IMPLEMENTATION STYLE

The analysis of implementation style depends on a number of physical steps, as follows:

1. Construction steps
2. Selecting the right idea
3. Using the best implementation style or mechanism parameters of the design affecting the textile implementation style of the design idea:



Figure 4. Samples of Idea No. 1.

There are various construction parameters that impact the style implementation. The relative importance of such parameters and their sequence differ with regard to the implementation strategy that involves the following stages:

- **Stage 1: Constructing the proper textile idea:**

It is defined so that it is compatible with the proposed design idea and the best implementation style. It is advisable to experiment and test all proposed ideas to reach the best result with regard to the best textile sustainability and the best design innovations that express the proposed design requirements.

In fact, this stage involves achieving compatibility among the design construction of the idea, the used weaving construction,

the sustainable materials' construction mechanism used to execute the design. Achieving such integration depends on the balance between the construction system of the textile pieces used to express the idea both in the present and future time within the context of safety, stability, quality, productivity and other factors involving the popularity of implementation style, consumer's perception of the product and post-purchase services.

- **Stage 2: Implementation Style Stage**

This is a complementary stage. It involves the different actions and processes needed to produce the work by making compromises among the main components of production or the production triangle: time, quality and materials. If the main

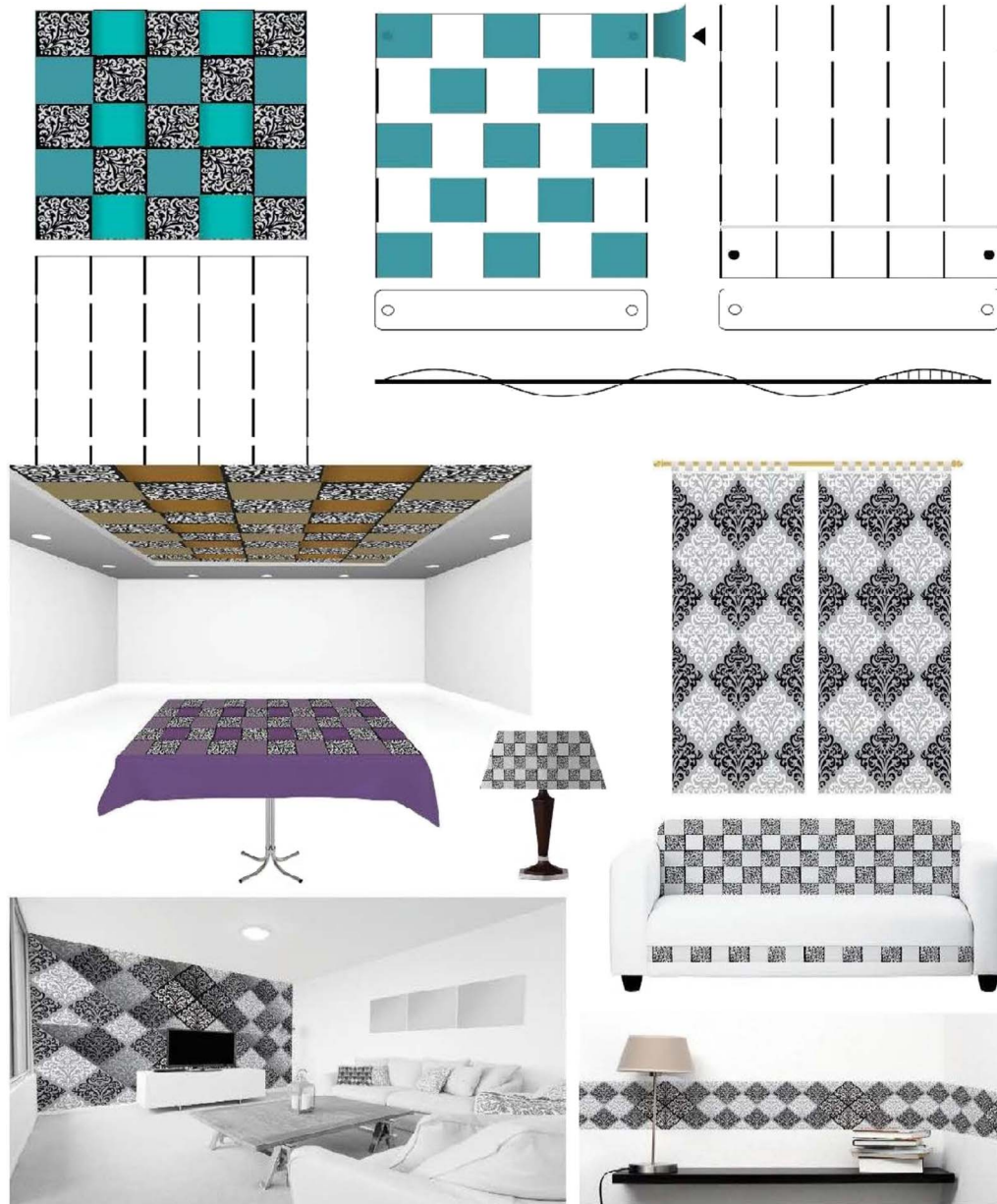


Figure 5. Samples of Idea No. 2.

requirement of production is high quality, for instance, the other two components take second place, and so forth.

### • Stage 3: Mechanism of the Implementation Style of the Design Idea

This mechanism is connected with the preliminary experimental stages of the design idea location and its sustainability, in addition to other working alternative locations of the living space under investigation. The idea can be applied to a wall by using textile pieces put together in a designerly way in the form of wallpaper, a work of art, a curtain or any decorative design. It can be used on the ceiling in a variety of decorative forms. It can also be implemented on the floor as part of the decorative

carpet designs or a designed ribbon on the floor itself, or the furniture pieces that enhance consumer psychology of the interior space. The main idea is to create changeable and transformable innovative design solutions and ideas using adequate techniques based on defined specifications and parameters. By doing so, consumers develop a sense of ongoing change and belonging through time.

The shared elements from both the implementation style and textile sustainability as shown in the consumer-textile-design system have their impact on the used technical implementation mechanism. The interrelationship between the implementation style, the quality of design idea and textile sustainability also affects the total outcome of the process. Therefore, the



Figure 6. Samples of Idea No. 3.

implementation style is deemed necessary and effective in the context of the sustainable design idea and its location in the design of the living room space.

## 6 PROPOSED APPLICATIONS

### 6.1 Idea no. 1: The net-based textile pieces

This idea depends on a double zipper base. The zippers are located according to certain design ideas in a flow and continuous mood. Each piece is a part of a separate design unit that also considers the shape, length and colors of the zippers as

valuable design elements. The designed textile pieces are connected together by the net of zippers. This type of construction is characterized by flexibility, easiness and changeability. So, the base can be designed in various sizes and designs that fit a variety of locations. The production company or the textile factory produces nets of continuous pieces that can be made of unlimited small pieces to be used in sustainable design solutions (Figure 4).

#### • Implementation Method

After developing the final design, connect the small pieces with the net base using the zippers. Make sure that the total design solution is made out of the designs of all different pieces used in

**Table 1.** Summary comparison of the five methods of implementation.

Idea	Advantages	Disadvantages
1	<ul style="list-style-type: none"> <li>This type of construction is characterized by flexibility, easiness and changeability.</li> <li>The base can be designed in various sizes and designs that fit a variety of locations.</li> <li>Facilitation for production companies that can produce networks of unlimited continuous parts.</li> </ul>	<ul style="list-style-type: none"> <li>The zipper system generally needs to be used carefully so as not to perish or cause problems with it.</li> <li>Changing the waistband after problems with it may cause damage to the fabric in some cases.</li> <li>The necessity to choose good types of zippers so that no problems arise.</li> </ul>
2	<ul style="list-style-type: none"> <li>It allows for greater changes and transformations in the design idea by using different lengths and colors of fabric strips.</li> </ul>	<ul style="list-style-type: none"> <li>Do not give flexibility in using a single product; after filling, it is difficult to replace or change the strips.</li> </ul>
3	<ul style="list-style-type: none"> <li>The linear decoration mood offers greater chances of rich designs.</li> <li>Encourage the consumers to be more creative thinkers during the process of implementation.</li> </ul>	<ul style="list-style-type: none"> <li>The sponge may not have high durability during the time.</li> <li>The assembly of small sponge pieces requires great effort and care to fit the pieces to each other and does not cause deformation in the assembly.</li> </ul>
4	<ul style="list-style-type: none"> <li>It is considered one of the simplest methods, as it depends on the interlock by inserting a part of a small piece into a suitable store for it in the second piece.</li> </ul>	<ul style="list-style-type: none"> <li>Flexibility is not given in the use of different pieces, but each piece has specific dimensions and design and is fixed to match with the next piece.</li> </ul>
5	<ul style="list-style-type: none"> <li>This method allows the consumer to one ornamentation unit to produce an unlimited number of designs using layers on top of each other.</li> <li>This method allows for shapes and colors variations.</li> </ul>	<ul style="list-style-type: none"> <li>This method provides the consumer with one ornamentation unit, and thus it may be difficult to use more than one ornamentation unit in one place.</li> </ul>

all locations of the designated sustainable design solution of the living interior space.

## 6.2 Idea no. 2: Stuffing technique

It depends on using textile ribbons or long textile bands. The bands can be stuffed in a textile-designed base or area using different lengths and colors, allowing for greater design idea changes and transformations (Figure 5).

### • Implementation Method

Firstly, choosing a blank textile area with proper dimensions appropriate to house the added ribbons. Then, adding the woven ribbons that come with certain dimensions and colors to the designed base.

## 6.3 Idea no. 3: The assembled puzzle like textile

The main idea depends on designing an assembled strong spongy base. Such a base can be stuffed with pieces of different sizes according to a certain design idea. The design takes a horizontal mood that is composed of smaller pieces of various color themes. The linear decoration mood offers greater chances of rich designs that stimulate consumers and encourage them to be more creative thinkers during the process of implementation (Figure 6).

### • Implementation Method

The method of implementation in this idea depends on several steps similar to puzzle game in the overlay of small parts to form a large body. The steps come as follows: Choose the fabric base first and then choose small pieces of different sizes and colors to overlay with other parts of different decorative colors to be the desired shape.

## 6.4 Idea no. 4: Assembled textile (Tong and Hole)

The main idea of this assembled design depends very simply on connecting two pieces by inserting the smaller end of one piece into a hole in one side of a different piece. This is called the tong and hole technique for joining smaller designed pieces to create a larger designed piece of textile. The design may also include the background (the piece itself where the main design is placed, and the little pieces connected together) and the frame (the area surrounding the main piece) as shown in Figure 7.

### • Implementation Method

The method of implementation in this idea depends on the method of interlock as in wood. One of the pieces containing a prominent part is processed. This prominence is inserted into another that is discharged in the same prominent form as in the first. This process is repeated until all the pieces are assembled together consisting of the shape to be manufactured.

## 6.5 Idea no. 5: The layered textile method.

It is also called decorative modeling or the layered ornamentation unit. This method allows the consumer to one ornamentation unit to produce an unlimited number of designs using layers on top of each other (Figure 8).

### • Implementation Method

The design is produced by combining the small or large pieces according to a certain composition that allows for shapes and colors variations.

## 6.6 Summary of the ideas

By reviewing the previous models of ideas, it is possible to conclude and make a comparison of the advantages and disadvantages of each method through Table 1.

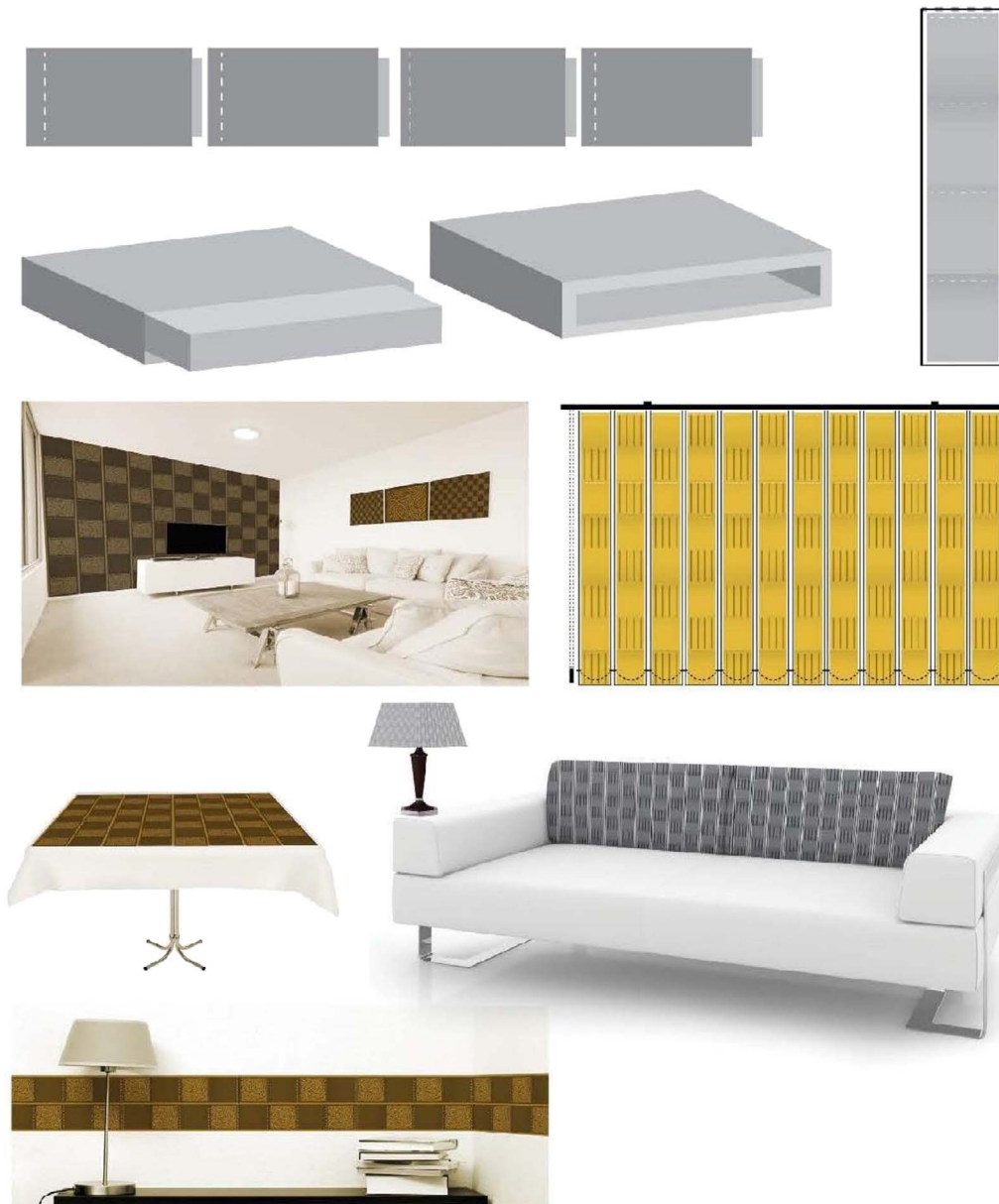


Figure 7. Samples of Idea No. 4.

## 7 BASIC GROUNDS OF THE PROPOSED DESIGNS

1. If the design base is an ornamentation unit, the change in design work depends on textile pieces and colors using different and neutral colors.
2. If the design base is a neutral color, the change in design work depends on the colored textile pieces using different colors and ornaments.

### 7.1 Characteristics of sustainable ideas

1. **Simplicity:** the different techniques used in implementing,

changing and transforming sustainable textile design, keeping the same materials, are simple and easy to manage.

2. **Quality:** using diverse ideas requires proper textile construction techniques with an emphasis on high quality to ensure product sustainability for longer life.
3. **Cost:** even in the situation where textile cost is relatively high, consumers do not mind the higher cost for getting better and renewable sustainability.
4. **Diversity:** the unlimited variation of textile types, shapes, colors and textures enables factories to compete against each other for better quality textile products and more innovative ideas.

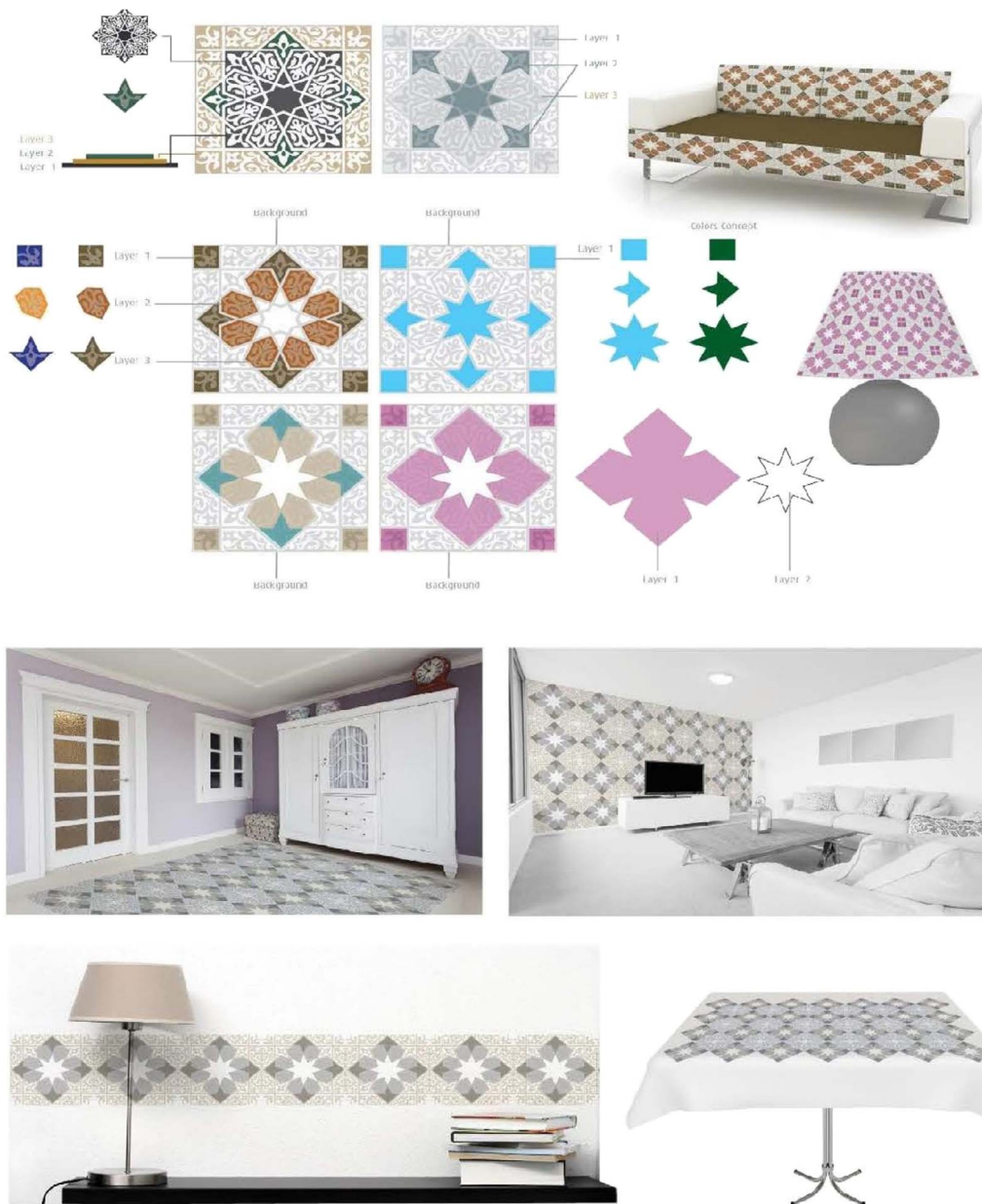


Figure 8. Samples of Idea No. 5.

## 8 SUMMARY

The most important feature that characterizes the thoughts and dimensions of the techniques used to sustain textiles in the interior space is the ease of designing. The ways such designs are implemented help to improve the sustainability aspects among people, including consumers, manufacturers and designers.

Using simple and sustainable designs, including neutral and earth color in addition to black and white, as well as proper textile construction methods, enabled consumers to be more creative in

sustaining textiles. Developing a strong design base using simple construction design techniques with colors and shapes in addition to different ornamental motifs based on Islamic, Egyptian, and Greek motifs also gave a broader for creative, sustainable design solutions (Figure 9).

- **First: Performance Dimension**

It focuses on sustainability through the proposed techniques used in this paper or by the companies and textile factories that are capable of improving them.

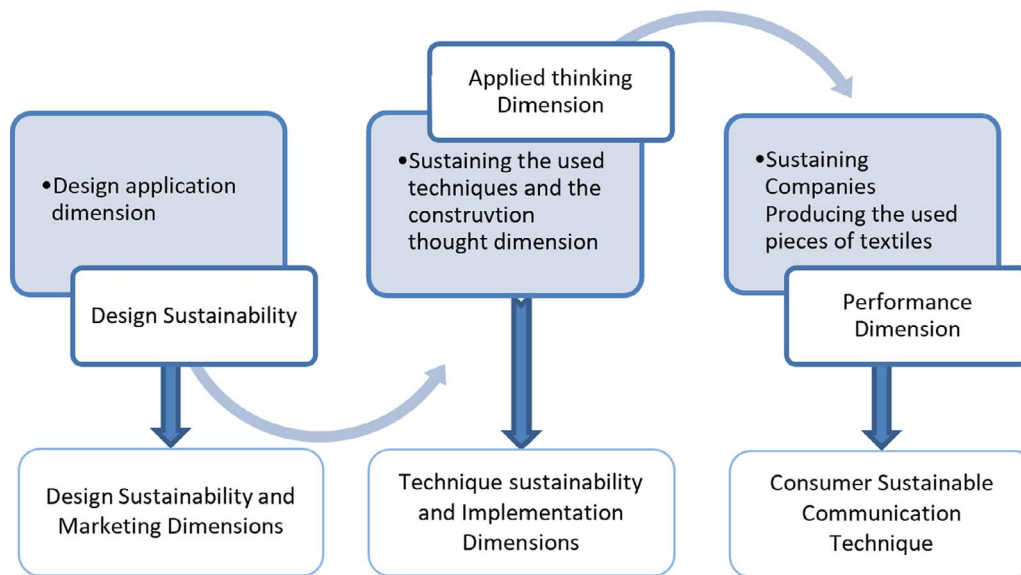


Figure 9. Proposed idea for activating the concept of sustainable textile.

### • Second: Applied thought Dimension

It focuses on sustainability through design ideas that comply with the scientific developments and the futuristic technologies of textiles and its sustainable construction methods. It also ensures the continuous development of the sustainable design thoughts suggested by the textile factories. They all enforce the concept of continuity and innovation of products and the styles of sustainable construction methods.

### • Third: Applied Design Dimension

It focuses on design sustainability through communication among consumers and their creative thinking capability. It also stimulates in them their imagination of sustainable textile design solutions. Acquiring such a broad experience enriches consumers' capabilities in the sustainable textile design solution.

## 9 CONCLUSION

The importance of reviewing some methods of implementing textile design ideas, noting the important role of involving the consumer in the implementation of pieces of furniture and choosing the appropriate method for his taste, desires and capabilities, and the effect of this in creating a link and identity for a piece of furniture, as well as the effect of this in creating a sustainable environment in the field of fabric manufacturing from the start, was highlighted in the research. The research methodology is based on reviewing and analysing the method of implementing the design idea, which is one of the most important criteria for the sustainability of textile design, as it reviews its impact on the main factors of textile sustainability. The diversity of methods of implementing textile designs, the interaction of the consumer with them and his role in setting his vision in implementing his

desires according to the various alternatives were mentioned for methods of implementation.

There are some other points that should be mentioned as follows:

- Using proper textile construction that achieves quality, lower cost and sustainability
- Using easy and simple construction and implementation styles.
- Developing mechanisms of different construction methods helps sustain textile products and solutions.
- Assessing stages of idea development and continuity through trial-and-error approaches supports the sustainability of textiles, their techniques and their proposed designs.
- Achieving compatibility among textile sustainable design thinking, consumer behavior and people.
- By comparing the five applied models, we find that there are methods that allow flexibility in design and diversity in the materials and colors used, such as the first, second and fourth methods, and there are other methods that may allow different alternatives to be made based on one unit, such as the fifth method. All of these methods allow consumer participation, which gives distinction in engaging the consumer in making what is commensurate with his desires and capabilities as well.
- The first method is one of the preferred methods of use because it allows flexibility, ease of use and a lack of detail.

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