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REVIEW

Systematic review of literature on crafts and handcrafted products with natural fibers: an ecological perspective

Revisión sistemática de literatura de artesanías y productos elaborados a mano con fibras naturales: una perspectiva ecológica

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ABSTRACT

This study conducted a systematic literature review to identify research published between 2018 and 2024 on handicrafts and products made from natural fibers currently worldwide. The Scopus database was used where 50 articles were selected. In the results it was identified that most of the selected articles came from Asia, specifically from India and from 2023 with experimental research methodology, among the handmade handicrafts made with natural fibers were highlighted bamboo, wicker, kenaf fabrics and among the products made with natural fibers were identified palms, rice and coconut husk, wood fibers, jute, sisal and hemp. As a main conclusion, it was identified that among the handicrafts made with natural fibers, the bamboo industry in India stood out with ecological handicraft products, also handicrafts in wood, paper and sesame wood, the embroideries in goshawk straw are the maximum representatives of a European handicraft in the XIX century.

Keywords: Handicrafts; Handmade Crafts; Natural Fibers; Fique.

RESUMEN

Este estudio realizó una revisión sistemática de la literatura para identificar las investigaciones publicadas entre 2018 y 2024 sobre artesanías y productos elaborados con fibras naturales actualmente a nivel mundial. Se utilizó la base de datos de Scopus donde se seleccionaron 50 artículos. En los resultados se identificó que la mayoría de los artículos seleccionados procedían de Asia, específicamente de la India y del año 2023 con metodología de investigación experimental, entre las artesanías hechas a mano con fibras naturales se destacaron los tejidos de bambú, mimbre, kenaf y entre los productos elaborados con fibras naturales se identificaron las palmas, cascarilla de arroz y de coco, fibras de madera, yute, sisal y el cáñamo. Como conclusión principal se identificó que entre las artesanías hechas a mano a base de fibras naturales se destacó la industria del bambú en la India con productos artesanales ecológicos, también artesanías en madera, papel y la madera de sésamo, los bordados en paja de azores son los máximos representantes de una artesanía europea en el siglo XIX.

Palabras clave: Artesanías; Artesanías Hechas a Mano; Fibras Naturales; Fique.

INTRODUCTION

Handcrafted items have multiple possibilities as commercial products. They are usually utilitarian objects. As heritage items, they carry tradition and aesthetics. Souvenirs are associated with our memories of being in a place or event. Handcrafted items through participatory engagement provide experiences and embedded knowledge.[1]

Craftsmanship combines the intangible dimensions of skill, ability, tradition, and knowledge with tangible elements such as tools, machines, and materials to transform them into handcrafted items. Important work towards generic approaches to craft representation identifies tangible and intangible dimensions.[2]

Some intangible dimensions relate to the cultural, economic, or religious contexts that identify communities. Others relate to the technical context of a specific craft and the corresponding skills, knowledge, or know-how. Costin et al[2] reviews the social context, group membership, and social relationships relevant to craftsmanship. Guidelines for preservation projects emphasize representation and consent from the relevant community. In addition, intangible dimensions consider the environmental resources in which a craft flourishes and, as such, consider the environmental and climatic context.[3]

Craft practice is ubiquitous, as craft acts are infiltrated into most aspects of society, from the industrial workplace to the home. Furthermore, craft is also an attitude and a way of life. Readers are invited to broaden their notions of what handmade crafts and other natural fiber-based products can be, discussing topics related to craft research and hybrid forms of digital and handmade craft processes.

Craftsmanship is ubiquitous, with many forms of craftsmanship and skilled material considerations existing in multiple contexts and situations. There has been debate about what is considered craft and what is not Dormer et al[4] with the consensus that craft evades definitions and instead thrives as an adhesive between other domains, such as art and design.[5] Craft is an attitude, a way of thinking and being in the world.[6] Craft further facilitates reflective platforms that can carry and sustain cultural associations that have developed and become embodied over time.[6]

The question of where to draw the boundaries between craft practices and other forms of skilled work is addressed to some extent by Pye et al[7] who, in his definition of work of risk and certainty, distinguishes skilled work that involves an intelligent approach to risk from rudimentary and predictable work. Risatti et al[8] refers to Pye et al[7] and illustrates the difference by comparing a modern electrician or plumber who uses limited material knowledge and manual skills in their work with the specialized skill and dexterity of a plasterer who also knows how to prepare and extinguish lime before application.

Given the importance of crafts worldwide and environmental concerns, this study aims to systematically review the literature to identify research published in the last decade. This article has two main objectives.

First, it aims to systematically collect, summarise, analyze, and synthesize information from previous studies published between 2018 and 2024. Second, it attempts to examine in detail the results of these systematically collected studies to identify the crafts and handmade products currently produced worldwide.

To achieve the objectives of the article, the following research questions are addressed:

- RQ1. What handicrafts have been produced by hand using natural fibers worldwide?
- RQ2. What are the products made from natural fibers?

METHOD

This study used a systematic literature review, following the guidelines of Kitchenham et al.[9]

A systematic literature review refers to establishing a research protocol to evaluate and interpret all relevant research based on the research question, phenomenon of interest, or area Kitchenham et al.[9] The study was conducted in three phases: planning, execution, and reporting. These three phases have sub-elements, which include (1) identifying review questions, (2) formulating a review protocol, (3) developing inclusion and exclusion criteria, (4) reviewing the selection strategy and procedures, (5) studying the quality assessment; and (6) strategy for data extraction and reporting of the answers to RQ1: RQ2. Each step is explained in the following sections:

Search strategy

The study's research questions were posed in the introduction. To find answers, an automated search was conducted in Scopus using keywords to obtain research related to the research questions, including crafts, handmade crafts, natural fibers, products made from natural fibers, and dyes made from natural fibers. The review process for the selected articles is shown in table 1.

Study selection criteria

The review process for the selected articles was based on issues related to handcrafted products and other products made from natural fibers for studies conducted between 2018 and 2024. The main objective of this

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inclusion and exclusion strategy was to confirm that the systematic literature review was relevant to the study.

Table 1. Application of screening criteria in Scopus

Screening criteria	Scopus
Type of access: open access	12600
Year (2018-2024)	14400
Subject area (Arts, culture, environmental sciences)	1342
Type of document (Article)	850
(Language: English)	475
(Language: Spanish)	125

Inclusion/exclusion strategy

This study included full-text online articles related to the research questions, written in English and Spanish and published in Scopus over 7 years (2018-2024). Therefore, irrelevant articles, articles published outside the study period, articles written in languages other than English and Spanish, and articles whose full text was not available were excluded.

Quality assessment

Kitchenham et al.[9] stated that quality is the process of evaluating the quality of primary studies using specific criteria and making a decision based on these criteria. The five quality control questions used in this study are shown below.

A. Does the research address handmade crafts?
B. Is the context of the research clear?
C. Is the research methodology clearly defined in the study?
D. Are the data collection methods detailed in the study?
E. Is the data analysis technique adequately evaluated in the article?

A quality control check was conducted on 50 articles about handicrafts and handmade products made from natural fibers. The quality was assessed based on the questions developed above, and the corresponding ratings were given. According to Nidra et al.[10] high, medium, or low-quality ratings should be considered to rate quality standards in quality control. Each of the five questions received a maximum score of 2. Based on the quality assessment questions, the papers that fully met the requirement received the maximum score (2), and those that partially met the requirement were rated 1. Based on this, 38 articles received a high score, 12 received a medium score, and only nine received a low score (which were excluded), indicating that there are 50 articles for the study after excluding those that scored low.

Data extraction strategy

The data extraction strategy used Microsoft Excel to record all article information. Kitchenham et al[9] indicated that the forms used for the extracted data should be used to record the information from the primary studies, as recorded by the researchers.

The data extracted from the 50 articles were as follows:

1. The source of the article
2. The author and country or region of the research
3. The research topic and year of publication.
4. The methodology used for the research.
5. Type of craft or product made by hand with natural fibers.

RESULTS AND DISCUSSION

Source of the articles

The total of 50 articles selected were journal publications from the Scopus database.

Research regions

The research publications came from 21 different countries. As shown in table 2, most of the 50 selected articles came from Asia (27). India has the highest number of articles, followed by South America and Europe with eight each, North America with 5, and Oceania and Africa with one each

Table 2. Continent and country of publication

Country	Number	Continent
India	9	Asia

China	6	
Thailand	5	
Taiwan	3	
Indonesia	3	
Iran	1	
Colombia	4	South America
Brazil	2	
Ecuador	1	
Peru	1	
England	2	Europe
Denmark	2	
Portugal	2	
Belgium	1	
France	1	
United States	2	North America
Mexico	2	
Haiti	1	
New Zealand	1	Oceania
Ethiopia	1	Africa
Total	50	

Year of publication

Details on the year of publication of the 50 articles are shown in table 3.

Table 3. Year of publication of articles

Year	Number of items
2024	8
2023	13
2022	7
2021	6
2020	8
2019	7
2018	1
Total	50

Research methodologies

The researchers of the articles used different methodologies, as presented in Table 4.

Table 4. Research methodologies used in the articles

Research methodology	Number of items
Experimental	16
Qualitative	11
Descriptive	11
Quantitative	5
Exploratory	3
Mixed	1
Participatory action research (PAR)	1
Applied research	1
Case study	1
Total	50

Handcrafted items made from natural fibres

Table 5 shows the types of handcrafted items made using different natural fibres as raw materials. According to table 5, Shengzhou bamboo weaving is a traditional Chinese craft with exquisite shapes, such as birds and figures, and high artistic and aesthetic Li et al.[7] In Taiwan, artisans are dedicated to weaving, using grass mats or bamboo as their materials. In nature, grass mats and bamboo are unpretentious and straightforward. They can be transformed into exquisite handicrafts thanks to the ingenuity and skill of the artisans, and most have practical value and appear in everyday life. They use simple materials and changing shapes to create a unique

life aesthetic. At the same time, these handicrafts can also be used as decorations for people to see.[17]

Table 5. Handicrafts made from natural fibres

Handicrafts	Authors
Shengzhou bamboo fabrics	(7)
Taiwanese fabric for making crafts with grass mats or bamboo	(11)
Embroidery on hawk's nest straw	(12)
Seagrass (Krajood) wicker products in Thailand	(13)
Traditional willow wicker crafts in the Himalayan plains of Kashmir, India	(14)
Palmyra wicker crafts	(4)
The vueltiao hat	(15)
Use of aquatic plants called water hyacinths for basketry in Thailand	(16)
Arts and crafts with Xia Bu 夏布, a traditional hand-woven ramie fabric	(17)
Handmade Iranian rugs	(18)
Grade C kenaf fibre (poor quality) as an alternative material for textile crafts in Indonesia	(19)
Handicrafts woven from waste palm oil stems in Riau, Indonesia.	(20)
Mats called Ela or cachihuango woven from the fibre of the aguaje palm and other wetland plant species in the Chambira River basin, Loreto, Peru.	(21)
Jinnan embroidery is a traditional craft from southern Shanxi, China	(22)
Handmade interlacing: the 'straw' (lattice) technique in furniture	(23)
Straw crafts in Haiti and Curaçao	(24)
Handcrafted Kolhapuri footwear in India	(25)
Handcrafted industrial products designed from sugar palm fibres	(26)
Bamboo weaving in Sansui, south-west China	(27)
Textile crafts woven in contemporary commercial contexts	(28)
Guane weaving of fique, cotton and other natural fibres to make sacks, backpacks, clothing and cord, using horizontal looms.	(29)
Crafts made from arrowroot fibres (Gynerium sagittatum)	(5)
Handicrafts made from wood in northern India. Pottery industry in Khurja, India.	(30)
Jute handicrafts in Hindustan, India. Brass handicrafts from India. Bamboo handicrafts from Bareilly Pilibheet, Lakhimpur, Kheree, India.	(31)
Prayagraj moonj handicrafts, India.	
Badaun is famous for its handicraft product called zari zardozi.	

Similarly, bamboo weaving in Sansui, southwestern China, suggests that the traditional knowledge associated with this weaving can be attributed to government support and innovations within the bamboo weaving industry.[28]

Similarly, the bamboo crafts of Bareilly Pilibheet, Lakhimpur, and Kheree are famous. The bamboo industry is a renowned creation in northeast India, especially among the scheduled tribes of India's seven sister states, also called the northeast region of bamboo crafts. Bamboo-related items are eco-friendly handicraft products. Bamboo items, such as baskets, dolls, jewelry, toys, and Waal tapestries, are made from bamboo. These handicrafts are manufactured in Assam, Tripura, and West Bengal.

There are also handicrafts made from wood in northern India, which has a rich culture. In Assam, a bamboo cane is used, and Chhattisgarh specializes in wood crafts such as masks, doors, and wooden sculptures for windows. Andhra Pradesh is famous for its cutlery, delicate bozos, and paper knives, which have a different design. In Tamil Nadu, especially in Madurai, rosewood carvings can be found. Karnataka is famous for its elephant figurines and furniture made from sandalwood, which is also used to make utilitarian and decorative items such as vines, birds, and decorative animals. Most women in Kerala create Kumbleli, which is very popular, and Jharkhand is also essential for its woodwork.

Similarly, Saharanpur, India, is renowned for its woodcraft, papercraft, and sesame wood, which generally provides the raw material for this industry.

On the other hand, embroidery on hawk's straw is the most representative of European craftsmanship in the 19th century. Traditional arts and crafts are diverse, and in hawk's straw, there is a unique European tradition: straw embroidery. Using straw for weaving dates back thousands of years, and examples can be found in Belarus, which added this tradition to its list of intangible cultural heritage. In the past, embroidery was used on shawls, scarves, hats, tablecloths, and dance dresses.[12]

Similarly, straw crafts are found in Haiti and Curaçao. Straw weavings produced in the Caribbean in the

early 20th century accounted for a small but sustainable percentage of the region's exports. After the US occupation of Haiti, craftsmanship was promoted as economic development; women were trained to weave Panama hats, and products were displayed at international exhibitions and exported to Europe and the United States. Straw artifacts and photographs from the Dutch National Museum of World Cultures collection were used as a starting point to trace the intertwining of imperial education and ethnographic exhibitions as sites of gender production.[25]

Similarly, Thailand's seagrass (Krajood) products were deliberately developed based on design technologies, identifying consumer needs and potential styles to produce them. In Thailand, industrial handicraft products play an essential role in the country's economy and society, as they help people create jobs, increase employment rates, optimize the use of natural resources, preserve Thai craftsmanship, and contribute to the country's enormous annual income.

During the economic downturn, 'Thailand's industrial handicraft products' demonstrated inherent strengths by integrating local wisdom and cultures. This combination provides a solid foundation for works endowed with beauty, values, and identities that portray the Thai nation.[13]

On another note, Kashmir's wicker handicrafts are a well-known small-scale craft industry based in the forests of the Shaakhsaaz communities in rural Kashmir.[33] The Shaakhsaaz communities derived their name from the Kashmiri words shaikh and Saaz, which mean thin tree branches or twigs and the act of weaving, respectively. Wicker weaving is undoubtedly the most widespread and admired craft, passed down since immemorial and deeply rooted in the local material culture.[14]

Wicker crafts made from the branches of Salix triandra, S. viminalis, S. daphnoides, Indigofera pulchella, Cotoneaster bacillary, Parrotia jacquemontiana, etc., have received worldwide acclaim for their exceptional designs, artifacts, and efficient utilities.[34] The wicker craft enterprise plays a vital role in income diversification, self-employment, socio-economic improvement, material culture, small businesses, and poverty alleviation for entrepreneurs in Kashmir.[33]

Traditional willow wicker craftsmanship in the Himalayan foothills of Kashmir, India, specializes in the fact that willow products serve as decoration and as household items for storing and transporting food items on special occasions.[14]

Similarly, palmyra wicker crafts embody human ingenuity in using natural materials; weaving can make any material strong and used for everyday purposes. In Indonesia, there are many wicker craft cultures, including the palmyra wicker craft of the eastern flowers of Nusa Tenggara Island. To ensure its sustainability, wicker craftsmanship must adapt to the modern lifestyle. The unique feature of Palmyra wicker crafts is their hexagonal weaving pattern. They are used to create baskets, trays, and bags. Palmyra grows abundantly in the east.

The wicker is made from palm leaves that are only three months old. They have a soft texture but a firm surface, giving off a beautiful light yellow color when re-colored. The palmyra's smooth, tough, and water-absorbent stem makes it an excellent weaving material and is sustainable because the leaves grow in three weeks.[4]

Furthermore, the Vuelta represents the biocultural memory of the Zenú people, becoming an icon of their material culture in recent decades. This object has not only become a significant source of income for local communities but also represents a diverse set of knowledge about the natural environment, traditional weaving techniques, and the local cultivation of 'cañaflecha' (Gynerium sagittatum), a herb of artisanal origin used for medicinal purposes in this region. Thus, the Vuelta hat has cultural and social significance for the Zenú community, rooted not only in its commercial nature but also in local knowledge about culture-nature relationships and social networks in the hat supply chain, especially in rural areas of the municipality of Tuchín, located in the department of Córdoba, Colombia.[15]

Similarly, Indigenous descendants of the Zenú family survive in the department of Sucre, Colombia, where they maintain some cultural traditions and make handicrafts from cane fibers.[30]

In Thailand, aquatic plants called water hyacinths are used for basketry. The technique dates back four thousand years and has been developed using materials such as bamboo and rattan. Thai basketry, a distinctive attribute of agricultural cultures, has always been sensitive to the use of local resources, generating patterns that appeal to aesthetics, utility, religious rites, and cultural customs. This has resulted in the production of designs unique to Thailand.[16]

On the other hand, arts and crafts with Xia Bu 夏布, a traditional hand-woven ramie fabric, and innovative design methods that combine traditional craftsmanship and modern design have led to innovation in ramie fabric weaving, screen printing, and fabric redesign processes, increasing the economic value of ramie fabric products and their additional value.[17]

Handmade Iranian carpets are also important in culture and art and play a vital economic role. Traditionally, natural raw materials such as dyes and natural fibers such as wool, cotton, and silk, which can be dyed using natural materials, have been used to produce handmade Iranian carpets.[18]

Carpet weaving in northern India, especially in the Uttar Pradesh Purvanchal region in the Bhadohi district,

spread to Sonbhadra Banaras, Mirzapur, and part of the Jaunpur district. It is essential to know the type of carpet weaving produced in Bhadohi Rang, its craftsmanship and quality, the different colors, and many factors involved in developing and finishing the carpet. The handicraft sector in Uttar Pradesh plays an essential role in carpet weaving in the Taj Mahal culture, offering better designs in different prints, and there are more than 500 carpet manufacturing units in the stained city of Bhadohi, making Bhadohi a leading company in hand-knotted and durries, tufted carpet type in the Bandha district.

This industry is a basic South Asian center in the industrial centers of Jammu and Kashmir. In addition, Jammu and Kashmir are known for their silk carpets, which are mostly woven in Srinagar.[6]

Alternatively, grade C kenaf fiber (poor quality) is an alternative material for textile crafts in Indonesia. Low-quality fibers are considered less promising and have only been used for jute sacks. A four-stage investigation focused on design and craftsmanship to create woven and crocheted yarns and fabrics. The result was a solution that adds value to a material and produces trendy materials to develop handicraft products.

Other examples include handicrafts woven from waste palm oil stems in Riau, Indonesia. Knowledge management and innovation affect the sustainable competitive advantage in handicrafts woven from waste palm oil stems.[20]

In addition, the Uranina women are known for weaving mats called Ela or cachihuango from the fiber of the aguaje palm and other wetland plant species in the Chambira River basin, Loreto, Peru. Weaving becomes a sign of identity that unites past and present generations, establishing a link between the master weaver and the young apprentice.[30]

Jinnan embroidery is also a traditional craft from southern Shanxi, China. After an in-depth analysis of its theme and value, it was demonstrated that the embroidery patterns convey long-term aesthetic concepts and the living customs of southern Shanxi.[35]

Meanwhile, a study investigated the results of transforming sugar palm leaf fibers into product designs. The degree of satisfaction with the products was determined at an exhibition.[35] Handicraft industrial products made from palm fiber, in line with the good effectiveness of developing handmade commercial products to add value to palm leaves, brought surplus resources from agricultural areas each harvest season with disposal rates of more than 12 leaves per tree.

Therefore, it is suitable for application in the construction of handmade commercial products due to the leaf fibers' more or less uniform energy processing ratios. In addition, the physical characteristics of the soft fibers, beautiful colors, and good uniqueness mean that they represent a high weight for a fiber line. In this case, it is considered a potential fiber for application in product and furniture design, effectively in line with the development of sustainability objectives through the use of such components.[36]

On another note, hand-woven interlacing is the technique of 'straw' (lattice) in furniture. Stackers are artisans who perform the Indian method of filling furniture with straw. Handcrafted stuffing tends to be neglected today in favor of more industrialized processes. Therefore, it is a craft practice that is in danger of being lost in the municipality on the outskirts of Porto (Portugal), introducing generations to a craft of yesteryear that involves a lot of manual labor and the general public to the industrial heritage related to furniture production.[23]

Likewise, modernist furniture design in the Netherlands and Belgium. Handcrafted items are produced in limited quantities as a study practice and design, encompassing products manufactured industrially in large quantities. For example, the artistic production of the family business and workshop of Wilhelma, Kuyken Jr., has undergone industrialization processes in modernist furniture design.[24]

Similarly, Kolhapuri's handmade footwear stands out for its craftsmanship and design in India. The manual evaluation of sole cutting is carried out using production techniques and ergonomics, conceptualized in the innovative development of a cutting machine that meets the ergonomic characteristics and requirements of the artisans' end users, thus improving their well-being.[26]

On the other hand, woven textile crafts in contemporary commercial contexts are textile and weaving initiatives where culture and fabric meet the modern context and have worked in some way with an external specialist. The examples and weaving initiatives highlight the need to see income-generating weaving responses as part of a process.[37]

Similarly, weaving in Santander, Colombia, has been practiced since the first Indigenous settlements of the Guane, Yareguíes, Chitareros, and Laches, who traditionally process fique, cotton, and other native fibers to make backpacks, sacks, ropes, and clothing. The Guane, Yareguíes, Chitareros, and Laches, who traditionally process fique, cotton, and other native fibers to make backpacks, sacks, ropes, and clothing using horizontal loom weaving.[38]

On another note, the Khurja pottery industry is famous in Uttar Pradesh and is the best-known form of all the arts. There is a different tradition known for handmade pottery in northern India. Pottery is considered the most sensual of all the arts. This is a staple of Harappa civilization, and in Uttar Pradesh, this pottery is known for its different colors: dark black and brown. In Rajasthan, the district of Alwar is popular for its kanji pottery, and Jaipur blue pottery is well-known in India.

On the other hand, jute, known in West Bengal and Bangladesh in the independent era, was the most significant part of jute production in Hindustan. It is a handcrafted product used to create handicrafts and a wide range of products manufactured by artisans with a global market, such as bags, footwear, Bengal jute, wall hangings, and many other products recognized in Assam, Bihar, and Bengal.

On the other hand, the brass and metal handicraft industry in different parts of India is well known, specifically in Uttar Pradesh, Moradabad, also called Petal Nagri, and Rajasthan, where there are various types of brass items, such as vases with figures of Lord Ganesh, table boards, ornament boxes, and wine glasses. These artisans are involved in brass handicrafts known as kansaris, which are manufactured in Rajasthan.

On the other hand, Zardozi and Zari involve creating, designing, and applying silver and gold threads with small pearls and precious and semi-precious stones that increase the value of Zardozi handicrafts. Different intricate designs of gold and silver are made from silk and velvet, which are even used as fabric material famous in India's largest state, Uttar Pradesh. This work was important with silver wires and real gold leaves, but over time, artisans now use a combination of copper wire that is silver or gold polished and a silk thread. The famous centers of Zardozi's work are Lucknow, Kashmir, Agra, Delhi, Mumbai, Ajmer, Chennai, and Bhopal.[31]

The Kanchipuram handcrafted sari has a modern look and some motifs and introduces new bright colors. The state of Andhra is known for its cotton sari with rich gold borders and heavy phal. In the state of Karnataka, which ranges in color from dark grey to earthy tones, one of the famous sari products of Karnataka is the authentic sari, which has a rich color such as pomegranate, peacock blue, and the renowned parrot green. The sari brand in Maharashtra is the paithani sari, which looks best in grey.[31]

Prayagraj moon crafts, such as coasters, tote bags, utility items, and decorative products, are eco-friendly and have the potential to appeal to global tastes.

Badaun is famous for its handicraft product, zari zardozi. This industry is artisanal, and around 35 % of the families in the state are engaged in it. The Bahraich district is famous for its handicraft products made from wheat stalks, and most of the artisans receive state awards from the government.

Ambedkar Nagar has a town called Tanda, known for Terri cotton fabrics and mechanically woven textiles. This district provides much employment, with around 43,000 artisans participating in this craft. Aroha is a city of musical instruments, especially dholes, with around 300 units and more than 1,000 artisans involved in this work. Azamgarh is called the black pottery city of India, and the city of Jaigarh in Nizamabad has around 200. The district is popular for its Bagpat black pottery.

The Banda district is famous for shazar stone, which is used as a decorative element in the Indian jewelry industry. Barley is also renowned for bamboo and zari-zardozi handicrafts. It is also popular for its world-famous carpets, and there are 70,000 artisans and lakh looms operating in the district, with 510 export units.The knotless, tufted carpet is famous worldwide. Bulandshahar, Khurja, is popular for pottery and ceramic work in India. Lakhimpur Kheri is best known for tribal handicrafts because the Tharu tribe of the district is wholly engaged in making these handicrafts with hand-made tools.

Mahoba is famous for its handicraft product, Gaura Stone Craft, which holds a special place in art and crafts. This stone is split into many pieces used to make various handicraft items. The Mainpuri district of Uttar Pradesh is well known for Takashi art, which is used to decorate jewelry boxes, nameplates, and other similar items.[31]

Finally, banana fibers are used in the craft traditions of the Kavalan people of Taiwan, and they are made of materials essential for ecological sustainability and cultural heritage.[32]

Products made from natural fibers

The vernacular dwellings or malocas in the region have proven to be efficient in terms of the environment, human comfort, and culture. Intricately woven palms, layered to form roofs and walls, create enclosures that repel water, insulate heat, and reflect light. Palm weaving has been at the very heart of the spirit of house building in the north-western Amazon in recent decades.[39]

Similarly, native palm species in Mexico, such as the Soyate palm, have been identified as an essential resource for many ethnic groups. Soyate leaves are the most helpful part of the palm and were used in the past for thatching roofs and weaving domestic and agricultural objects.[40]

On another note, global coconut production, mainly for food and oil, generates large quantities of coconut husks left unused after industrial processing. Traditional products such as textiles, mats, and brushes made from coconut fiber are joining new products such as building materials, solid biofuels, and absorbents for heavy metals and toxic materials. Using coconut fiber will reduce waste and increase sustainability.

Similarly, large-scale agricultural production generates organic waste that is discarded, such as rice husks, coconut husks, and wood fibers. Tests have been conducted to manufacture molded pulp packaging from organic waste.[41]

In addition, geotextile fibers such as jute, coconut fiber, sisal, and hemp have wide geotextile applications.[42] Cane fiber is a low-value waste stream in the hemp industry that can be used as an alternative to non-renewable plastics for packaging applications and single-use food service items. A prototype has demonstrated

the overall viability of this fiber source for molded fiber objects.[8]

Nipa palm is resistant and suitable for the manufacture of wicker products. It can also be converted into fabric for use in the design of various products. Weaving it into fabrics adds value to nipa palm and allows the community to maximize its resources and gain greater recognition.[43]

Uttar Pradesh is famous for its leather sector, especially the Kanpur district, which is called a leather city in India. Leather was used not only for the manufacture of fabrics but also for caps, hats, riding shoes, clothing, and footwear, such as Kolhapur chappal, which is popular throughout the country and manufactured in the state of Maharashtra in India. Madhya Pradesh is also recognized for its leather industry in India.

The district of Agra is popular for its leather and leather-related work, such as handbags and footwear. However, this raw material is imported from Kanpur, Kolkata, Chennai, and other countries. Amethi is also famous for its moon products, and different products, such as carrying bags for chairs and tables, are subtle by-products of Chattopadhyay et al.[44] Aligarh is much more famous for its locks, and its hardware products throughout the country are renowned for locks and hardware.

As for Phulkari embroidery, the Panjabi and Haryanvi technology means flower work, which was once used as embroidery but, over time, came to be called phulkari. However, the term has now been restricted to shawls and scarves. It is a type of embroidery with a complex design in horizontal, vertical, and sometimes diagonal patterns. Diagonally. The piece is made of yellow and white, brown silk thread on khaddar cotton and a famous fabric called kasha, a bulbul. These fabrics are brightly colored, complete, and modern, and designers are incorporating this phulkari into different garments, extending its use to jackets, bags, convertible cushion covers, and many more.

Kushinagar is famous for its fiber craftsmanship made from bananas in Uttar Pradesh, which is used to create threads, carrier bags, filaments, vermicomposting of by-products, and organic fertilizer due to the abundant cultivation of bananas in this district.

Now, bags made from natural fibers are the best alternative to synthetics. Jute is one of the most sought-after fibers in the packaging industry. The idea is to produce seamless bags by eliminating current processes in favor of fewer processes. Seamless jute products can reduce environmental impact, boost green marketing, and be an excellent alternative to plastic bags.[45]

As alternatives to plastic in industrialised countries, Jute and kenaf bags in India would reduce plastic waste and its adverse environmental effects.[46,47]

Banana fabrics in footwear production. The physical properties and comfort of banana fabrics have been evaluated for the appropriate use of cow and goat nubuck in footwear applications. The research results indicate that the selected banana fabrics can be used to create footwear.[44,48]

CONCLUSIONS

Three characteristics were identified that may be important considerations for future development efforts: (1) promoting craft education, (2) keeping up to date so that craftsmanship continues to transform, and (3) allowing crafts to reflect the true meaning of life better.

The large-scale industrial transfer of handicraft manufacturing in Taiwan in the 1980s due to high manual costs has made the process increasingly artistic in recent years. The limitation of bamboo's technological materials and the high technological advancement also hindered the inheritance and development of its talents.

Among the handmade crafts based on natural fibers, the bamboo industry in India stands out with its eco-friendly handicrafts, such as baskets, dolls, jewelry, toys, and Waal tapestries. There are also handcrafted products made from wood, such as masks, doors, and various wooden sculptures for windows, rosewood carvings, images of elephants, and furniture made from sandalwood, paper crafts, and sesame wood, which generally provides the raw material for this industry.

Azores straw embroidery is the finest example of European craftsmanship in the 19th century. Traditional arts and crafts are diverse, and the Azores have a unique European tradition: straw embroidery. Using straw for weaving dates back thousands of years, and examples can be found in Belarus, which added this tradition to its list of intangible cultural heritage. In the past, embroidery was used on shawls, scarves, hats, tablecloths, and dance dresses.

Similarly, straw craft in Haiti and Curaçao was promoted as an economic development, with women training to weave Panama hats. The products were displayed at international exhibitions and exported to Europe and the United States.

Among the products made from natural fibers are vernacular dwellings or malocas with intricately woven palm leaves laid in layers to form roofs and walls, creating water-repellent, heat-insulating, and light-reflecting structures. In Mexico, Soyate palm is used to weave domestic and agricultural objects. Coconut shells are used to make traditional products such as textiles, mats, and brushes and to manufacture molded pulp containers from organic waste such as rice husks, coconut husks, and wood fibers.

Universities can establish interregional social practice plans for cultivating creative talent and bamboo

craftsmanship to provide more opportunities for university students to participate in research and cooperation in craftsmanship, culture, and industry. The knowledge and skills learned in the bamboo craft course can be better implemented in social practice to make their learning effective and develop students' cultural confidence in bamboo craftsmanship..

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CONFLICT OF INTEREST

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