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Sustainable Textiles in the Past “Wisdom of the Past: Inherited Weaving Techniques Are the Pillars of Sustainability in the Handloom Textile Sector of Sri Lanka”

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Abstract: The paper aims to identify characteristics of the driving force of the domestic handloom textile industry of Sri Lanka. A qualitative data analysis methodology was chosen for the research. Data were gathered from observational studies and semi-structured interviews. The observational study was carried out in museum collections, scholarly written books, and research journal articles. Semi-structured interviews were carried out with weavers, designers, technical instructors, and administrative officers. Data were analyzed according to observational study, coding, and concept development. Identified characteristics are interlinked with inherited craft knowledge, Buddhist culture, and the networks of people who live and work in a particular industrial society. The industry is developed through hands-on experience and prolonged engagement, where human resources are the key factor. The research scrutinized seven concepts related to the sustainable survival of the weaving structures. Learning is the direct enforcer. The infrastructure is supplied by the Textile Department. The research suggests recognition of a consistent infrastructure supply chain as national policy. The paper recommends to policymakers with the factors found to connect culture with an active action plan.

Keywords: inherited knowledge system; human resource; learning; training; hands-on experience; prolonged engagement; culture and tradition; handloom industry of Sri Lanka



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1. Introduction

The objective of the paper is to identify characteristics of the driving force of the domestic handloom textile industry [1] (p. 3) of Sri Lanka. The objective is examined by addressing two questions which explore the relationship between inherited wearing structures of the domestic textile industry and their contribution to the cultural sustainability of the country. The research questions are as follows,

How does the sustainability of the domestic textile industry relate to its inherited knowledge culture?

What is the relationship between the market demand and the technical application of design structures of their productions?

This research paper focuses on inherited handloom textile knowledge of Sri Lanka. The significance of the research is concluded in several aspects. The basic definition and concept of cultural sustainability and its behavioral pattern are discussed in the context of Sri Lanka. Research findings are significant to the stakeholders of the handloom industry, research, and policy making. The socio-cultural structure is analyzed. The Sri Lankan

handloom textile industry then and now has been analyzed to understand the continuous narration of the industry since ancient times. We record nine weaving structures that are used in Sri Lankan handloom textiles today with the history of development, weaving structure, technical drawing, and color. Characteristics which are identical to the Sri Lankan local context are forwarded. It is emphasized that inherited knowledge is being adapted to concurrent trends that are allowed for sustainable survival. Further, distinguishing characteristics which show an intimately connected link between the inherited craft, the craftsman, the product, and the market have been emphasized. It is viewed as a process of a steady evolution in which human ability grows in terms of establishing new structures, resolving issues, adjusting to ongoing social and cultural change, and working consciously and imaginatively to realize new objectives.

First, the introduction discusses key phases, inspirations, and structural changes of the domestic handloom industry of Sri Lanka from ancient times to today. Secondly, the introduction discusses the relationships between sustainability and tradition and development. A definition and explanation of sustainability is summarized by the views of scholars. It discusses the relationship of culture with some selected creative industries of the world.

1.1. The Domestic Handloom Textile Industry of Sri Lanka

The domestic handloom textile industry of Sri Lanka is economically viable. This identified success is suggested to be sustainable in this research. There are many contributory factors to this success. Of these factors, a large contribution comes from knowledge of inherited weaving structures. This knowledge has been inherited from generation to generation since ancient times and is now driven by a well-structured government body. The inherited knowledge gives identity, cultural diversity, and emotional experiences which is the target selling point in textile marketing of the consumer society today. The industry caters to two main market levels: mass productions for the larger group of consumers and designer productions for a niche consumer market. The second-level niche market is defined by its own unique needs, the exclusiveness of designs, preferences, or identity that makes it different from the market at large, but the cultural identity is higher there. The official website of the Textile Department of Sri Lanka notes its linkage with the heritage which dates to the time of Kuweni, the Princess of the Yaksha clan, who did textile spinning in Sri Lanka in the 5th century BC and the continuing historical relationship with the inherited textile production [2] (p. 123).

Sri Lanka possesses a successful domestic textile history which has continued since ancient times and later it became the most successful handloom industry that earns profits. Traditional knowledge of design and technology has been documented in textbooks that give resource intensity to future usage. Coomaraswamy [3] (pp. 232–236) in *Medieval Sinhalese Art* discusses hand-woven textiles and their inheritance, and families who had the patronage of the King during the period of the Kandyan Kingdom of Sri Lanka (14th Century AD–1815), the material used, color, product categories, domestic looms, and tools and equipment are recorded with illustrations. Is it because scholars of the early 20th century saw the direction of Sri Lankan art and craft headed and discussed a productive future? Sri Lankan traditional art and crafts of today are associated with Kandyan art and craft which was developed during the Kandyan reign (14th Century AD to 1815) of Sri Lanka. Kandyan art has a living culture. Ananda Coomaraswamy records participant observations about Kandyan art and craft in the book on *Medieval Sinhalese Art*. His attempt was like how William Morris developed new consumer art from Victorian art in Britain [4–6]. Coomaraswamy, who was much influenced by William Morris's work, envisioned a similar resurgence of traditional arts in Ceylon [7] (p. 2).

According to Ananda Coomaraswamy [3] (p. vi), the rise of commercialism is to blame for the arts' downfall because the system of production has separated art from labor.

*When nations grow old
The arts grow cold
And commerce settles on every tree*
[3] (p. vi)

His observations paved the way for the sustainable survival and development of art in the future. He defines the differences between traditional art and consumer art as follows: “Today commercial production forbids a union of art with labor” [3] (p. vii). This is the main characteristic of the art and craft production of traditional society. Therefore, tradition needs to join with modern technology to forward ideal innovations to the future as suggested by Huntington [8]. “It is essential that mechanical production should in the future be not abandoned but controlled in the real interests of humanity” [3] (p. vii). For a reunion of art with labor, that machinery should be controlled. “Traditional society art was developed by hand-work on it. To stop competition between machine and hand work in today’s consumer society, we need to intelligently define and delimit the proper sphere by restoring the entire control of production to the actual workers, as in the old guild system. In history, the king or the overlord of the traditional community was the patron. Appointing as associations servants, its craftsmen, and its artists, just as it now appoints its judges, its preachers, its professors”. Coomaraswamy [3] (p. viii) says that art from prophecy to amusement strikes at the root of any possible revival of true art, which has to do, not with imitation, but with imagination. To reunite imagination with technique is as necessary as to reassociate art with labor. Today, the hand-woven textile industry of Sri Lanka is driven by these principles.

1.1.1. Tradition of Textiles in the Kandyan Kingdom of Sri Lanka (14th Century AD—1815)

Design, color, material, and tools and techniques characterize the textile tradition of the past. Woven structures have been handed down from inherited families whose families served the King during the Kandyan Kingdom. During the Kandyan Kingdom, all lands belonged to the King [9] (p. 134). The civilians worked for the King and lived on the King’s land. The caste and land tenure system known as Rajakariya, which assigned professions according to caste, organized the ancient Sri Lankan society. The King granted land (Nindagam) to the service castes in favor of giving them a variety of roles. Each caste had the responsibility to provide the King with a specific type of labor [10] (p. 132). Dumbura and Thalgune, two villages in Sri Lanka’s hill region known for their handloom textile weaving, have carried on the hereditary legacy of indigenous textiles since the days of the Kandyan era.

The weaving of homespun cotton continues in the Kandyan region and its surroundings. Coomaraswamy [11] (p. 203) says “Sri Lankan work is essential cotton”. Cotton yarn was often used for weaving but occasionally silk and linen were also used [3] (p. 238). At Sri Lankan museums, a variety of items are on display. These include bedspreads, handkerchiefs, tuppotti (men’s body cloth), hela (women’s saree), diya-kacci (king’s loincloth), and kerchiefs (mottappiiliya—a cloth for head covering), shawls, pillowcases, belts, mats, and carpets.

Color composition is created through the structure used. Blue and red stripes on white cloth are common. The cloth was colored by dyeing. Colors used were red and blue on white. Many designs and motifs are associated with the Kandyan Kingdom and have continued in the current society.

In the case of weaving two classes, the first was limited in amount, for the court and aristocracy and Indian in style, the second more strictly indigenous seen. It is shown that more Indian weaving techniques penetrated the local tradition. It is clear from the Indian term such as *dik-jala* (horizontal jala) which is used in weaving structures today. *Jala* means net-like pattern which may have been derived from India. Woven textile productions have been revived since the early 20th century. It is seen that hand-woven textile production has been incorporated into a successful domestic industry which is incorporated into

the local economy. Hand-woven textile productions have been revived since the early 20th century. It has been observed that hand-woven textile production has tried to be incorporated into the local economy as a successful domestic industry. Several attempts are recorded. Mrs. Coomaraswamy taught a class of Kandyan girls about inherited embroidery techniques in 1905 and 1906. Prizes were offered through the Ceylon Society of Arts and annual exhibitions were held in 1905 and 1906. Coomaraswamy [3] (p. 242) concluded that “the best evidence of the value of such work, was the interest awakened in old traditions and design”.

1.1.2. Sri Lankan Handloom Textile Industry Then and Now

The handloom industry has developed in leaps and bounds over the years. By the early 20th century, a proper industry had not been developed. Coomaraswamy [3] (p. 242) describes the current market demand for handloom textiles in 1905. If it were not for the demand for bed linens produced by the Kandy Art Association, the industry would struggle to thrive. Later, traditional textile crafts emerged as the top provider of consumer demand.

The handloom industry in Sri Lanka is concentrated especially in the Western, Eastern, Northwestern, and Southern Provinces. Handloom is a household or cottage industry in Sri Lanka, where experienced hands manufacture high-value items. Ukkubanda Dolapihille was sent to Japan in 1906 by Anagarika Dharmapala, who paid for the trip out of his riches, to receive training in textile industry technologies. As a result, the Hewawitharana Training School in Rajagiriya, Sri Lanka, was created on 4 December 1912 as the country's first-ever textile industry education provider. According to records, weaving inspectors were appointed during the British administration in 1920, and by 1945 the country had 198 display centers, 81 weaving schools, and 55 handloom workshops [12] (p. 70). There are 14 textile industry training schools established to sustain the human resources of the industry today. There are two design schools in operation under the Department of Textile Industry aimed at producing trained personnel for the handloom textile industry. The first offers a six-month Basic Training Course and the second a Final Certificate Course in Textile Industry (NVQ Level 04) over 13 months. Male and female pupils who complete the Final Certificate Course in Textile Industry (NVQ Level 04) are recruited to a course (12 months) which is called the Advanced Textile Industry Training Schools of Design. At present, the textile industry training and research activities are carried out here making use of the natural colors in the Rajagiriya Natural Color Mixing Unit. Further, the Research, Training, Designs, and Services Institute was established in Katubedda, Moratuwa. This institute comprises divisions such as the Training School of Design in Katubedda, Museum, Designs Division and Lab. The handloom industry in the nation reached its zenith in the 1960s and early 1970s due to support and encouragement from the ruling party at the time.

In 1965, the Cabinet authorized a plan to establish 1000 handloom centers throughout the country, with the primary goal of employing 25,000 people. The budgeted amount was 18.2 million rupees [12] (p. 80). Each center was supposed to have six looms and teach 25 students how to weave. The weavers of each center were to form co-operative society at the end of the six-month training session. The initiative began in 1966 to promote “Swadeshi Textiles”. Volunteer organizations responded magnificently, with 420 building sites for these centers said to have been provided by individuals. The number of handlooms in the country was predicted to increase to 70,000 after this initiative was completed. Around 70,000 installed looms were recorded in 1967 [13] (p. 22). According to the Industrial Product Regulation Act of 1965 and restrictions on foreign exchange, the country's fundamental textile and garment needs provided a protected domestic market for handloom producers.

The institutions engaged in handloom and power loom activities were responsible for meeting the apparel needs of Sri Lankans until the Department of Textile Industries was founded on 7 July 1977. Before the implementation of free economic policies in 1977, the World Bank performed a survey that found the highest number of installed looms to be 115,000 [13] (p. 2) However, due to different issues, only around 30% of these looms were

operational. The Handloom Industry was concentrated in specific sections of the island during this time, primarily in the Western, Northwestern, Central, Southern, and Eastern Provinces. Cabinet approval of a five-year development plan for 790 handloom villages came in 1990. This plan would add 16,000 more looms to the inventory and employ close to 24,000 people [13] (p. 5). The objectives were then changed to include 40,000 new looms, 60,000 new jobs, and a 60-million meter increase in the annual production of hand-loomed textiles. However, only 193 villages had been built by the end of June 1991, and only about 3000 weavers were employed. The Western Province is the largest contributor, followed by the Eastern and Central Provinces. Approximately 962 private producers are operating, with small, medium, and large-scale units. The export business is dominated by four main corporations. A total of 771 production center were owned by eight provincial councils. Around 15,000 people are employed in the industry, with a large proportion of them being women [12] (p. 80).

Sri Lanka produces ready-made clothing, soft toys, hand-woven carpets, tapestries, upholstery fabrics and curtaining, dress textiles, bed linen, table linen, and stationery items such as writing pads, books, notebooks, and albums with handcrafted covers.

Small and medium-scale producers dominate the handloom sector. There are also some large-scale producers. The following are the three categories in which the industry can be classified export-focused private businesses, indirect exporters, subcontractors, and individual suppliers; provincial councils that oversee the government's industrial facilities; and cooperative-cooperative societies.

The next political regime began in 2005 and lasted until 2014; political imperatives and programs for the development of crafts are considered as being intertwined. The Minister of Industry and Commerce established a Task Force in 2012 to create "a vibrant, globally competitive, and sustainable Handloom Industry with an internationally renowned brand identity" by the president's Mahinda Chintana or Vision for a New Sri Lanka, a policy framework. The Task Force was charged with examining industry issues and developing a business model for the industry's long-term sustainable development. The Task Force concentrated its research on four major areas: marketing, training, design, technology, and entrepreneurship development. They analyzed the whole sector and produced the above cause-and-effect graph showing seven components that have an immediate effect on the resilience of Sri Lanka's handloom sector.

The product, market, profitability, environment, and the 3Ms, or man, machine, and material, are all important considerations. The Task Force, determined the seven factors such as product, market, profitability, environment, manpower, machinery and material have a direct impact on the sustainability of the Sri Lankan handloom sector [13] (p. 11).

Furthermore, the Task Force encourages and facilitates the marketing of handloom products to ensure the industry's long-term viability and maximize benefits to all stakeholders as the Ministry of Industry & Commerce, Export Development Board and (EDB) producers [13] (p. 14).

The research Task Force made two recommendations for achieving the goals of Sri Lanka's handloom textile industry.

1. An export promotion handbook has been produced by EDB and the Department of Commerce. Establish a brand identity, including a name and logo, active local marketing targeted at the tourism industry, and high-end sales through upscale stores and department stores.
2. Involve well-known supermarket companies in production and distribution.

The total value of handloom exports in 2018 was 0.96 million USD, while it was 0.935 million USD in 2019 (Jan to Nov). The top markets for Sri Lankan handloom textiles are as follows: European Union (Austria, Italy, Belgium, Switzerland, Germany, the United Kingdom, Sweden, and France), United States, Australia, Japan, United Arab Emirates, Norway, and the Maldives. The following organizations collaborate with government agencies to address issues relating to the handloom industry to support it: Sri Lanka Institute of Textile and Apparel, University of Moratuwa (UOM), National Enterprise

Development Authority (NEDA), Department of Textiles [14]; Ministry of Industry and Commerce (p. 5).

1.2. Basic Definition and Concept of Sustainability

The basic definition of sustainability is the enduring well-being of human societies and communities [15] (p. 88). The concept is widely discussed in a consumer society in many disciplines such as science, agriculture, engineering, medicine, art, and culture extensively in such wide areas today [16] (p. 215), [17] (p. 3), [18] (pp. 1–2), [19] (p. 877). Therefore, sustainability has become an important topic in every aspect of life, and it has conjoined with the process of development. The history of sustainable development has also evolved as a concept, originating from the science of economics [20] (p. 2).

According to the definition of development, it is “an evolutionary process in which human potential improves in terms of creating new structures, coping with issues, adapting to continual change, and working consciously and creatively to reach new goals” [21] (p. 92). It is a socio-economic situation in a country where the demands of the populace are met through the sensible and sustainable utilization of natural systems and resources. Although at times it was mostly focused on economic activity that led to environmental deterioration and the depletion of natural resources, that definition has evolved in recognition of the close connections between society and the environment [8].

Intergenerational equity is a sustainability trait. Intellectual aspects of a society that have been passed down from generation to generation are processed by cultural capital [22] (p. 15).

This results in three interconnected realms or spheres of sustainability that explain the connections between the environmental, economic, and social facets of sustainable development [20] (p. 8), [23] (p. 681). It was observed that as a progressive movement, human potential is important in development. Further, human capital is key and without it political or economic development is impossible. Culture stands for the norms, values, and identity of a society. Culture stands for the best solutions and practices achieved through coping, adapting, and creating such processes. Therefore, it is observed that culture makes a pervasive influence in all societies. It is because culture itself is an indicator of development.

1.2.1. Culture Suggests an Intellectual Property Economy in Sustainable Development

According to Tipps [24] (p. 208), the traditional cultures’ development is hampered by the rules, beliefs, and values that surround them. Developmental tradition assesses as changing processes [24] (p. 212). Native social and cultural aspects are a significant source of modernity. Considering the structural mechanisms underlying the interaction between societies is advised by Tipps [24] (p. 212). This concept provides the connection with the objective of the paper which is to identify characteristics of the driving force of the domestic economic institute. Further, additional key factors that explain the nature of their political and economic autonomy include the effects of colonial dominance, international political relations, trade, and cross-national flow.

The culture of contemporary civilizations, which is characterized by the accumulation of capital and industrialization, which are compatible with development, must thus be imitated by traditional communities for them to advance [25] (p. 49). In general, this approach aims to raise traditional societies’ living standards through economic development and the introduction of modern technologies [8].

This idea urges us to conjoin traditional knowledge with current technology even in 1976. The concept of sustainable development has expanded. Some theorists stressed on the cultural pillar in sustainable development [26] (p. 33), [27] (p. 5), [28] (p. 5).

The cultural industry, which is another economic area with growth potential, includes the intellectual property economy. Many people agree that the cultural industries and the arts sector serve as platforms for artistic expression and as indicators of regional and societal identity [26] (p. 41). The cultural industries, often known as mono-culture economies, enable a more competitive development platform [26] (p. 46). The field of sustainable

development has been acknowledged as one that protects the environment and uses fewer natural resources [27] (p. 5). The intellectual and emotional components of society, such as values, traditions, and cultural standards, are what some academics refer to as the “culture dimension” of sustainable development [28] (p. 11). Culture is emphasized as the economy of intellectual property in this discussion.

1.2.2. Sustainability Objectives Are Based on Economy, Community, Social Values, and Culture

A critical component of the conversation on sustainability is centered on social and cultural values [27] (p. 5). Scholars argue that sustainable development is incomplete without culture. Keywords of sustainability such as slow lifestyle, recycling, up-cycling, eco-friendly production, and consumption had been merely rooted in life then. In 1999, Sweden adopted the concept that cultural heritage is a driving force of a sustainable society. The Swedish government believes that a connection between natural resources and cultural heritage is essential to the achievement of a long-lasting, high-quality environment. Tourism largely depends on the well-being of inherited art and culture of the country [29] (p. 7). Culture gives the art, heritage, and cultural identity for sustainable development [26] (p. 36). Addressing the “social and economic opportunities and requirements to mainstream investments in cultural heritage and the living arts” is the major goal of the relationship between culture and sustainable development [26] (p. 35).

Cultural marketing in Ubud, Bali [30] (p. 4209) Dakshina-Chitra in Southern India [31] (p. 694), and Chinese lacquer art, China [32] (p. 423) achieved the highest tourist attractions.

In Tokyo, Japan, a special initiative that began in 2002 attempts to inspire kids to try their hand at various crafts during lessons offered in 60 schools and taught by acknowledged professional craft MSEs in silk weaving and ceramics [33] (p. 16). Thailand’s creative industries have been encouraged to use local knowledge and skills to produce handicrafts under the “One Tambon One Product” (OTOP) idea. In 2004, 29,000 productive communities signed up for the initiative, a significant rise from 16,000 in 2003. By 2004, their sales had reached 874 million USD, and by the end of 2005, they were projected to reach 1 billion USD [33] (p. 12). Traditional art and crafts have been based on distinguished communities since ancient times in Sri Lanka. Reed works in Pasyala, pottery in Molagoda, Brassware in Pilimathalawa, handloom textile in Thalagune, and mat weaving in Dumbara are famous tourist destinations which resemble traditional art and craft values. Skills and knowledge are considered as inheritance and the wisdom of the ancestors. The knowledge is strictly given by father to son. They serve at the annual procession at the temple of the tooth relic in Central Province without any monetary gain. Nurse [26] (p. 35) in his book “Culture” identifies four disputed definitions of culture that point to the adoption of attitudinal changes to achieve sustainable growth.

1. A mental condition that has developed, as in “a person of culture” or “a cultured person”.
2. The development processes, such as “culture interests” and “cultural activities.”
3. The tools used in these processes are referred to as “the arts” and “humane intellectual works” in culture.
4. Finally, as “a comprehensive way of life,” “a signifying system,” and a means of expressing, experiencing, and exploring a social order.

According to Mazzocchi [15] (p. 77), “indigenous knowledge may supply, evaluating the principles that govern indigenous relationships with nature, such reciprocity and caretaking.” Through indigenous, perceptive principles, and multiple cultural viewpoints, different cultures and their knowledge systems contribute to sustainability.

Learning from indigenous ideas such as customs and ancient norms and values may aid modern cultures in making better decisions and policies [15] (p. 89).

“We show respect for a plant by accepting its offering with respect” [15] (p. 81). Many indigenous civilizations from around the world share concepts like interconnectedness, reciprocity, and caretaking. Ideal sustainability calls for a giving, reciprocal, and caring attitude as well as a sense of interconnectedness and dependency on the natural environment.

1.2.3. Sustainable Textiles in the Past

Textiles are the world's largest waste today (dyeing, finishing, decomposed material). Therefore, sustainability in clothing and textile has become a well-known area for seeking sustainable ways of production systems. Scholars focus on the concept of an ideology of use rather than materialistic answers. It implies that usage ideology determines the durability, which is helped by materials, design, and construction [34] (p. 236).

Scholars are invited to find better solutions from traditional practices from inherited knowledge [35,36] (p. 80). Scholars try to identify the transcendent qualities of traditional practices. According to Fletcher [34] (p. 230), "the ability of a traditional design process to reach into the life world of the user and influence behavior appears to be weak, and in the context of fashion clothes, weakened further by fashion's social nature, which sees it influenced by human exchanges and actions as well as material objects, rather than just physical objects. There are long-lasting clothes, but they are more influenced by an ideology of usage than by the physical durability or the quality of the interaction between the user and the object".

Traditional knowledge is interwoven with the environmental, cultural, social, and economic four pillars of sustainability, those who are interested in fostering the development of sustainability. In fact, according to the World Intellectual Property Organization, traditional knowledge can aid in the sustainable growth of a community [37] (p. 84). According to Article 25 of the United Nations Charter, "Indigenous people have the right to maintain, control, defend, and develop their traditional knowledge, including to protect and develop their intellectual property over such traditional knowledge [37] (p. 84)".

Traditional literary, artistic, or scientific works, performances, innovations, scientific discoveries, designs, marks, names, and unreleased information would all fall under this category. Environmental, biological, cultural, social, and economic aspects are all linked by traditional wisdom. Traditional knowledge has economic worth, which cannot be separated from other values.

Matale, Thalagune village, and Dumbara designs at Dumbara are famous for unique traditional handloom textiles. They live as textile communities reluctant to share or publish skills, techniques, and designs that they protect as ancient wisdom.

These members also serve in the textile industry with the employees who newly gain education from the textile school. It is observed that they have an identical problem-solving system which is unique to their living surroundings. Their sustainable practices, culture, and tradition are bound with customs, beliefs, and norms, therefore they differ from other countries. Therefore, it is seen that the way of developing a sustainable lifestyle differs due to cultural factors. Handloom weaving and related techniques are supportive factors in their living culture.

Documentation enables traditional knowledge to be ascertained for future references by our next generation. The holders of such traditional knowledge are growing old, and many die taking their knowledge with them to the grave [38] (p. 24). Therefore, documentation of traditional knowledge has its advantages.

The inherent characteristics of the Meghalayan artists in the northeastern part of India indicated a great love for textile art through ancestry, enthusiasm, inventiveness, and pride. External considerations made clear the importance of the local administration, the economy, and the ease of living in maintaining the traditional textile arts in this area [39].

Bali is home to a wide variety of traditional textiles whose knowledge and folklore allude to the abilities and philosophies that emerge in society as a result of the interplay between the diverse cultures, religions, social environments, and natural elements [40]. Analysis showed that despite the ingenuity and invention of the Balinese handwoven culture business, which improved people's desire for preserving their tradition and strengthened their feeling of identity, the cultural worth of handwoven textiles was still present. Further investigation based on the cultural value found that the sustainability of Balinese handwoven textiles is largely affected by local knowledge.

Nationalist groups were gaining ground in colonial nations all over the world in the 19th century. The resurgence of local languages, indigenous faiths, and cultural expressions was a key component of these nationalist movements. Irish traditional crafts were revived in part owing to William Morris (1834–1896) of the Arts and Crafts Movement. Local wisdom plays a pivotal role in sustainable development all around the world.

It is observed from the literature review that sustainability has been a lifestyle in traditional society. Sustainability and culture are inextricably linked together. The evolution of traditional cultures is hampered by the norms, beliefs, and values that bind them. Therefore, traditional societies must imitate to advance. The achievement of sustainability goals depends on local economies, social and cultural values, and a change in attitude.

Indigenous knowledge is based on caretaking which is crucial to indigenous relationships with the environment. According to academics, indigenous concepts including ancient norms, beliefs, and rituals may aid modern cultures in developing better policies and decisions.

The literature review suggests the concept of an ideology of use rather than materialistic answers in analyzing sustainable textiles as a creative process.

2. Materials and Methods

The objective of the paper is to identify characteristics of the driving force of the domestic handloom textile industry of Sri Lanka. In UNCTAD 2011 textiles are part of the valuation of crafts and their contribution to the sustainable development goals focus on south Asia. It focuses on policies for sustainable tourism, strengthening human and institutional capacity, and optimizing the developmental potentials of services [41] (p. 53).

To better understand the issue and improve the reliability of the results, this study combined qualitative research approaches. The following discussion covers data collecting and analysis methods.

2.1. Data Gathering Techniques

In this study, the data were gathered using two different methods: observational studies of museum collections, scholarly written books, and research journal articles and data were gathered from semi-structured interviews. The two methods are briefly discussed below.

2.2. Observational Studies: Museum and Handloom Teaching Observation

Observational visits were made to the Textile Museum in Katubedda attached to the Handloom Teaching School in Moratuwa, in Colombo District during March and April 2022, which showcased the history of handloom textiles in Sri Lanka for nearly 45 years, exhibited an array of woven structures utilized in the handloom industry, Sri Lanka. Observation is useful for understanding people's daily routines and for giving the researcher a glimpse into the interviewee's perspective [42] (p. 39). The visits were made to observe the product categories, materials, different handloom textiles with finishing techniques, woven structures, National Award-winning handloom products, manufacturing machinery and equipment, and portfolios of weaving structures that were utilized in the recent past of Sri Lankan textile history. Additionally, relevant objects and woven structures were visually recorded. The findings were written down on a sheet. The teaching of handloom textile weaving in the school is also observed on the same premises. Studies of the two-year curriculum of handloom weaving and weaving structured observations carried out. Different looms and machinery were utilized for weaving. All the looms were photographed, and descriptions were noted down on a sheet. Woven structures and productions were recorded.

Collections of ancient textiles are on display at the National Museum of Colombo and the Museum of Kandy. Woven structures, design and motifs, colors, and product categories were examined. Textiles belong to the Kandyan Kingdom of Sri Lanka.

2.3. Semi-Structured Interviews

Semi-structured interviews are a common qualitative research method [43] (p. 194) to get the answers to two inquiries that look at the connections between inherited woven structures of the handloom textile industry and their contribution to the cultural sustainability of the industry. In a semi-structured interview, questions are prepared that are consistent and methodical and are guided by defined themes to elicit more in-depth responses to help steer the conversation toward the subjects and concerns that the interviewers want to learn more about, and to incorporate several major themes that will be covered during the interview [44] (p. 245).

- How does the sustainability of the domestic textile industry relate to its inherited knowledge culture?
- What is the relationship between the market demand and the technical application of design structures of their productions?

The interviews ended with an open-ended question asking for additional comments on a variety of handloom woven structures. For conducting interviews, interviewees were selected from the industry employees who were considered ideal since they were awarded National Textile Awards for many years for handloom products of traditional woven patterns with a considerable bent to crafting modern patterns on handloom products. Further, the study was conducted on exploring the sustainability related to its inherited knowledge culture and the connection between the market demand for both the productions' technical implementation to the sustainability of the industry.

The purpose of the interviews was to identify the inherited knowledge and its continuation throughout history, we explore an array of questions to the employees of the industry. Qualitative researchers often rely on the interview as the basic method of data gathering [45] (p. 646). What are the weaving structures that practices in the industry? What are the tools and techniques, material, color, design and motifs, and products related to each structure? Who are the industry employees? What are thier linkages to inherited craft families or traditional education obtained from the industrial school? How do they adapt to the consumer demands of today? What are the infrastructure plans implemented by the administration to earn profit from the market? What are the market levels that they cater to? How to design knowledge and the skill vary according to the market level Such key points were questioned. The interviewees responded in their way. Although the information obtained from qualitative interviews cannot be generalized, its exploratory nature enables the gathering of rich information that can address issues about which little is now known [46] (pp. 391–392). According to Seidman “the desire to comprehend other people’s experiences and the significance they place on them lies at the heart of interviewing [47] (p. 3). The ability for interviewees to respond in their own words, according to how they think and use language, is important. If the researchers seek to comprehend how the respondents view the social milieu under study, it tends to be extremely helpful [44] (p. 243). Semi-structured interviews, for instance, can be used to better understand how people interpret and construct meanings about their roles and work environments [44] (p. 246). We recorded interviews by writing clear descriptions of their experiences and thought processes.

The information gleaned from interviews provides another analytical choice for the “documentary method of interpretation (DMI)” [48] (p. 6)”. Interviewees were selected according to institutional hierarchy and the expert knowledge of each weaving technique. Additionally, the actual interviewing procedure is strictly controlled to ensure that researchers are impartial and consistent throughout all interviews [49] (p. 4). The craft artisans, such as Weavers and Designers, officers such as Provincial Directors, Technical Officers, and Instructors employed in the handloom textile industry, are known for the history and development of the handloom textile clusters in Sri Lanka. Accordingly, 11 interviewees, both male and female, were selected. It was assumed that all participants could accurately identify the woven structures and known evolution of the handloom textile industry in Sri

Lanka. Interviews were held in April and May 2022 with four Weaving Instructors, three Instructors, one Professor of Textile, one senior academic of Textile Engineering, one design in charge, weavers, and one officer in the Textile Department.

Details of the interviewees and the purpose of the interviews are given in Table 1.

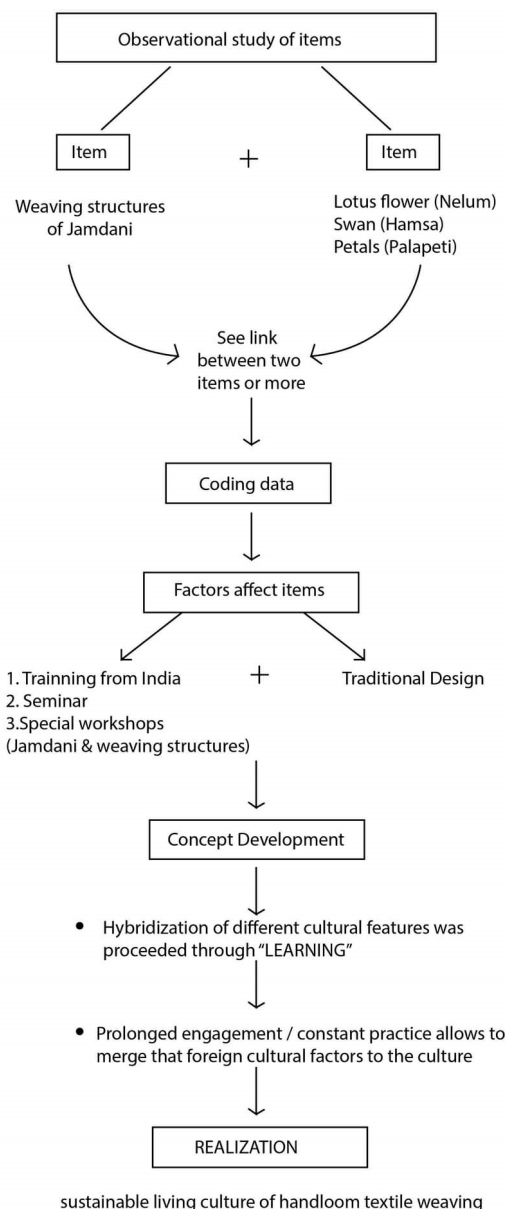
Table 1. Interview summary.

Code	Interviewee Details	Purpose of Interview
Interviewee 1	Weaver	Self-experiences in handloom weaving To understand the woven material behavior and different structures The knowledge gained from Training Sessions
Interviewee 2	Weaver	Self-experiences in handloom weaving Behavior and final look of the different yarns in textile products The knowledge gained from Training Sessions Method of designing Identification of demanding products and designs
Interviewee 3	Provincial Director	Availability of material for the production Production strategy and production target Annual turn over Marketing and selling the products Organizing the Annual Textile Competition Organize buyer-seller forum Capacity enhancement of MOU with State Universities Forecasting new trends Strategies used to motivate weavers
Interviewee 4	Weaver	Traditional weaving practices that hailed from inheritance Current market demand for traditional woven products Traditional folklore about weaving Types of Dumbara woven structures
Interviewee 5	Professor of Textile Engineering	Innovations—Banana fiber handloom products
Interviewee 6	Senior academic with a doctoral in Textile Engineering	Availability of raw material The efficiency of the Supply Chain in the handloom industry Utilizing advanced technology in the handloom industry comparison of the infrastructure available in the past and present
Interviewee 7	Instructor, Textile School	Educational qualification for a professional weaver Quality of the human resources for the handloom industry
Interviewee 8	Retired Teacher, Textile School	An ability to learn woven structures, produce a technical drawing, costing the end-product, and mechanical knowledge of textile production
Interviewee 9	Weaving Instructor	Identification of capability to blend two different woven structures Accuracy of using proportionate woven designs The ability of self-learning capacity Experience gained from overseas training and inspiration from Indian designs
Interviewee 10	Designer In Charge	The institutional procedure of designing and producing handloom textile products Evaluating customer feedback Costing the end-product Considering customer satisfaction and demand
Interviewee 11	Weaving Instructor	The capability of handling weaving shraff designs (native word— <i>polu rata</i>) Own experimentation in handloom weaving Achieved awards for handloom The knowledge gained from Training Sessions Utilizing new knowledge for the Annual Textile Competition The self-satisfaction of the job

2.4. Data Analysis

Data were analyzed according to steps of observational study, coding, and concept development. First, handloom textile-related items were observed and recorded. Then gathered items were categorized according to weaving structures, color, design and motifs, tools and techniques used. Observational study of research items helped to identify the

links between research items and the factors that affect items. Memo-ing was carried out while observing. Identified links revealed themes or codes. Codes themselves show links with the socio-cultural context of Sri Lanka. Coded data were analyzed with socio-cultural factors. Derived coded data explore concepts. The chart below shows how data were analyzed and concepts scrutinized.



3. Results

3.1. How Does the Sustainability of the Domestic Textile Industry Relate to Its Inherited Knowledge Culture?

Data were categorized into different themes which showed similar characteristics to the two research questions of the research.

3.1.1. Weaving Culture Shows a Strong Connection with Buddhist Customs, Rituals, Norms, and Values

Historical roots and development show that inherited weaving structures have been handed down from generation to generation. This section sets out the technical drawings of each basic weaving structure which are currently in use. Dumbara Rata, Mal Baama, Plain weave, and Shaft designs (*Polu rata*) show direct links with native culture, folklore,

and tradition. Weaving culture shows a strong connection with the Buddhist ideology such as customs, rituals, norms, and values. Intricate design patterns and skills are not given by the artisans for recording as they considered it as their hereditary wisdom.

- ‘Dumbara Rata’ weaving technique

Dumbara Rata weaving shows folklore-based design and motifs, color and weaving structure. Rata means designs. Dumbara Rata weaving structures were originally woven in black, ash, and white. According to folk stories, the pattern has a history which goes back to the dates of Kuweni (5th century BC) (a warrior queen of the country). It is said that when Prince Vijaya came from north India, he met her while she was spinning cotton threads. According to the legendary story, she owned a cotton farm in Dumbara in the central hills of the country. When she was expelled by Prince Vijaya later on, she cursed and then burnt the field of her cotton farm. The ashes rose high in the sky and blanketed the land with patterns. Dumbara Rata weaving patterns have taken inspiration from the ancient pattern and continued since then. Beliefs, customs, and norms became a lifestyle, and it is the intellectual property of the handloom weavers today.

During the Kandyan Kingdom, a village known as Dumbara was famous for mat weaving [3] (p. 243,334), (plateXXXIV). It was observed that now they applied mat weaving designs to textiles. Weaving culture has changed over time according to market demand.

“My great ancestors served for the last king of Kandy, Sri Wickrama Rajasinghe. He provided Dumbara mats for the Temple of the Tooth relic annually. That is our responsibility and service to the great Buddha. We live on lands donated by the King. Now we make only wall hangings with many colors. Wall hangings of Dumbara Rata are demanding among both locals and foreigners. We all know folk stories about the history of Dumbara Rata. Our grandmother and relatives told us. I will carry on weaving further”.

(Interview 4, Weaver, 2022)

It is seen that weaving is their lifestyle. Artisans guard inherited craft knowledge. They have identified the value of ancient craft. It is observed that traditional customs, norms, values, and Buddhist culture are the direct factors of the sustainable survival of the weaving culture.

Figure 1 showcases a method of patterning where some weft threads perform the function of creating the design motifs while other weft threads weave the ground fabric. Traditionally the warp and the weft of the ground fabric were both of unbleached cotton yarn. The design picks were colored red, and dark blue, green, and black.

- ‘Mal Baama’ weaving technique.

This is the most common and extensively demanding style in handloom consumers of Sri Lanka since the Kandyan era. Ananda Coomaraswamy records many historical handloom textiles with this technique [3] (plates XXVIII and XXIX). Many ancient textile samples and products are on display at the National Museum of Colombo and the Museum of Kandy. Most of the designs resemble Kandyan-era flora and fauna designs and motifs. Artisans collections, museum collections, consumer’s collections and items that are in the outlets for selling show similar consistency in design and motifs. The total appearance of the art looks like a decoration. Figure graphics are artistically and symbolically developed based on natural figure forms. The most common floral design is the lotus. Sri Lankan culture is based on Buddhism. The lotus is a sacred flower which is interpreted in many abstract forms in every item of the handloom fabrics. Swan is the famous animal motif in handloom textiles. It is believed that swans are competent in distilling milk from water. It is an influential animal that can identify good merit from bad attitudes. Moreover, geometric designs are the most common design element. A traditional form of creepers called ‘palapethi’ is common in this weaving technique.

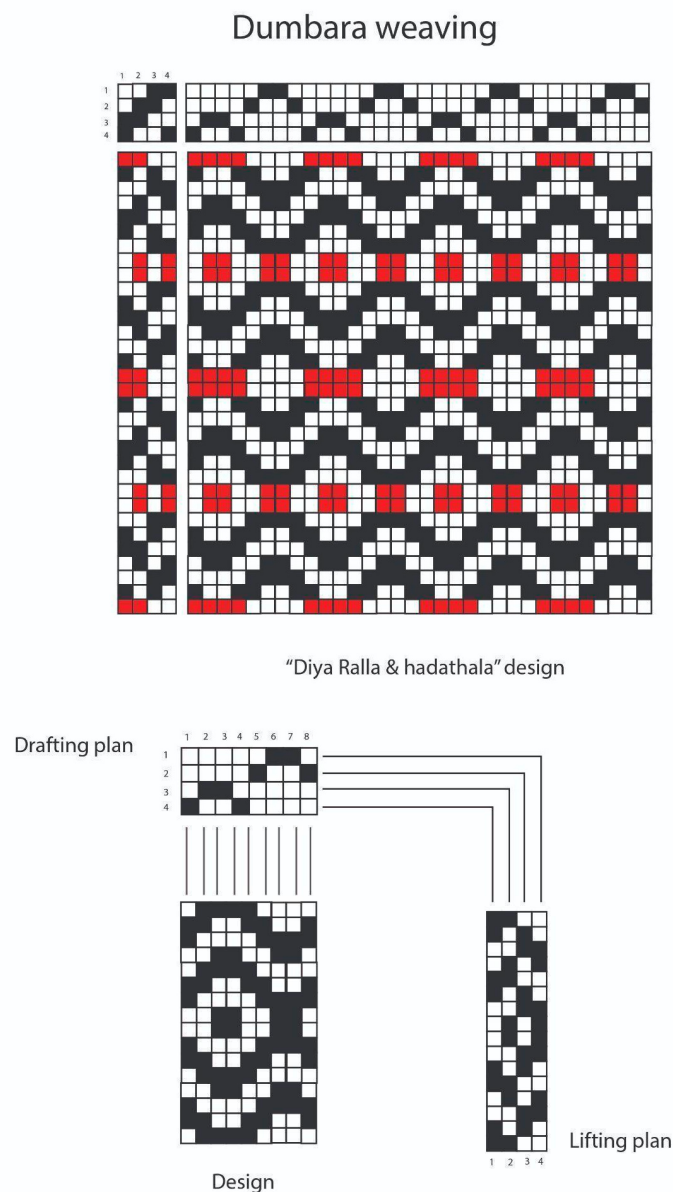


Figure 1. Technical drawing and the drafting plan of Dumbara weaving structure (drawing by KPN Bhaggya).

Mal Baama is shown in Figure 2. Fabrics with intriguing textures can be produced by selecting a weave pattern that varies the proportion of under and over threads. Materials with visual patterns can be created by employing colored threads and, in a similar manner, selecting which threads should appear across the design at particular times. Weft thread should be joined with three shafts and weaved by the pattern. By choosing a weave pattern that mixes the ratio of under and over threads, fabrics with interesting textures can be created. Materials with visual patterns can be fashioned by using different colored threads and choosing which threads appear at the top of the design (over the threads) at certain points in a similar way. Three shafts should be combined and weft thread should be weaved according to the design.

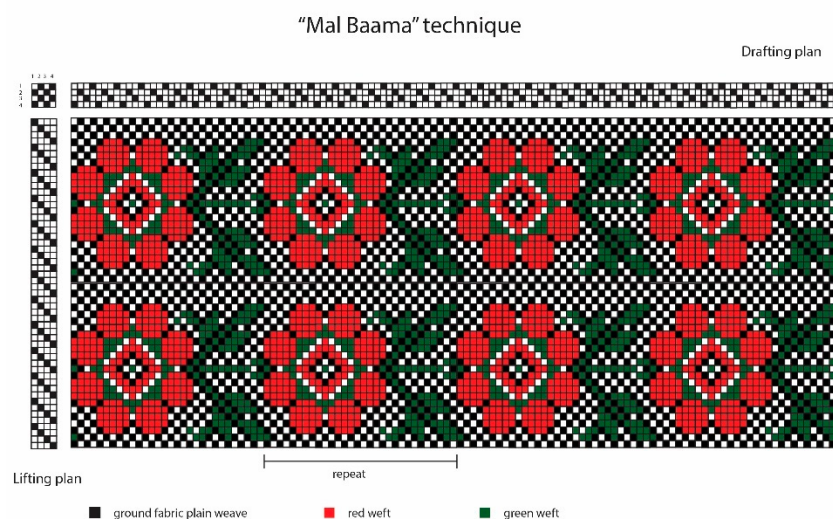


Figure 2. Technical drawing of 'Mal Baama' technique (drawing by KPN Bhaggya).

- Plain weave technique

Figure 3 is known as plain weave which is the oldest and most commonly used weaving structure. Plain weave is woven with each weft thread passing over and beneath each warp thread. Clothes of plain weave were white or limited colors during the Kandyan Kingdom of the 18th Century. The famous Kandyan blue cloth which is traditionally called '*kalu kangana*' was also made of plain weave [3] (p. 233). Except for green (seen very rarely indeed), only the three colors, red, white, and blue are found even in the most ornamental woven cloths. The materials were also made into betel bags. Today, this weaving technique is applied to produce color combination sarees which is the most demanded category among customers. A spectrum of colored sarees is produced today. It was observed that plain weaving has experimented with color application. Natural dye is another area which has been given more attention by the industry. Sustainability presented by the use of natural dyes has been an age-old tradition of Sri Lanka. A dye lab has been established in Katubedda Textile Weaving School for research and innovation in natural dye. Natural dye application is another category in the National Handloom Competition. Recent research by the authors of this article presented natural dye substances, dye recipes, and natural mordants which show the traditional practice of handloom textiles in Sri Lanka [50] (pp. 58–83).

- Shaft designs (*Polu rata*) weaving technique.

Figure 4 shows shaft designs (*Polu rata*). *rata* means designs. This weaving technique uses different heald shafts and foot treadles to weave the fabric design [51] (p. 128). According to the drafting thread pattern and lifting foot treadles pattern, the design is woven in the fabric. Shaft designs (*Polu rata*) are often done in association with four or six shafts (*polu*) to create colorful delicate designs. Six shafts create more intricate designs than four. These designs are known as *mal baama* (creating designs with shafts).

3.1.2. Cross-Fertilization Features to Enrich the Collection of Design and Motifs and Woven Structures from Time to Time

Different techniques and tools have been introduced from time to time. Shaft designs (*Polu rata*), Dumbara Rata (Indigenous weaving designs), Mal Baama, and Plain weave were seen in the retrieved artifacts inherited from the Kandyan era of Sri Lanka. Some products are on display in the curatorial department at the National Museum of Colombo. Most of the original objects are recorded in photographs and sketches. Coomaraswamy [3] (p. 235) says that "some design techniques called *mal petta*, *para mala* and *dethi mala* are mentioned.

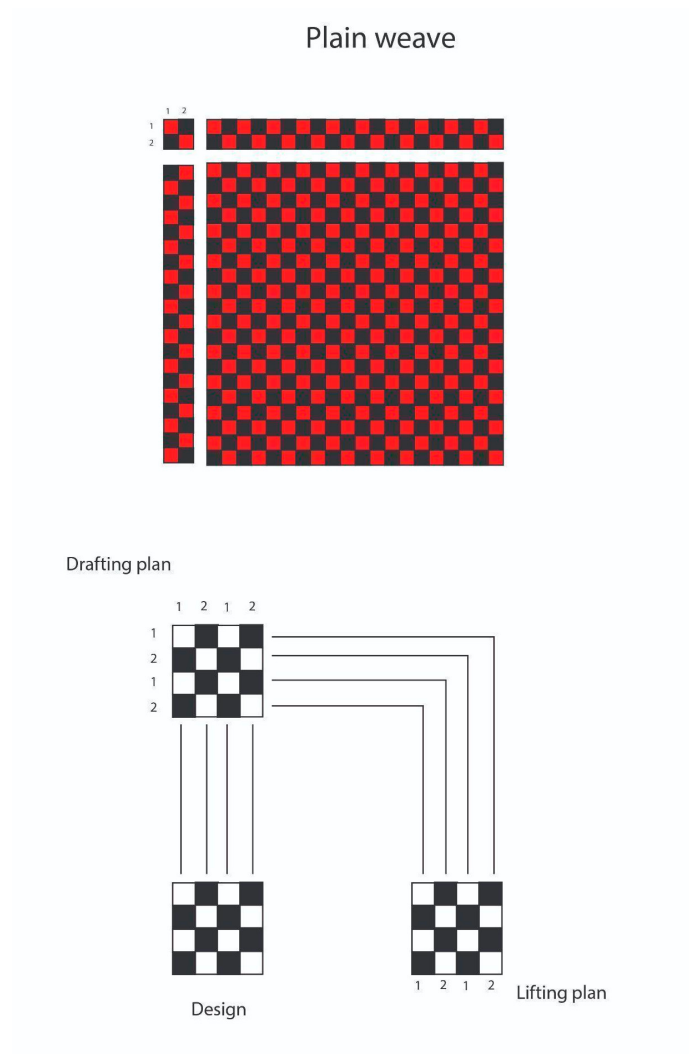


Figure 3. Technical drawing and the drafting plan of the plain weave structure (drawing by KPN Bhaggya).

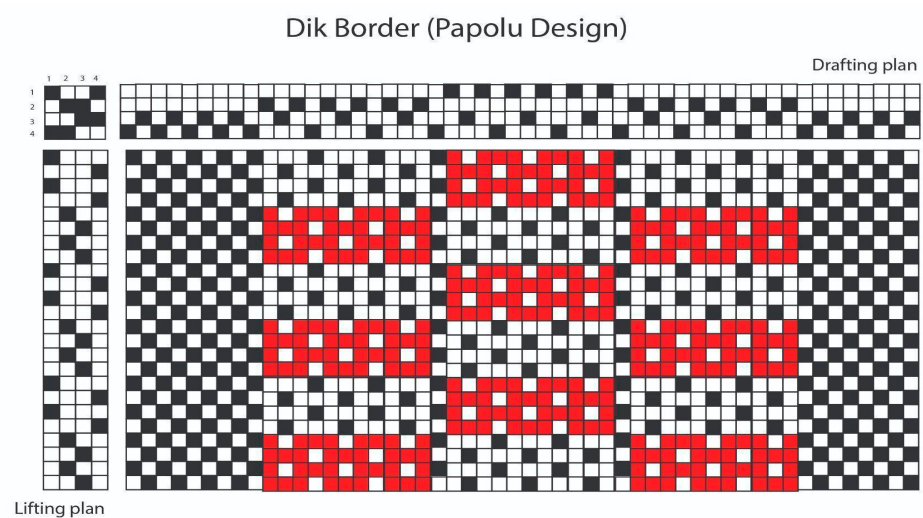


Figure 4. Technical drawing and the drafting plan of creating dik border' (horizontal boarder) design by shafts. (drawing by KPN Bhaggya).

Mala gives the meaning of the flower. The names of the many patterns found on old clothes are now forgotten. Old weaving is considered as a combination of weaving and tapestry and colors were limited to red and blue”.

New weaving techniques were introduced in the 1970s. Interviewers claim that Dobby, Jacquard, Jamdani, Dik border structure, (Dik border is also known as Dik Jala), and Warp printing were introduced by India.

- Dobby weaving technique

Figure 5 is called Dobby weaving technique and consists of small figurative designs (floral or geometric) woven repeatedly into the cloth, created with a dobbie attachment on the loom and a combination of two or more basic weaves. A plastic tape with punched holes that controls the raising and lowering of warp yarns controls the weaving pattern. It has a maximum of 32 harnesses. Dobby is commonly used for borders of sarees.

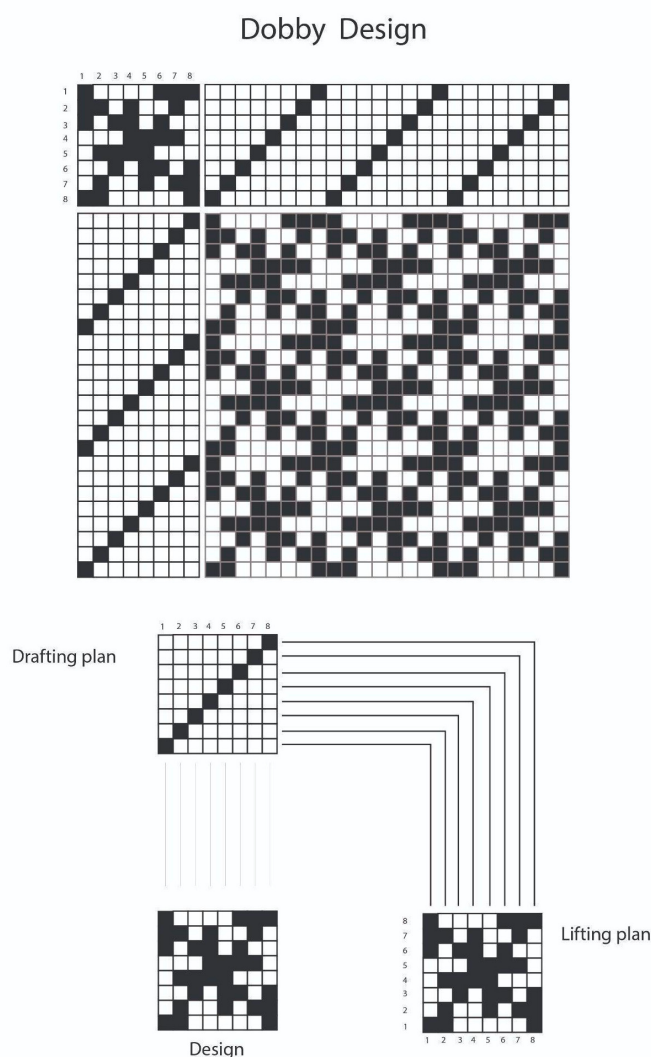


Figure 5. Technical drawing and the drafting plan of dobbie weaving technique (drawing by KPN Bhaggya).

- Jacquard weaving technique

The Jacquard weaving technique, which is depicted in Figure 6, is used to create all-over figured fabrics such as brocades, tapestries, and damasks. It is woven on a loom with a Jacquard attachment to control individual warps. Two or more basic weaves are combined to create the Jacquard weave, with different weaves used for the design and background. The “punch card” control system is what makes Jacquard remarkable. The

extra weft or extra warp in handloom Jacquard design is the design thread that creates the embossed impression on the fabric. One weft yarn is used to weave the ground cloth, and an additional weft is introduced at intervals to form a decorative pattern on the surface of the cloth in an extra weft structure [52] (p. 2864). To accentuate the extra weft, the ground fabric is normally woven with a simple structure such as a plain or twill weave, but various structures can be employed. A set of warp yarns is used for the ground cloth in an extra warp structure, and another set of warp yarn is put up on separate shafts to allow it to be woven independently from the ground cloth [53] (p. 128). Jacquard is commonly used for borders of sarees.

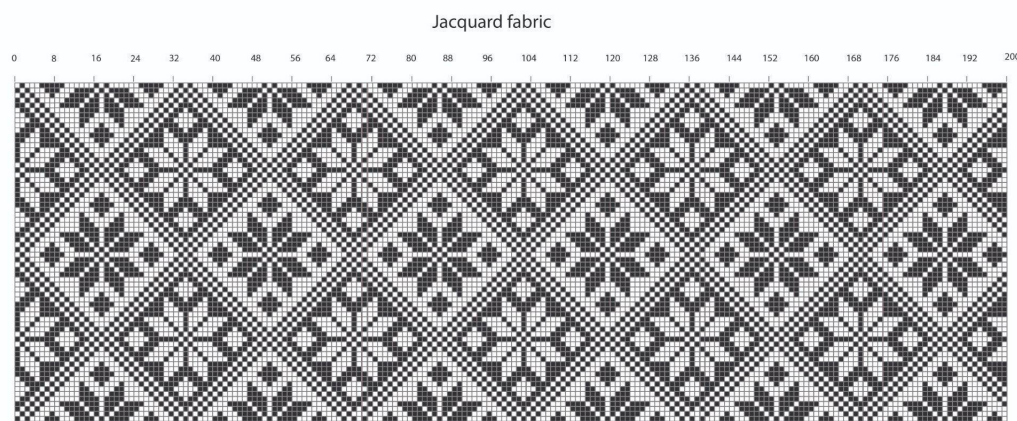


Figure 6. Technical drawing and the drafting plan of Jacquard weaving technique (drawing by KPN Bhagya).

- Jamdani weaving technique.

Jamdani is a weft weaving technique showcased in Figure 7 and is the practice of delicate “Parsi Gara” on a loom. By manually combining a denser thread with the delicate warp threads of Jamdani, designs are inlaid into the cloth. This method is famous in Bengal, India. Jamdani is a weaving method that employs additional or supplemental weft to produce a motif. Interviewers claim that this weaving technique was introduced in India. Now, this technique is used with Sri Lankan traditional designs for handloom sarees. It was observed that the hybrid formation of indigenous design with foreign influence became Sri Lankan. On the other hand, traditional designs meet new technology. These two factors affect their traditional way of life as handloom weavers. These two factors directly affect the cultural sustainability of the handloom textile industry.

- Dik Jala (Horizontal jala) weaving technique

Figure 8 shows the Dik Jala design structure. The Jala technique in weaving involves raising the Warp threads via the Jala. The weaving technique is used to weave the borders of the sarees. Four heald shafts and four -foot treadles are used to weave the “dik jala” design. The key benefit of this method is that it is simple to create a corner design element at the intersection of a border and cross-border design. interviewees claim that this weaving technique was introduced in India. Now, this technique is used with Sri Lankan traditional designs for handloom sarees.

“I have made another machine part for Dik Jala. This is my innovation. It worked. Now I weave neat, beautiful dik jala sarees which are demanding among customers”. (Interview 1, weaving Instructor, 2022)

It was observed that the prolonged engagement of the same skill teaches them solutions. They have their solutions.

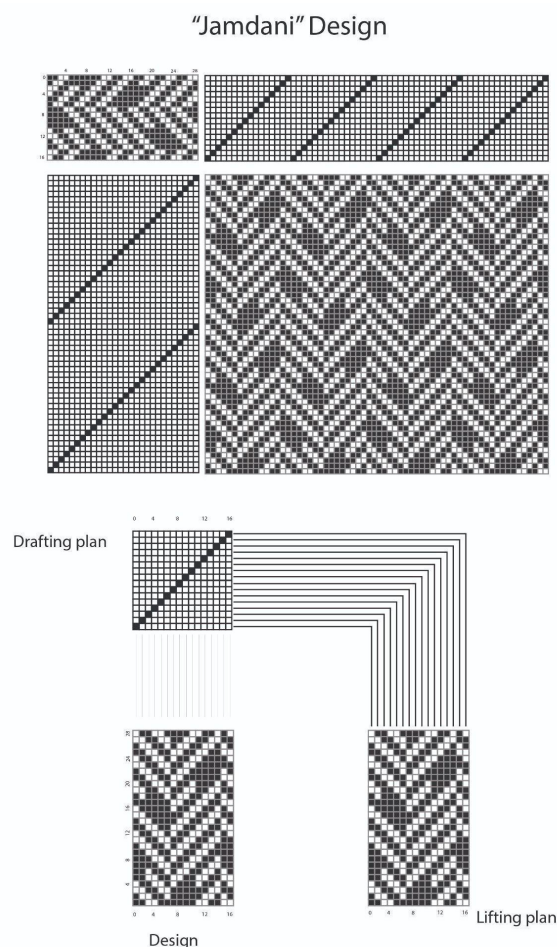


Figure 7. Technical drawing and the drafting plan of ‘Jamdani’ structure (drawing by KPN Bhaggya).

- Warp printing technique.

Warp printing is a method of placing the design on the warp threads shown in Figure 9. The fabric must be a plain woven fabric. The warp threads are painted with fabric dyes according to design motifs. After drying the warp threads, the weaving process can proceed. Interviewers claim that this weaving technique was introduced in India. Now, this technique is used with Sri Lankan traditional designs for handloom sarees.

“I learnt from my father. My grandmother is very skilled in handloom textile weaving. Then I joined the industry. I had 37 years of working experience in the handloom textile industry. Jamdani, Dig Jala, Haras jala, catch card and Warp printing such weaving techniques were introduced in 1970 from India. During 1990 we had a training program in South India. They did not train us; they just wove in front of us. We spent lots of time observing how they weave beautiful designs. As we are skillful at weaving, we could learn those techniques by ourselves. After 1970 textile products were given variety with these newly introduced techniques”. (Interview 8, Retired Teacher, Government Textile school, 2022)

It is seen that education has been continuous during 37 years of experience. Cross-fertilization features entered the weaving culture through education.

3.1.3. Experiential Learning in Weaving Structures with New Yarns

The weaving structure is visualized through yarn, color, and design application. Rayon yarns were introduced in the early 21st century, as were fancy yarns (Interview 1, 2, 3, 4, 8, and 11, 2022). Smooth, rough, glossy, and cozy textile qualities were introduced.

Fancy yarns and yarns made from rayon fibers are used in ceremonial sarees such as wedding sarees. Whole rayon sarees are woven. Rayon and cotton are mixed in designing sarees. Weavers and designers do experiments using fancy yarns in different weaving structures. They are well-experienced, educated, and trained artisans. Some weavers have experimented with combinations of fancy yarns with weaving structures.

“The Provincial Director gave linen fiber. I wove a sarong and a shirt. But I feel that the material is hard in texture. I think if I wash it with soap it will soften. I will try natural softener as well”.(Interview 1, weaver, 2022)

“I had 12 years of experience, we had only cotton yarn until 2003. Then we were introduced to rayon and fancy yarns. It is a glossy fiber. Now I am using fancy yarn for wedding sarees”.(Interview 2, weaver, 2022)

“Dik Jala” Design

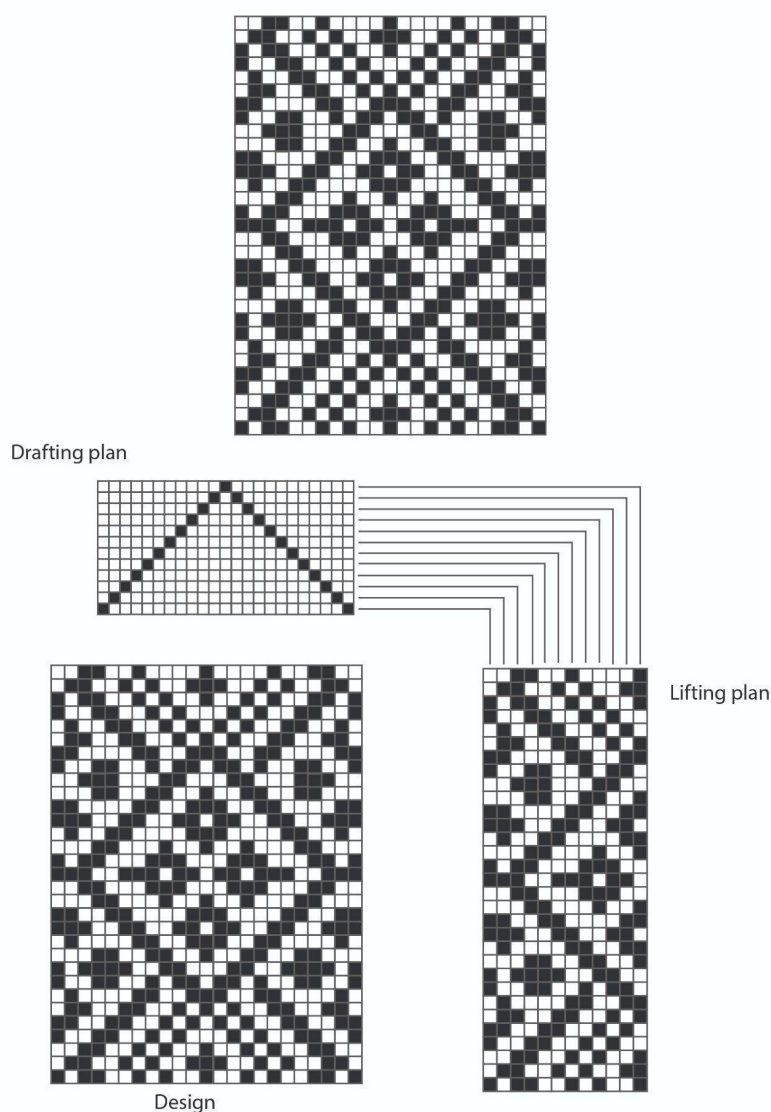


Figure 8. Technical drawing and the drafting plan of ‘Dik Jala’ weaving technique (drawing by KPN Bhaggya).

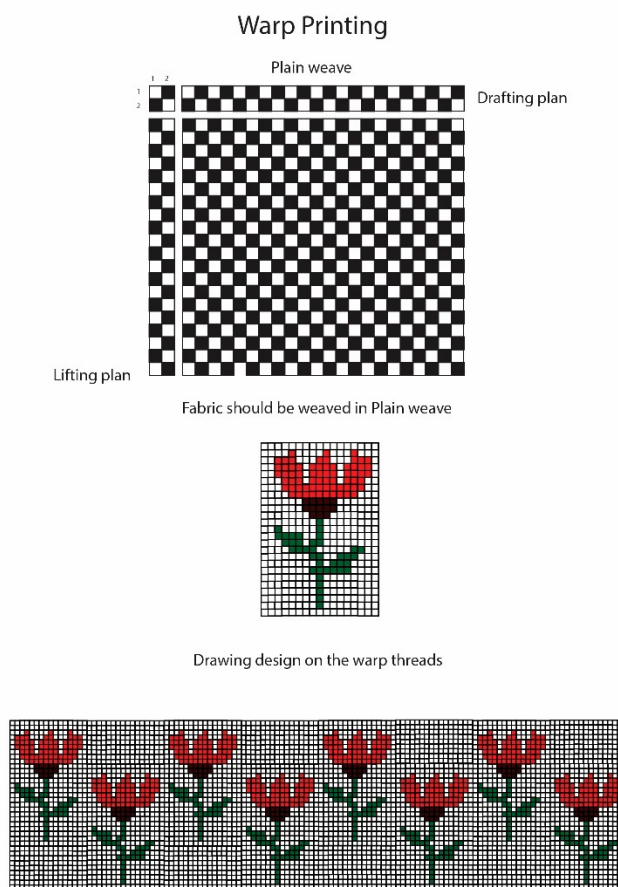


Figure 9. Technical drawing and the drafting plan of ‘Dik Jala’ structure (drawing by KPN Bhaggya).

- Mixing two structures make an innovation: learning through experiments

Employees who had systematic education and were trained at the government textile weaving school tend to experiment with new weaving structures. They do trial and error experiments, change the normal order of the traditional weaving process to create new techniques or mix two techniques to create a new one. New creations were accepted by the design committee and allowed permission for taking orders. These combined design sarees attract customers and receive orders (Interview 1, weaver, 2022). The employee trained the new employees as well.

“I intentionally did. I wove the border of the saree from twill to strengthen the border. I changed the normal order of the weaving of Shaft designs (Polu rata) technique. I combined Shaft designs (Polu rata) and the twill techniques. I did the border from Dik Jala and designs were added to the center of the saree from Jamdani”. (Interview 1, weaver, 2022)

Weavers learn and their skill has been enhanced from their prolonged engagement in the same work.

“I have 22 years of experience. First, I wove designs with plain weave. First, I created designs from only 2 shafts. Now I have experienced doing 2 to 6 or 8 shafts. Because I have been doing this for 22 years”. (Interview 11, Weaving instructor, 2022)

“I have 22 years of experience. I learn from trial-and-error experiments. Hakaback and plain weaving structures don’t go together. Huckaback is good for towels and pillowcases. Shaft designs (Polu rata) go well with plain weaving techniques. Twill weaving technique gives delicate soft fabric which is suitable for clothing material”. (Interview 9, Weaving instructor, 2022)

- Mixing two yarns: An innovative yarn

In 2020, a new fiber created from a mixture of banana and cotton was experimented and it was announced by the Ministry of Industry and Commerce that the attempt had succeeded (Interview 5, Professor in Textile, 2022). Research scholars state that raw material, dye supply chain, tools, techniques, and advanced technology infrastructure should ensure supply consistency to fulfil the demand and supply of innovation. (Interview 6, Senior Lecturer, 2022). This fact is considerable even in the handloom industry today. All yarns and dye are imported from India today (Interview 3, Provincial Director, 2022). In the past, the infrastructure was established in the local context. Sri Lankan woven textiles are essentially cotton in ancient times. It is said that cotton was extensively grown in Sri Lanka since ancient times [3] (p. 235).

3.1.4. New Technology for Traditional Tasks of Weaving

Traditional tasks associated with weaving are modified with new technology. Spinning is a time-consuming task. In 2019, with the collaboration of the University of Ruhuna, the Southern Province of Textile Department developed an effective machine for spinning. It reduced the cost and saved time and energy (Interview 3, Provincial Director, 2022). Semi-automated winding machines were developed with the collaboration of the University of Ruhuna. Three machines were given to three centers in three districts: Poddala center in Galle, Vellamadama center in Matara, and Dammulla center in Hambantota.

3.1.5. Inherited Traditional Knowledge Is Protected by Imposing Rules

European designs and motifs are not allowed for the Annual National Textile Competition. Rules and regulations of the competition are documented and handed over to panel of judges before the commencement of the judging. Competitors are given awareness through Instructors and Designers of each Provincial Council Department before the preparation of the products for the annual competition. Weavers and designers are given traditional Sri Lankan designs from the book of Ananda Coomaraswamy's *Medieval Sinhalese Art* at their annual training, seminars, and the weaving textile school. Therefore, as the norm European designs are hardly practiced in handloom textiles even for the local market. Due to prolonged engagement of the system, all employees are pertinent to the survival of the structure of the existence of the industry.

"I have participated in several workshops where I had a good opportunity to observe traditional designs of birds, flowers, animals, creepers, and geometric designs. During the workshop, I drew a technical drawing of traditional swan (hamsa) design, lotus flower and geometric designs. because those designs are demanding in the local market. It took time. Because there were so many details to be drawn accurately and proportionately. Then in the evening, I experimented on a table loom to practice my technical drawing of (swan) design. I learned a lot. Now I am practicing these detailed designs for sarees". (Interview 9, Weaving instructor, 2022)

"I absorbed many advanced techniques by observing how Indian weavers did, sometimes I copied Indian designs and used them in weaving. But I am careful not to take too many Indian-looking designs". (Interview 9, Weaving instructor, 2022)

"In 2000 pethampili (a weaving technique) designs were at a basic level. Those days we didn't do weft pethampili, we did only pethampili for warp. Now pethampili is done for both warp and weft lines. I do lots of experiments with pethampili. I experimented with pethampili with natural dyes and tie-dyes. I won a Golden Award at the Annual National Handloom Competition for a saree of pethampili that was made of both warp and weft lines". (Interview 11, Weaving Instructor, 2022)

3.1.6. Both Traditional and Contemporary Knowledge Is Institutionally Structured

The artisans who have education from the textile schools are recruited in each district's department. A range of subjects weaving, designing, coloring, raw material, machines,

marketing, and administration particular to the handloom textile industry are taught at these schools.

“I studied the basics of textile weaving. Maths related to textiles. There, recognition of yarn, yarn counting, yarn numbering techniques, costing, technical drawings, around 40 weaving techniques and mechanical drawings are taught”. (Interview 8, Retired Teacher, Government Textile School, 2022)

Employees who complete and get through the examination after two years are recruited to the Textile Department. Therefore, the industry comprises educated, trained, and skillful employees (Interview 7, Instructor of the Government Textile school, 2022). New professions are created according to the demand such as dye master, designer, merchandisers, and development officers. According to the administrative regulations, Designers, Instructors, and Marketing Officers are given comprehensive training programs throughout the year from time to time. Apart from that, according to the regulation all the employers of each category of the Textile Department must undergo twelve hours of training per year. The authorities make sure to conduct these training schedules each year to further the development of the industry. The progress of the training programs is evaluated in a five-year strategic plan (Interview 3, Provincial Director, 2022). It was observed that experience and training help them to identify more advanced techniques and designs.

“I had training in India. I absorbed many advanced techniques by observing how Indian weavers did, sometimes I copied Indian designs and used them in weaving”. (Interview 9, Weaving instructor, 2022)

3.2. What Is the Relationship between the Market Demand and the Technical Application of Their Productions?

3.2.1. Production Priority Is Given to Demanding Textile Designs and Products at the Market

The product range has increased due to customer demand throughout history. During the Kandyan Kingdom, items such as mats, quilts or sheets, carpets, pillowcases, aprons or bathing drawers for men, kerchiefs or shawls, or towels were produced [3] (p. 232). Today, the product catalogue of the Annual Textile Competition indicates 19 product categories. The weavers and designers are being educated about world handcrafts by the internet. They tend to create new designs for the annual textile competition taking inspiration from global demanding products, shapes, techniques, colors, and materials (Interview 9, Weaving instructor, 2022).

Designing is often dependent on the availability of material and Color. Designs are copied from the textbook given by the weaving textile school of the Department. The design committee also recommends designs. There are resources which provide designs to weavers such as textbooks, design schools, and design committees.

The Textile Department has noticed that during the last 5–6 years (2018–2022), demand factors have risen dramatically for design sarees (Interview 2, weaver, 2022). There was a shortage of importing thick threads (2/30) which were used for designing. Therefore, they have stopped fewer demanding products which were designed as pillowcases and created sarees only. This situation has increased during the COVID-19 pandemic period and due to the economic crisis of the country.

3.2.2. Annual, Monthly Events Forecast New Customer Demands

The Annual National Exhibition forecasts new customer demands. The award-winning sarees are reproduced on customer demand. Therefore, instructions are given to keep a technical sketch of the saree. In 2021 the Mahamodara outlet of Galle District was able to sell 90% of award-winning design sarees. There was a dramatic demand for *pethampili* sarees during 2019/2020. The demand is also high for color combination sarees and bedroom sets (Interview 3, Provincial Director, 2022).

The annual competition is set in two steps. Products are selected from the provincial level by a particular panel of judges. Then, selected products are sent to the national

level and judged by the national team of judges. A range of products is presented for the competition. After the competition at the provincial exhibition and at the national exhibition many productions are sold at a high rate. There are a considerable number of weavers who are competent in intricate woven structures. It was observed that weavers tend to create intricate designs by using complex structures only for the Annual National Textile Competition known as “Ransalu”.

“I utilize the knowledge acquired from training sessions to present an excellent product for the Annual Competition. I use simple weaving techniques to produce sarees for today’s normal orders”.(Interview 11, Weaving Instructor, 2022)

However, they do not often practice them. There is a fixed rate paid for each product at their weaving centers. The weaving centers assigned a target number of products for each weaver for each month. One weaving center is given 750 production targets for a month and depending on the above adjustments it is enabled to fulfill the target (Interview 2, weaver, 2022). The most demanding products are made due to the availability of material and color. Each weaver who exceeded the target number is paid an incentive. Incentives are paid for several tasks, including dyeing and weaving. The weaver is paid 5% for 1 m (Interview 3, Provincial Director, 2022). The target consumer is the government official who often wears an official dress *saree*, *ohori*, or a shirt for duty. The Textile Department organizes a Trade Fair once a month in government offices, and schools, and allows consumers to buy products on an easy payment system which is very famous among the government officers in Sri Lanka. This easy payment system removed all the barriers of cash in the hand buying system. The total amount for the products will be deducted from their monthly salaries at a minimum rate (Interview 3, Provincial Director, 2022). This system is convenient to the consumer and ultimately, they tend to buy local handloom products. Therefore, it is always exceeding the expected profit of the Handloom Textile Industry.

“We have enough work, and we are well paid for the target work”.(Interview 11, Weaving Instructor, 2022)

In this system, it was observed that some common product categories with moderate designs are the target selling point of the mass market. Weavers are reluctant to sacrifice their overpaid incentives to carry out experiments with intricate woven structures which take time and a lot of energy and have not been paid an extra amount. As a result of the lack of weaving in such intricate and complex woven structures designs, there are hardly any such products available in the current mass market.

Customer demand is observed by the feedback given by the customers to the in-house weaving technical officer at the outlets. There is a monthly committee in each province to evaluate the progress of their sales composed of Provincial directors, Instructors, and Designers. The Chief Designer of the committee and the technical experts evaluate the customer feedback and give necessary guidelines to fulfill the demand. At this meeting, the committee is focused on the cost per meter against the required design. They tried to give the best solution to the customer demand and satisfaction. (Interview 10, Designer In charge, 2022).

The buyer-seller forum is important in identifying the textile demand (a buyer-seller program that permits pre-scheduled interactions between exhibitors and buyers from domestic traders) (Interview 3, Provincial Director, 2022). This forum is set up by the Provincial Council after the Provincial competition is over, inviting outside business parties to buy their existing products. This forum allows businesses to connect directly with key buyers to meet and do business.

4. Discussion

There is a direct correlation between sustainable survival of the handloom weaving structures with Buddhism, inheritance, knowledge, customs, folklore, norms, values, traditional education, modern education, traditional institutions, and today’s government

institutional structure. The direct factors are discussed according to two questions of the research.

4.1. How does the Sustainability of the Domestic Textile Industry Relate to Its Inherited Knowledge Culture?

4.1.1. Traditional Customs, Norms, and Values Are Based on Buddhism

Most common designs and motifs resemble the philosophy of Buddhism, and they are represented in cultural practices of Buddhist religion and lifestyle as discussed in the results points in Sections 3.1.1 and 3.1.2. Sri Lankan art and craft were based on Buddhist culture. The most common designs in the handloom textile products are the lotus flower and swan. The lotus signifies purity in Buddhist culture. The swan is a symbol of the good merits and bad. These textile motifs have been continued since ancient times to the present day emphasizing the cultural link between the past and present. “The values seem to be path dependent” [23] (p. 49). Therefore, the belief systems are so robust and enduring, it is impossible that the traditional value system will lose its power [23] (p. 49).

4.1.2. Inherited Craft Knowledge Is Preserved by Artisans

The artisans are reluctant to expose their skills, tools, and knowledge for public usage as pointed out in Sections 3.1.1 and 3.1.2. The inherited textile knowledge is considered a treasure and the ancient wisdom of their ancestors. On the other hand, they use their maximum capacity to compete in the annual competition to produce the most identical traditional handloom product. The artisans identify the demanding value of inherited knowledge. They take care of the knowledge; the knowledge takes care of them. This attitudinal caretaking is seen in *Dumbara Rata* weaving technique (Indigenous weaving technique). There is a living culture in the concept of art and living. Designs, colors, and weaving structures are recorded in folklore which gives Sri Lankan cultural identity.

4.1.3. Cross-Fertilization Features to Enrich the Collection of Design and Motifs and Woven Structures from Time to Time

Traditional design and motifs, tools, techniques, materials, product categories, color, and market have been influenced and increased by foreign trends from time to time. Foreign training, seminars, and workshops helped to increase the cross-fertilization features of the industry as pointed out in Section 3.1.3. This shows how inherited knowledge developed through hybrid culture and fertilized with different cultural values. It was observed that traditional craft knowledge has been modified by modern technology as pointed out in Section 3.1.4. Traditional handloom textiles were influenced by multifaceted machines such as Dobby, Jacquard, Jamdani, Dik border, and Warp printing, the researchers identify that traditional Sri Lankan designs are woven in Indian introduced handloom machine called ‘Jamdani’ signifies cross-cultural features of a living culture. “Tradition changes; it is not stagnant” [23] (p. 49).

4.1.4. The Knowledge of the Weaving Structures Survived through the Constant Practice of Artisans

Artisans are Systematically Involved in Constant Learning as pointed out in Sections 3.1.1–3.1.5.

The practice is demanded by a sound market. Both traditional and contemporary knowledge is institutionally established. In the traditional society, youngsters learn from the elders of the family. Today, it is identified that systematized training and pedagogical structure lead the way in the industry. As in Japan, and Thailand, identified learning and training are proactive tools in protecting the heritage [31] (p. 16). The Department arranges annual workshops, seminars, and foreign training, and implements a research center for each province to encourage employees to increase their creativity. Human resources are craft artisans who are the employees in the industry. Technology will only be a facilitator. The human touch of a product is unique. Identity and authenticity are the most demanding selling points in both high-end and mass markets. “Products must transform into crafts of

use and cultivate and amplify the skills, habits of mind, and abilities of users to generate more inventiveness and longevity [32] (p. 236)".

4.1.5. Traditional Technology was Modified with Concurrent Technology

It was shown that traditional technology was modified with concurrent technology during the course of time as Pointed out in Sections 3.1.3, 3.1.4 and 3.1.6. That helped the survival of the traditional knowledge, innovations, and adaptation to consumer society. Techniques were combined to create an innovation. New material introduction and increase in experiments are key turning points in adapting the traditional system to modern society. Inherited knowledge successfully walked from the traditional society to consumer society. This fact suggests that tradition needs to cooperate with concurrent technology.

4.2. *What Is the Relationship between the Market Demand and the Technical Application of Design Structures of Their Productions?*

4.2.1. Production Priority Is Given to Demanding Textile Designs and Products at the Market

Textile designs are the demanding factor as pointed out in Section 3.2.1. It is seen that product range has been increased due to gradual consumer demand.

4.2.2. Annual Competition and Exhibition, Monthly Trade Fair, Buyer–Seller Forum, and Design Committee Meeting Constantly Identify the Most Demanding Customer Selling Point in Handloom Textile Productions

National exhibitions and the competition added value to the industry. Methodically and systematically selected artisans are awarded annually. Imposing rules and regulations on the handloom industry employees of the traditional design culture are protected. It was observed that artisans identify the event where their art and craft knowledge and skills are evaluated. Their target customer is penetrated through lower level to high-end designer level from annual competitions, trade fairs, and exhibitions. Traditional weaving techniques are presented in a variety of products, at their peak of traditional art and craft value. Therefore, it is seen that the handloom textile market is stabilized in the local cultural context.

5. Conclusions

The discussion section scrutinized seven concepts related to the sustainable survival of the weaving structures' handloom sector in Sri Lanka. Learning is the direct enforcer. These concepts are recommended as the survival-driven forces of the industry. The weaving structures, design and motifs, and color of the handloom industry were based on Buddhist culture. There is an existing living culture. The living culture of handloom textile has been continuing through continuous learning of many weaving structures since ancient times. The learning enabled making an identity and demand in weaving structures. Artisans are persuaded to learn weaving techniques, design and motifs, and color from their education system. It is seen that there has been a consistency in forwarding design applications since ancient times. The same traditional design and motifs have been used since ancient times. In the 1970s, a variety of weaving techniques were introduced. This collection of weaving techniques provided ample opportunities to produce various products with traditional designs and motifs. The product range has been increased. Inherited knowledge was passed down from ancestors to the new generation from learning and practicing. The new technology of weaving structures is fused with traditional knowledge. It was noticed that newly learnt knowledge of weaving structures became a tradition through practice. Then, the next factor shows that training, seminars, and workshops with such a variety of learning styles enable a bridge between traditional knowledge and new technology. Innovation on material tools developed through a creative learning process which is being tried to address the millennium customer desires. Annual national exhibition and competition, monthly trade fair, buyer-seller forum, and design committee meetings where customer demand, availability of material, durability, and cost factors overlap and juxtaposed give insight into the most economically and culturally viable products.

This found identical authentic learning structure has been adapted in today's industry. The ancient textile industry was taken care of by the King. In ancient times, their art and craft were modified and evolved through education gained from inheritances. Artisans who were involved in learning art and craft were involved in the occupation as well. Traditional social organizations protected both art and artisans. Today, the same structure has been reformed and organized to protect the artisan and the industry. The artist is accommodated in a structured institute where the artisan acquires constant learning as training. The learning introduced them to new technology, foreign trends, tools, techniques, and materials such as infrastructure, which industry requires constantly. Learning gives insight and the ability to the artisan to adapt to today.

The industry is developed through hands-on experience, and prolonged engagement, where human resources are the key factor. The infrastructure is supplied by the Textile Department. The research suggests recognition of a consistent infrastructure supply chain as national policy. The paper recommends policy makers with the factors found to connect culture with an active action plan.

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