THE TRANSFORMATION OF AI TECHNOLOGY IN TENUN PAHANG MOTIFS

Norbayanti binti Abu Bakar[1], Ahmad Zainuddin[2], Jamal Rizal Razali[3]
[1]UCYP University, Pahang, [2]Malaysia Design Council, [3]Universiti Malaysia Pahang Al-Sultan Abdullah
norbayanti@ucyp.edu.my, rahim_zainuddin@yahoo.com, jamalrizal@ump.edu.my

Abstract

This paper examines the transformation of Tenun Pahang (TP) motifs in both design and pattern development. Originating from Pulau Keladi, Pekan, Pahang, this traditional handicraft is believed to have been introduced from Sulawesi to Malaya approximately 300 years ago. Employing a qualitative methodology, the study combines field observations and interviews to document the diverse motifs created by local weavers. Two key informants were interviewed: a descendant of the eleventh generation of Karaeng Aji credited with introducing this weaving tradition to Pulau Keladi and a young weaver who produces numerous motifs in response to contemporary trends. The findings reveal that Tenun Pahang (TP) artisans have begun a transformation process by integrating AI technology into the design of modern products, while continuing to draw inspiration from the natural environment. This transformation reflects the artisans' capacity to meet changing market demands while preserving Malay cultural traditions in the era of technological innovation.

Keywords – Tenun Pahang, AI Technology, Motifs, Transformation

Introduction

Tenun Pahang (TP) is one of the Malay cultural heritages in Pahang that holds historical value, identity, and symbolic importance within the Malay community. The motifs of Tenun Pahang (TP) are not only decorative in nature but also carry meanings and philosophies that reflect customs, beliefs, and local wisdom. Among the commonly used motifs are those inspired by flora, fauna and geometric forms arranged according to the principles of balance and harmony. However, in the modern era, Tenun Pahang (TP) faces significant challenges as younger weavers are increasingly less interested in continuing the traditional motifs that have been inherited for generations. In terms of demand, weavers must also compete with the modern textile industry, which is faster and cheaper. Therefore, the exploration of new technologies such as Artificial Intelligence (AI) is seen as a path for transformation by reconstructing traditional motifs into contemporary designs through AI technology without losing their original identity.

This study is also conducted to identify the potential of AI technology in assisting the design of more modern motifs that meet current market demands without compromising the identity of Tenun Pahang (TP) itself. The identified problem is that AI technology is still new to weavers and requires a considerable amount of time to learn, which causes delays in the weaving process. The main issue is that weavers remain bound by the production of traditional motif designs, and there is concern that the transformation of AI technology could lead to the extinction of Malay aesthetics. This is because the new designs tend to emphasize market demand rather than symbolic meanings that are significant to the Malay community.

Therefore, this study analyses the transformation of Tenun Pahang (TP) motifs through the exploration of AI technology as applied to motif design. Through this approach, the study is expected to contribute to the preservation of Malay cultural heritage while expanding creativity in design based on AI technology.

Method

This study employs a qualitative approach encompassing research design, observation, and interviews. A theoretical analysis was undertaken to provide deeper insights into the current state of Tenun Pahang (TP) and to examine the challenges faced by weavers in developing TP motifs through the integration of AI technology. This approach is deemed necessary as previous studies have not sufficiently addressed the intersection of traditional weaving practices and technological innovation. At the preliminary stage, the research design was structured to systematically align with efforts to resolve the identified research problem and to establish a framework for subsequent inquiry.

According to Creswell (2014), qualitative research is regarded as an inquiry process aimed at understanding meaning and exploring social issues. The data collection in this study drew on both primary and secondary sources. A phenomenological approach was adopted as the study seeks to generate findings that explain the phenomenon of the role and influence of AI on Tenun Pahang (TP) motifs, particularly in relation to the transformation from traditional to contemporary designs. This approach enables the researcher to construct a more complex and holistic understanding while providing detailed descriptions of the role and influence of AI on Tenun Pahang (TP) motifs, making it highly appropriate for exploring the research problem in depth. Primary data were obtained through structured interviews with two informants: one being the 11th-generation descendant of Karaeng Aji who still practices traditional motif design, and the other a young weaver who is also a lecturer at the Institut Kemahiran Tenun Pahang Diraja (IKTPD), producing more modern and contemporary motif designs. These informants were selected based on their qualifications and relevance to the research topic. The researcher posed questions to the informants to obtain information related to this study, thereby gaining deeper insights to achieve the research objectives.

This study also employed thematic analysis, which aims to identify, analyze, and report patterns (themes) within the data. This process involved systematically organizing the data to identify recurring themes. Overall, this analytical strategy was used to examine differences in the informants' perspectives on the roles and functions of AI, the challenges and threats it presents, and how they perceive AI within the textile industry, particularly in the context of Tenun Pahang (TP).

Furthermore, this study is supported by a theoretical foundation that underpins the research. The theory applied is Syed Ahmad Jamal's Theory Rupa dan Jiwa (1992), which serves as an aesthetic framework in the study of motif transformation in Tenun Pahang (TP). This theory positions AI technology as a tool to preserve, reinterpret, and renew the aesthetics of Tenun Pahang (TP) motifs while remaining rooted in Malay cultural values. In this context, the aesthetic framework is employed to examine the transformation of Tenun Pahang (TP) motifs, which encompass geometric forms, floral and fauna

motifs, traditional color applications, and weaving structures.

Table 1 The Theoretical Framework Based on Syed Ahmad Jamal (1992)

(Form/Visual)	Aesthetic/Meaning	Sociocultural Context
New Design Motifs	Cultural Symbolism	Heritage Sustainability
Contemporary Colours	Malay Pahang Identity	Younger Generation
Symmetry & geometry	Tradition + Transformation	Global Market

Finding and Discussion

Findings from the interview analysis revealed that both informants held different views and opinions regarding the transformation of Tenun Pahang (TP) motifs. The first informant, a 11th-generation descendant of Karaeng Aji who has preserved the Tenun Pahang (TP) motifs through traditional practices, had never heard of AI technology and continues to maintain the conventional methods. However, he did not reject the idea that AI could assist in accelerating the design process to produce new and modern motifs that meet buyers' preferences, although not as a replacement for traditional craftsmanship.

The second informant, a young weaver who is also a lecturer at IKTPD, perceived AI as a new medium for expanding creativity and attracting the interest of the younger generation. For him, AI opens opportunities for innovation in producing more contemporary motifs, while also enabling traditional Tenun Pahang (TP) motifs to be transformed into more diverse, complex, and refreshing forms without compromising their inherited structural foundations. He further highlighted that AI has the potential to encourage younger generations to take an interest in weaving, as it offers a more accessible way to design motifs based on their creative ideas while still preserving Malay cultural identity. Through the creativity of young weavers, AI can generate hybrid patterns that merge traditional and modern elements, thereby making Tenun Pahang (TP) more relevant to contemporary tastes.

The findings of this study suggest that the transformation of Tenun Pahang motifs through AI serves as an additional medium that broadens the weavers' ideas and creativity. AI is not intended to replace manual weaving skills. This discussion also shows that, in terms of motif production, whether in earlier hand-drawn forms or modern representations inspired by nature, AI indirectly contributes to motif design by translating the fundamental structures of Tenun Pahang (TP). These structures retain elements of geometry, symmetry, and visual harmony while offering greater complexity, more systematic arrangements, and a wider palette of colors.

Furthermore, AI can be regarded as a catalyst for making Tenun Pahang (TP) motifs more relevant to the demands of contemporary society. Traditional motifs that are transformed with AI not only appeal to younger generations and contemporary fashion designers but also create opportunities in international markets, making Tenun Pahang (TP) more versatile across various product forms.

In conclusion, this discussion highlights that the transformation of Tenun Pahang (TP) motifs through AI is a process that requires balance. Tradition must not be sacrificed for innovation, yet innovation should not be restricted either. Instead, both must coexist in harmony while

upholding the traditional art of the Malay Pahang heritage. AI holds the potential to serve as a transformative tool in developing traditional motifs into modern and contemporary designs, provided it is used ethically, inclusively, and guided by cultural values deeply rooted in the Malay Pahang community. With such an approach, Tenun Pahang (TP) motifs can not only be preserved but also evolve as a significant identity of Malay textile art that remains relevant at the global level.

Conclusions

The findings of this study indicate that Artificial Intelligence (AI) has significant potential as a creative medium capable of enriching motif variations in Tenun Pahang (TP). Through the application of AI, weavers are able to expand its use in the context of motif design sketches. Nevertheless, the authenticity and symbolism embedded in the motifs of Tenun Pahang (TP) remain the primary aspects, even when transformations in design creation occur. The use of AI is mainly focused on the design process of Tenun Pahang (TP) motifs. It does not involve the procedures or production processes of weaving itself, but rather serves to assist weavers in generating designs more quickly, without requiring a lengthy amount of time. This, in turn, accelerates the motif design process, making it more modern and aligned with the tastes of contemporary Tenun Pahang enthusiasts.

In conclusion, the transformation of AI in Tenun Pahang (TP) is not a form of replacement for the indigenous wisdom of weavers in developing motifs. Instead, it serves as a platform where AI functions as a supporting tool that enhances the creativity of weavers. It does not substitute the traditional handcrafting skills passed down through generations, but rather strengthens the sustainability of Tenun Pahang (TP) so that it remains relevant in the textile industry.

The identity of Tenun Pahang (TP) motifs is largely derived from natural elements, particularly flora. One of the motifs that has become the hallmark of the Malay community in Pahang is the bunga sepit udang (prawn claw flower), regarded as a masterpiece in Tenun Pahang (TP). This motif serves as both a complement and an embellishment to Tenun Pahang fabrics and is not found in other states such as Terengganu and Kelantan. Traditionally, the motif of the prawn claw was inspired by natural forms, then translated into sketches on graph paper before being used as the main reference in the weaving process.

Figure 1: The weaver captures the observed imagery directly and records it in the form of a sketch, allowing the visual impression to be translated into a tangible reference. This process not only preserves the authenticity of the inspiration but also provides a structured guide for further development of motif design in Tenun Pahang (TP).

The *sepit udang* motif is captured in the weaver's imagination as a source of inspiration, before being translated into sketches that serve as the foundation for Tenun Pahang (TP) design patterns.

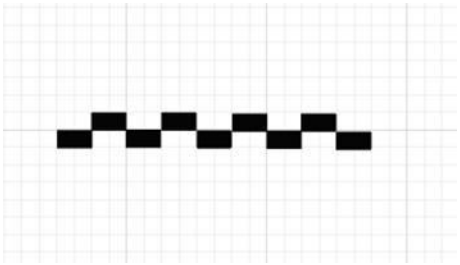

Figure 2: The weaver sketches in a grid form as a guide for thread measurement, allowing the motif to be systematically organised and proportionately arranged. This method not only assists in visualising the overall composition but also serves as an essential reference in ensuring that the woven design maintains accuracy and harmony.

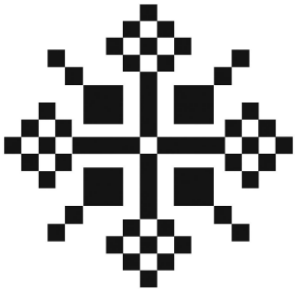

Figure 3: From Syed Ahmad Jamal's perspective, this transformation can be interpreted through the concepts of *rupa* and *jiwa* . In terms of *rupa*, AI emphasizes visual aspects such as form, symmetry, colour, and composition, which become more diverse and dynamic. In terms of *jiwa*, however, the preservation of cultural symbolism and the identity of the Malay Pahang tradition remain intact, even when expressed through modern technological mediums. This approach highlights that AI is not a replacement for tradition but rather a complement that strengthens the continuity of heritage, rendering it relevant to contemporary aesthetics while also attracting the interest of younger generations.

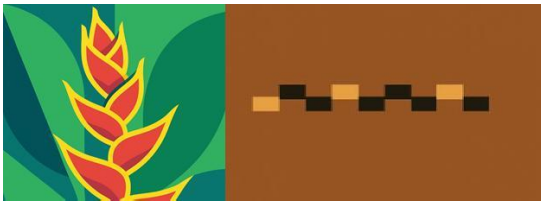

Figure 4: AI technology is applied by incorporating suitable colours and shapes into the motif design, serving as a creative tool that assists weavers in experimenting with various aesthetic combinations. This approach not only accelerates the design process but also provides opportunities to modernise traditional motifs while maintaining their symbolic and cultural significance.

This study also concludes that the transformation of AI in Tenun Pahang (TP) largely depends on achieving a balance between innovation and the preservation of cultural identity. Tradition must continue to serve as the primary point of reference, while technology functions as a catalyst for renewal. Through this approach, Tenun Pahang (TP) has the potential not only to emerge as a symbol of Malay heritage in Pahang but also as a textile art identity that can stand on par at the international stage.

A proposed direction for future research is the development of an educational module that integrates traditional skills with proficiency in AI technology. This educational module could be implemented in training institutions such as the Institut Kemahiran Tenun Pahang Diraja (IKTPD) or in art schools, to ensure that the younger generation not only understands the fundamentals of traditional handweaving but is also able to utilise AI as a creative tool in motif design.In conclusion, this study asserts that the transformation of Artificial Intelligence (AI) in Tenun Pahang (TP) is not intended to replace the traditional

weaving process. Instead, it serves as a complementary medium that supports and enhances the creativity of weavers in designing motifs that are more modern and transformative. The findings highlight that although AI introduces new possibilities for innovation, the essence of Tenun Pahang (TP) remains deeply rooted in its cultural, historical, and aesthetic foundations.

The study further emphasizes that the strength of Tenun Pahang (TP) lies in its dual identity: as a living heritage passed down through generations, and as an evolving art form that must adapt to contemporary demands. By balancing technological innovation with the preservation of cultural identity, Tenun Pahang (TP) has the potential to continue flourishing as a sustainable heritage textile art. This balance is crucial, as it ensures that the symbolic values, motifs, and weaving techniques that define Tenun Pahang (TP) are not lost in the process of modernization. Instead, these values are recontextualized and revitalized in ways that preserve their relevance for younger generations and global audiences.

The application of AI in motif design represents one of the most significant contributions of this study. Through AI, weavers are equipped with tools that enable them to explore new variations in color, form, and structure without compromising the symbolic essence of traditional motifs such as bunga sepit udang. The integration of AI does not interfere with the physical weaving process, which continues to depend on skilled craftsmanship and traditional knowledge. This ensures that the authenticity of Tenun Pahang (TP) remains intact, while the design process becomes more dynamic, efficient, and responsive to market trends.

The theoretical foundation of this study, grounded in Syed Ahmad Jamal's Theory of Form and Soul (1992), provides an aesthetic lens that strengthens the interpretation of this transformation. The study demonstrates how technology can contribute to the preservation and renewal of design without eroding cultural identity. This perspective reinforces the notion that Tenun Pahang (TP) is not merely a textile product but a cultural expression embodying the values, philosophy, and artistic sensitivity of the Malay world. Thus, AI becomes a medium through which these values can be expanded into new domains while remaining faithful to their origins.

The use of AI in motif design also paves the way for product diversification, market expansion, and international recognition of Tenun Pahang (TP). Contemporary consumers increasingly value products that merge tradition with modernity, and AI enables the creation of culturally grounded yet innovative motifs. Traditionally, motif design has been a time-consuming process that relies heavily on manual sketches. With AI, this process is streamlined, allowing weavers to experiment with multiple design possibilities in a fraction of the time. This not only boosts productivity but also frees weavers to focus on the more refined aspects of craftsmanship during the weaving process. AI does not diminish the role of weavers; instead, it elevates their position as cultural custodians who now have access to enhanced creative tools. The synergy between human intuition and technological assistance enriches both the design process and the final weaving outcome.

The research also underscores the broader cultural implications of AI integration in heritage arts. At a time when many traditional crafts face the

risk of decline due to industrialization and globalization, the ability to adapt and innovate is vital for survival. Tenun Pahang (TP) stands as a case study of how tradition can coexist with technology in a mutually reinforcing relationship. With the adoption of AI, this art form demonstrates resilience and adaptability—qualities essential for cultural sustainability in the modern era. This approach not only safeguards the craft for future generations but also enhances its visibility and prestige at national and international levels.

The study further suggests that the development of AI applications specifically tailored for textile motif design should be explored, integrating databases of traditional motifs and their symbolic meanings. AI can provide intelligent recommendations aligned with cultural aesthetics while allowing room for creative innovation. AI-assisted Tenun Pahang (TP) also opens avenues for further inquiry into whether technological integration influences the perceived authenticity and value of the textile.

Based on these findings, it is evident that the future of Tenun Pahang (TP) depends on its ability to balance continuity and change. AI offers opportunities for transformation, yet the foundation of the craft must remain anchored in traditional values, motifs, and weaving techniques. Only by maintaining this balance can Tenun Pahang (TP) continue to serve as both a cultural identity marker and a competitive product in the contemporary market.

References

Azah, A. (1999). Songket: Satu Warisan Malaysia. Petronas.

Habibah Abdul Jabbar (2016),Inovasi Struktur Tenunan dalam penghasilan kain Tenun Pahang Diraja Conference Proceeding: 2ndInternationalConference on Creative Media, Design & Technology (REKA2016)

Hatta, A.K. (8 Mei 2006). Penjenamaan Kreatif Kembangkan Fabrik Tenunan. Utusan Malaysia.

Mohamed Najib Dawa. (2008). Transformasi Tradisi untuk Konteks Kontemporari Ke arah Pembentukan Identiti. Kuala Lumpur: Mohamed Najib Ahmad Dawa (Ph.D).

Mok Soon Sang. (2010). Literatur dan Kaedah Penyelidikan. Selangor: Penerbitan Multimedia Sdn. Bhd.

Mumtaz Mokhtar (2018), Art and Craft in theEra of Creative Industry in Malaysia, Jurnal seni rupa dan desain Volume 21 Nomor 2 – Agustus 2018

Nik Amirulmumin Nik Min (2025), Pahang Kaji Peluang adaptasi teknologi AI dalam sektor awam Negeri, Sinar Harian Online

Norwani Nawawi. (2002). Songket Malaysia. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Nani Hartina Ahmad (2015) Evolusi Penggunaan Motif Dan Ragam Hias Dalam Tenunan Songket, ICOMHAC2015 eproceedings, UiTM Cawangan Kedah-INSPIN

Siti Zainon Ismail. (1997). The Traditional Malay Handicraft Design. Kuala Lumpur: Dewan Bahasa Dan Pustaka.

Siti Zainon Ismail. (2016). RekabentukKraftangan Melayu Tradisi. Selangor: Dewan Bahasa dan Pustaka. p.20.

Syed Ahmad Jamal. (1992). Rupa dan Jiwa. Dewan Bahasa dan Pustaka & Kementerian Pendidikan Malaysia. Kuala Lumpur: Harian (Zulfadzli) Sdn. Bhd., p.33

Syed Ahmad Jamal. (1971). Syor-Syor Bagi Mencapai Objektif-Objektif Seni Dalam Perkembangan Kebudayaan Malaysia. Kementerian Kebudayaan Belia Dan Sukan Malaysia. Asas Kebudayaan

Kebangsaan: mengandungi kertas kerja Kongres Kebudayaan Kebangsaan dari 16hb Ogos – 20 Ogos 1971. Kuala Lumpur: KBBSM. 1973. m/s. 313.

Zainuddin Abindinhazir @Abd. Rashid1, Amir Hashim, Lee Hoi Yeh, Norzuraina Mohd Nor (2022), *3-Dimensional Design in Traditional Malay's Art KUPAS SENI ISSN 2289- 4640 /eISSN 0127-9688 Vol. 10 Special Issue 2022 (1-11)*