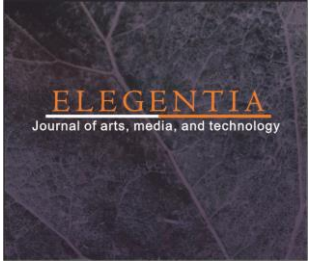
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RESEARCH ARTICLE

Changes in the style and technique of Acehnese calligraphy: from tradition to digitalization

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Abstract: This study discusses a crucial phenomenon of changes in the style and technique of Acehnese calligraphy art that has undergone a significant transformation from manual tradition to digitalization. This issue is important because it illustrates the dynamics of local Islamic culture in the face of modernity and global technology that affect the form, function, and aesthetic meaning of calligraphy. The purpose of this study is to analyze the process of changing techniques, placements, and materials in the art of calligraphy in Aceh and its implications for the cultural identity and spiritual values of the community. The research was conducted with a qualitative approach through visual observations, interviews with artists, and literature studies on traditional and digital calligraphy artifacts. The results of the study show a shift from manual to digital techniques, from placement on tombstones to public spaces and mosques, and from natural materials to synthetic materials. In conclusion, digitalization brings revitalization of the expression of Acehnese calligraphy art without erasing its spiritual roots. This research recommendation emphasizes the importance of collaboration between artists, academics, and cultural institutions in maintaining the continuity of traditional values in the digital era.

Keywords: Style Change, Acehnese Calligraphy, Art Transformation, Digitalization, Islamic Visual Identity.

***Abstract**:* Penelitian ini membahas fenomena krusial tentang perubahan gaya dan teknik seni kaligrafi Aceh yang mengalami transformasi signifikan dari tradisi manual menuju digitalisasi. Isu ini penting karena menggambarkan dinamika kebudayaan Islam lokal dalam menghadapi modernitas dan teknologi global yang memengaruhi bentuk, fungsi, serta makna estetika kaligrafi. Tujuan penelitian ini adalah menganalisis proses perubahan teknik, penempatan, dan material dalam seni kaligrafi Aceh serta implikasinya terhadap identitas budaya dan nilai spiritual masyarakat. Penelitian dilakukan dengan pendekatan kualitatif melalui observasi visual, wawancara dengan seniman, dan studi literatur terhadap artefak kaligrafi tradisional dan digital. Hasil penelitian menunjukkan adanya pergeseran dari teknik manual ke digital, dari penempatan pada batu nisan ke ruang publik dan masjid, serta dari material alami ke material sintetis. Kesimpulannya, digitalisasi membawa revitalisasi ekspresi seni kaligrafi Aceh tanpa menghapus akar spiritualnya. Rekomendasi penelitian ini menekankan pentingnya kolaborasi antara seniman, akademisi, dan lembaga budaya dalam menjaga kesinambungan nilai tradisi di era digital.

***Keywords**:* Perubahan Gaya, Kaligrafi Aceh, Transformasi Seni, Digitalisasi, Identitas Visual Islam

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1. Introduction

The phenomenon of the transformation of Acehnese calligraphy art from tradition to digitalization reflects the social and cultural dynamics of the Acehnese people in the face of modernity. Calligraphy, which once functioned as a spiritual medium on tombstones and manuscripts, has now evolved into visual expression in public spaces and digital platforms. This change is important to examine considering how Islamic values and traditional aesthetics negotiate with modern technology and the needs of today's visual communication. In the context of cultural globalization, digital calligraphy art is a means of maintaining local identity and spirituality in the midst of the flow of visual homogenization (Ziskin, 2019). In addition, this transformation marks a form of resilience of Acehnese Islamic culture to the challenges of modernity (Awaliyah, 2023). Through digital approaches, the art of calligraphy not only survives but also innovates, showing that cultural preservation can go hand in hand with technological advances (Khan, 2023). Therefore, this phenomenon deserves to be studied as a representation of the creative adaptation of local culture in the digital era.

The study of Acehnese calligraphy art has been dominated by research that focuses solely on historical and religious aspects, while the dimensions of technological transformation and digital aesthetics have not received much attention. Rainfall et.al, (2024) highlights Acehnese calligraphy as an Islamic epigraphic heritage that represents spiritual and social values, but has not reviewed how the form has adapted in the modern visual context. Uzrina et al., (2024) emphasizing the importance of preserving Islamic values in Acehnese calligraphy, but less discusses the influence of digitalization on changes in techniques, materials, and placement of works. On the other hand, the theory of digital art put forward by Drucker (2013) is more widely used to explain the phenomenon of global art, without attributing it to the local context and Islamic spirituality of the archipelago. This literary gap shows that there is an academic gap that needs to be filled, namely a study that integrates traditions, technology, and local cultural contexts in reading the transformation of Acehnese calligraphy art in the digital era.

The purpose of this paper is to complement the shortcomings of previous studies that have not seen the problem of changing the art of calligraphy in Aceh as a process of cultural transformation influenced by digitalization and modernity, and have not examined the long-term consequences of shifting techniques, placements, and materials on the spiritual value and cultural identity of the Acehnese people. In line with that, this paper seeks to answer three main questions: (1) how the change in technique from manual to digital affects the character and authenticity of Acehnese calligraphy works; (2) how the shift in placement from tombstones to mosques and public spaces changed the meaning and social function of calligraphy; and (3) how material innovation reflects the adaptation of art to modernity. Answering these three questions will provide a comprehensive understanding of how Acehnese calligraphy art transformed from a traditional heritage into a contemporary visual medium of expression that remains grounded in Islamic spiritual values and local cultural identity.

The argument put forward in this study is that changes in technique, placement, and materials in Acehnese calligraphy art are a direct consequence of the interaction between the development of digital technology and the socio-cultural dynamics of Acehnese society. Hypothetically, the transformation of techniques from manual to digital (cause) led to a shift in the meaning and function of calligraphy from sacred spiritual expression to a more communicative and commercial form of modern aesthetic (consequence). Similarly, the change in the placement of works from tombstones to public spaces is influenced by the increasing collective awareness of Islamic cultural identity and visual aesthetics in the digital age. Material innovation from natural elements to synthetic and digital materials is also a response to the demands of visual efficiency and durability in the context of modernity. Thus, this study examines the cause-and-effect relationship between technology and changes in visual culture, which are shaping a new face of Acehnese calligraphy art in the midst of globalization currents.

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2. Literature review

2.1. Style Changes

Stylistic changes in the context of art are shifts in forms of visual expression, techniques, and meaning influenced by social, technological, and cultural developments. Style, according to Palmer et al., (2013), not just a distinctive visual form, but the result of artistic choices that reflect the values and context of its time. In fine art, stylistic changes often occur as artists adapt to new mediums or evolving aesthetic ideologies (Leader & Nadal, 2014). Morriss-Kay (2010) adding that the force is never static; Style always transforms according to the way humans see and interpret the world. In the context of calligraphy, the change in style is an indicator of how tradition negotiates itself in the midst of modernity from sacred symbolic expression to aesthetic representations that are adaptive to digital media. Thus, the concept of style change reflects the dynamics of interaction between the continuity of tradition and contemporary innovation in art practice.

The phenomenon of stylistic changes is evident in the evolution of calligraphy art in different regions of the world. For example, in a study Goodwin (1996), classical Islamic calligraphy underwent stylistic diversification as it moved from manuscript media to modern prints, showing visual adaptation without losing its spiritual value. In Indonesia, Atika & Ginting (2024) It notes that contemporary calligraphy styles combine elements of graphic design and modern typography, showing openness to digital technology. In the context of art, research Nahhas (2014) highlights the stylistic shift from traditional woodcarving-based calligraphy to a more experimental digital form, where artists blend Arabic script with local ornamental motifs. These cases show that style change is not just an aesthetic issue, but also a creative strategy to maintain cultural relevance in an increasingly digitally connected global art landscape.

2.2. The Art of Calligraphy

The art of calligraphy is conceptually understood as a visual art form that prioritizes the beauty of writing, where letters serve not only as a means of communication, but also as an aesthetic and spiritual expression. Ummah et al., (2025) defines Islamic calligraphy as the "ars artium" of all arts because it combines the beauty of form with the sacred value of revelation. According to Shaw (2021), calligraphy is a visual expression that connects sacred texts with symbolic beauty, making them both spiritual and aesthetic mediums. On the other hand, Alashari & Mohd Azhar Abd. Hamid (2021) sees calligraphy as a manifestation of the unity between form and meaning, where every stroke of the letter becomes a representation of the divine. In the context of Aceh, the art of calligraphy not only contains a religious dimension, but also becomes a representation of local cultural identity, because the shapes, patterns, and ornaments used reflect Islamic values that are firmly rooted in the traditions of the Acehnese people.

In practice, calligraphy art in the Islamic world displays a diversity of forms and functions according to their respective cultural contexts. Baydoun & Kamarudin (2020) suggests that calligraphy in the Middle East developed through the Kufi, Naskhi, and Thuluth styles, each of which reflects its historical context and social function. In Southeast Asia, Asrori et al., (2025) noted that calligraphy is a visual da'wah medium that plays an important role in the Islamization of local culture. In Indonesia, Afriadi, (2024) highlighting that Acehnese calligraphy art features a synthesis between classical Arabic calligraphy and traditional motifs such as cloud meuh, bamboo shoots, as well as Acehnese wood carving patterns, which make it a unique form of cultural expression. Through these examples, it can be understood that the art of calligraphy is not just a visual aesthetic, but also a space for dialogue between religion, culture, and technology that continues to develop from time to time.

2.3. Digitization

Digitalization is conceptually defined as the process of transformation from an analog system to a digital-based system that changes the way humans create, store, and distribute information. According to Ma & Cui (2020), digitization is a fundamental shift from the physical world to the bit world, allowing information to be reproduced without limits. Meanwhile, Bockshecker et al., (2018) emphasizing that digitalization is not just a

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technological process, but also a change in the social and cultural structure that makes up a network society. In the context of art, Yap et al., (2024) explained that digitalization has given birth to a new form of aesthetics based on interactivity, immateriality, and reproducibility. Thus, digitalization not only brings technological efficiency, but also shifts the paradigm of creation and perception of artworks from material-based and manual to virtual and dynamic visual representations, including in the development of contemporary Acehnese calligraphy art.

In practice, the digitization of art has created a new space for artists to experiment and interact with audiences globally. Knobel (2017) highlighting that digital art allows for cultural remix, where traditional works can be reprocessed through creative software without losing their symbolic value. In Indonesia, Kusumaningrum et al., (2024) notes that this shift is evident in modern calligraphy art, where artists are beginning to use digital tools such as Adobe Illustrator and Procreate to produce more precise and socially media-adaptive works. According to Siliutina et al., (2024), this phenomenon opens up opportunities for the preservation of traditions through digitalization, while presenting the challenge of authenticity in technology-based artworks. Thus, digitalization in the context of Acehnese calligraphy art represents a process of cultural adaptation that combines traditional values with technological innovation in a creative and reflective manner.

3. Method

The unit of analysis in this study is an Acehnese calligraphy artwork that has undergone a change in form, style, and technique from manual tradition to the digital era. The focus of the study is directed at the visual representation and production techniques of calligraphy works influenced by changes in media, technology, and socio-cultural contexts. The selection of this unit of analysis is based on the relevance of the phenomenon of artistic change that not only reflects the evolution of aesthetics, but also the dynamics of Acehnese cultural identity in the midst of modernization. Through this unit of analysis, the research seeks to trace the transformations that have occurred in the creative practices of Acehnese calligraphy artists and how they negotiate traditional values with digital technology in the production of works.

This study uses a qualitative approach with a descriptive-analytical study design. This design was chosen to examine in depth the changes in the style and technique of Acehnese calligraphy art through its visual interpretation and social context. The qualitative approach allows researchers to understand the meaning behind the form, process, and motivation behind the transformation of the work. This design also makes room for the exploration of the artist's narrative and subjective experience in response to digitalization. Thus, the research not only describes the phenomenon empirically, but also interprets the symbols, aesthetic values, and cultural meanings inherent in the change in calligraphy style in Aceh over time.

The data sources in this study consist of the main informant, visual text, and documentation media. The informants included Acehnese calligraphy artists, art academics, and cultural activists who understood the development of local calligraphy art. Textual data was obtained from online news, art articles, exhibition catalogues, and documentation of works on social media and digital platforms. In addition, audiovisual data such as videos of the creation process and interviews are used to strengthen understanding of the dynamics of changing techniques and styles. This combination of sources allows the research to comprehensively examine the phenomenon by tracing both the aspects of practice and the discourse that accompanies it.

Data collection techniques were carried out through observation, in-depth interviews, and documentation studies. Observation is directed at direct observation of Acehnese calligraphy works both in galleries, exhibition rooms, and digital media. In-depth interviews were conducted with calligraphy artists to explore their experiences, perceptions, and strategies in adapting digital technology. The documentation study was used to trace the visual archives, texts, and social media track records that record the journey of change in Aceh's calligraphy art. These three techniques complement each other, providing empirical, contextual, and reflective data on the object of study.

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Data analysis is carried out interactively through the stages of data reduction, data presentation, and conclusion drawn. Data reduction was carried out by sorting out relevant information related to changes in calligraphy style and technique. Furthermore, the data is presented in narrative and visual form to identify transformation patterns and the factors that influence them. This analysis uses visual semiotics and cultural transformation theory approaches to interpret the meaning behind changes in form, technique, and medium. In this way, the results of the analysis are expected to be able to display a deep understanding of the relationship between tradition, technology, and cultural identity in the development of contemporary Acehnese calligraphy art.

4. Results

4.1. Technical Change (manual to digital)

The change in technique in Acehnese calligraphy refers to the shift in manufacturing methods from traditional (manual) methods that rely on hand skills with tools such as pens, brushes, or chisels, to modern techniques (digital) that utilize design software (software) and digital tools such as graphic tablets or styluses. In manual techniques, calligraphy is made directly on a medium such as wood, or stone with high precision, following the strict rules of aesthetics and Islamic calligraphy rules. Meanwhile, in digital engineering, the process of making calligraphy is carried out through a computer program, allowing for faster reproduction, flexible editing, and more varied exploration of styles. These changes not only affect the way they are made, but also change values such as authenticity, the uniqueness of the artist's hand, and the emotional connection between the maker and his work. This study aims to examine the impact of the shift in techniques on the aesthetics, cultural meaning, and preservation of Acehnese calligraphy art in the contemporary era. This is described in detail in the following section (Table 1).

Table 1 Visualization of techniques and styles in calligraphy art



***Figure** 1 Ancient Tombstone*



***Figure** 2 Calligraphy in the digital*

The image in Table 1 shows the transformation of techniques and styles in calligraphy, from the manual approach to the digital age. In the first line (Figure 1), we see a calligraphy relic carved on a tombstone. Calligraphy in the past was made manually with sculpting and engraving techniques that required high precision and a deep understanding of the shape of Arabic letters. Usually these calligraphy are found on tombstones, mosque walls, or historic buildings, indicating the sacred value and reverence for the scriptures. The writing style used generally follows classical rules such as kufi or naskhi, combined with

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elements of typical Islamic ornaments such as geometric patterns and flora. Meanwhile, in the second row (Figure 2), there are significant changes in the presentation of calligraphy in the digital era. Calligraphy is no longer limited to physical media such as stone or wood, but is created using digital software that allows for the exploration of colors, shapes, and visual effects more freely and expressively. Although the medium and techniques have changed, the essence of calligraphy has been maintained as an art that carries high religious and aesthetic value. The visual style is more modern, sometimes even combining typography elements with illustrative forms, showing how the art of calligraphy continues to evolve with the times without losing its identity.

4.2. Change of Placement (From Tombstones to Mosques)

The change in placement in Acehnese calligraphy refers to the shift in the location of installation of works from traditional media such as tombstones and manuscripts to contemporary spaces such as mosque walls, public buildings, or digital media. Traditionally, Acehnese calligraphy is found on the tombstones of ancient tombs, which function as grave markers as well as conveyors of religious and historical messages. This placement reflects spiritual values and respect for the spirit, as well as being archaeological evidence of Islamic civilization in Aceh. In addition, calligraphy also adorned religious manuscripts and royal palaces as symbols of knowledge and power. In its development, Acehnese calligraphy is now more often placed in mosques, government buildings, or other public spaces as an element of decoration and da'wah media. This change shows the transformation of the function from the sacred-memorial to the more educational-aesthetic. However, it also raises questions about the changing symbolic meaning, the level of community interaction with the work, and whether the original philosophical values are preserved in the context of the new placement.

Table 2. Table 2 Change of placement (from tombstone to mosque)

No	Report	Statement	Coding
1	Naufal, 38 th	"For the first time, it generally appeared simultaneously due to the culture of the Austronesians, and for calligraphy on the tombstone, it was usually due to the will of the person, for example, such as the scholars who wanted their tombstone simply with calligraphy written lailahaillah and so on"	Wasiat Individual
2	Ahmad, 45 years old	"Calligraphy on tombstones appeared early because the tradition of writing names and death dates has existed since the early days of Islam. Meanwhile, calligraphy in mosques developed later along with the progress of Islamic architecture."	Historical chronology of calligraphy
3	City, 32 th	"In our school, students learn calligraphy for both tombstones and mosques. We emphasize that both are equally important in Islamic art, although they have different functions."	Islamic art education
4	Rudi, 50 years old	"Based on archaeological findings, ancient tombstones in Makkah in the 7th century AD already used simple Kufi calligraphy. This was	Archaeological evidence

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		earlier than the mosque decorative calligraphy that appeared in the Umayyad era."	
5	Lina, 28 th	"As a calligraphy artist, I often get orders to make calligraphy for tombstones and mosques. Tombstone calligraphy is usually simpler and more personal, while for mosques it is more complex and decorative."	Differences in calligraphy styles
6	Budi, 42 years old	"In the tradition of our Islamic boarding school, tombstone calligraphy is taught as part of the fiqh of the corpse, while mosque calligraphy is taught in Islamic art. Both have their own portions."	Islamic boarding school education

Based on interview data with various informants, it was revealed that the development of Islamic calligraphy in the context of tombstones and mosques shows an interesting pattern. In general, there are differences of opinion regarding its origins. Some informants argue that calligraphy on tombstones appeared earlier, supported by archaeological evidence in the form of ancient tombstones using simple Kufi calligraphy dating back to the 7th century AD. Meanwhile, another view states that the two may have developed simultaneously, emphasizing the influence of certain cultural factors. In terms of function, there is a fundamental difference between these two forms of calligraphy. Tombstone calligraphy tends to be personal and simple, often made on special requests, especially for writing monotheistic sentences. This shows its main function as a grave marker as well as an intimate religious expression. On the other hand, mosque calligraphy developed as a more complex and decorative architectural element, adapting to the development of Islamic building styles over time.

In the context of education, these two forms of calligraphy are taught with different approaches. Tombstone calligraphy is generally taught as part of the study of fiqh related to the management of the body, while mosque calligraphy is more focused as part of Islamic art. Some educational institutions also emphasize the importance of studying the two in a balanced manner, albeit with the awareness of the differences in their functions and the context in which they are used. These findings reveal that the development of Islamic calligraphy is influenced by a variety of complex factors, including religious traditions, architectural developments, and cultural contexts. The difference in characteristics between personal tombstone calligraphy and mosque calligraphy that is more public and decorative shows the adaptation of calligraphy art to various needs in Muslim society. More in-depth research may be able to explore the regional variations and more detailed historical developments of these two forms of calligraphy.

4.3. Material Changes

Material changes in Acehnese calligraphy refer to the shift from the use of traditional media—such as tombstones, wood, paper, or leather—to modern materials such as PVC board, acrylic, metal, or digital prints. In the past, Acehnese calligraphy was often found on tombstones (e.g. in the tomb complex of Sultan Iskandar Muda or ancient Islamic tombs), which not only served as a tribute to the deceased but also as evidence of historical and cultural identity. Traditional materials such as stone and wood were chosen for their durability, natural aesthetic value, and sacredness in a religious context. Meanwhile, modern materials such as PVC board, acrylic, or digital printing are chosen for their practicality, lower production costs, and ease of installation. However, these changes raise questions about their long-term durability, changes in artistic value, and whether the philosophical and religious significance of calligraphy is preserved when it is moved to more commercial and temporary media.

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Table 3. Material Changes

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<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Figure 3 Stone material on the</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Figure 4 PVC material in mosque</td><td></td></tr>
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The change in material from tombstones to PVC in mosque ornaments reflects technological developments in Islamic calligraphy art. Natural stones such as marble and granite, which for centuries have been used for high aesthetic and durable tombstones, are now starting to be replaced by more practical PVC materials. This synthetic material offers ease of production, installation, and more affordable costs, so it is widely chosen for modern mosque ornaments.

The use of PVC as a calligraphy medium has several advantages over traditional stone. This material is lighter, easy to shape into a variety of intricate patterns, and is available in a variety of attractive colors. However, PVC also has limitations in terms of durability and sacred impression, where this material is not as strong as stone and is less able to maintain the traditional values inherent in classical Islamic calligraphy art.

This material transformation shows the effort to adapt Islamic art to the demands of the times without abandoning its cultural roots. Although PVC is widely used for efficiency and practicality, natural stone is still preserved to maintain historical and spiritual value. This blend of traditional and modern materials creates new harmony in contemporary mosque architecture and ornamentation.

5. Discussion

This research highlights the transformation of Acehnese calligraphy art styles and techniques from tradition to the digital era, with a focus on changes in technique, placement, and materials. The results of the study show that the creative process of Acehnese calligraphy has undergone a significant shift from manual work using traditional tools to digital techniques based on graphic design software. This change was also followed by a shift in the placement of works, from tombstones that are full of spiritual meaning to mosque walls and public spaces that emphasize aesthetic functions and cultural identity. In addition, the materials used have also evolved from stone, wood, and fabric to synthetic materials and digital media that are more adaptive to the needs of the times. Overall, this study confirms that Acehnese calligraphy art has not lost its meaning, but has been transformed into a modern form of visual expression that remains rooted in spiritual values and local Islamic traditions.

Changes in technique, placement, and materials in Acehnese calligraphy art show a close relationship between technological developments, social dynamics, and cultural adaptation to modernity. The shift from manual to digital techniques is not just a matter of tools, but a form of creative response to the globalization of visual aesthetics that demands efficiency and reproducibility (Wiratno & Callula, 2024). Meanwhile, the change in placement from tombstones to mosques and public spaces reflects the expansion of the symbolic function of calligraphy as a medium of social expression and collective identity (Salmani & Chatrbahr, 2018). The evolution of materials from natural elements to synthetic and digital materials signifies a paradigm shift in values from sacredness to a modern aesthetic that is more open to commodification (Charters, 2006). Thus, the transformation of Acehnese calligraphy is proof that local Islamic art is able to negotiate with the progress of the times without giving up its spiritual roots and traditional values.

The meaning of the change in the style and technique of Acehnese calligraphy art can be interpreted as a form of dialectic between tradition and modernity, in which Acehnese artists sought to maintain Islamic spiritual values while adapting to technological developments and contemporary aesthetic tastes. In the historical context, Acehnese calligraphy, which used to be a sacred medium on tombstones, has now transformed into a symbol of cultural identity and religious pride of the community (Perret, 2007). Socially, digitalization opens up new spaces for young generations to access, learn, and create calligraphy in digital platforms, making it an inclusive and dynamic cultural practice (Zhou, 2021). Meanwhile, ideologically, this shift reflects the spirit of Acehnese Islam that is adaptive to the changing times without losing the substance of monotheism and the aesthetic value of universal Islam (Voll, 2019). Thus, the transformation of Acehnese calligraphy emphasizes the continuity between faith, culture, and innovation.

Reflection on the results of this study shows that the transformation of Acehnese calligraphy art has double implications, both function and dysfunction, in the socio-cultural context. Functionally, digitalization expands access, enriches creativity, and strengthens the

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position of calligraphy as a symbol of Acehnese Islamic identity that is able to compete in the global realm (Cavalheiro, 2019). Technology opens up space for cross-disciplinary collaboration between traditional artists and digital designers, thus encouraging the regeneration of young artists. However, dysfunctionally, these changes also risk obscuring the spiritual value and sacred meaning inherent in traditional calligraphy, as commercial orientations and modern aesthetics tend to dominate (Manning, 2004). As a result, calligraphy can get caught up in visual reproduction without the depth of religious meaning. Therefore, it is necessary to strike a balance between digital innovation and the preservation of spiritual values so that Acehnese calligraphy art remains rooted in tradition while looking to the future.

The results of this study have similarities with the findings Syafi'i & Masbukin (2022) which affirms that Acehnese calligraphy is a religious and historical expression in local Islamic culture, but differs in a modern context that highlights aspects of digitalization and contemporary aesthetics. This research is also in line with the study Musri (2022) which emphasizes the importance of preserving spiritual values in Acehnese calligraphy art, but offers a new perspective by showing how technology can be a means of revitalizing traditions. On the other hand, this study broadens the view of Azizah & Maulani (2024) about digital aesthetics by linking it to the local dynamics of Aceh Islam, not just a global phenomenon. Thus, the novelty of this research lies in the integrative analysis between local contexts, Islamic spirituality, and art digitalization, which have not been touched much by previous studies, and confirms that the transformation of Acehnese calligraphy is a dynamic, adaptive, and strong cultural identity.

Based on the results of this research, a strategic action plan is needed to maintain a balance between digital innovation and the preservation of traditional values in Acehnese calligraphy art. Local governments, art education institutions, and the artist community need to collaborate in designing tradition-based digital calligraphy training programs, so that the younger generation is able to master technology without leaving cultural roots. In addition, it is necessary to create a digital preservation policy that documents traditional calligraphy works in digital format for research and cultural archive purposes. Museums, mosques, and public spaces can function as interactive galleries that combine traditional and digital works to expand public access and appreciation. Thus, this policy action not only preserves Aceh's Islamic artistic heritage, but also directs its development towards a sustainable and globally competitive creative ecosystem.

6. Conclusion

The most important finding from this study provides the wisdom that tradition is not something static, but a living entity that is able to transform with the times. The journey of Acehnese calligraphy art from traditional forms to the digital era shows that spiritual and cultural values can remain sustainable even though the medium and technique change. This transformation teaches that cultural preservation does not always have to mean maintaining old forms, but can also be realized through innovation and creative reinterpretation. In the social context, this is an important lesson that Acehnese cultural identity is adaptive and resilient, able to adapt to technological advances without losing its underlying religious meaning. Thus, Acehnese calligraphy art is a mirror that the balance between faith, tradition, and innovation is the main key in maintaining the sustainability of cultural heritage in the digital era.

The main strength of this research lies in its contribution in expanding the study of Islamic art in the archipelago through the perspective of the digital transformation of Acehnese calligraphy art, which has not been touched much by previous research. Scientifically, this study contributes empirical data on changes in techniques, placements, and materials that reflect cultural adaptation to modern technology. Conceptually, this research introduces an integrative approach between traditional aesthetics, art digitization theory (Paul, 2016), and cultural transformation theory (Hannerz, 1992) to read the dynamics of local Islamic art in a global context. In addition, this research raises new questions about how spiritual values can be conserved in digital-based art practices. Thus, this study not only enriches the treasure of Acehnese cultural arts knowledge, but also opens up space for

academic dialogue between tradition, technology, and spirituality in the study of contemporary art.

The limitation of this research lies in the scope and approach that focuses more on qualitative descriptive analysis of changes in Acehnese calligraphy styles and techniques, without being accompanied by an in-depth exploration of aspects of the creative economy and public perception of art digitalization. This research has also not fully explored the dynamics of production, distribution, and consumption of digital calligraphy works in Aceh which has the potential to reveal the relationship between art, market, and technology. In addition, limited access to visual data from traditional calligraphy archives means that historical analysis is not yet fully comprehensive. For further research, it is recommended to take an interdisciplinary approach involving the study of visual ethnography, digital semiotic analysis, and cultural economy perspectives in order to gain a deeper understanding of how Acehnese calligraphy has transformed not only as an aesthetic expression, but also as a social and economic practice in the digital era.

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