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THE IMPACT OF DIGITAL TRANSFORMATION AND INNOVATION ON ART.

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Abstract

The impact of digital innovation on visual art which constitutes what is known as art and design has been profound, reshaping traditional methods and expanding creative possibilities. While art has historically been linked to science and technology, the digital age has accelerated this relationship, particularly in drawing, painting, graphic design, textile design, and sculpture. This paper explores how technological advancements have influenced artistic practices, with a focus on Nigeria. While kinetic and functional sculptures remain underexplored in the country, digital tools have transformed other art forms, enhancing efficiency, interactivity, and accessibility. The study employs literature review, studio experiments, and analysis of some key works to highlight the shift towards technologically integrated art. The paper recommends a revision of Nigeria's art syllabus and curriculum across all educational levels to integrate technological and digital advancements, ensuring that artists remain relevant in the evolving creative landscape.

Keywords: Digital Innovation, Art, Technology, Design, Sculpture.

Introduction

The relationship between art and technology has evolved from ancient craftsmanship to the digital age, reshaping artistic creation through innovations like 3D printing, AR, VR, AI, and blockchain. While digital tools have transformed graphic design and photography in Nigeria, sculptors have yet to fully embrace technological advancements, particularly in kinetic and functional sculptures.

This study examines the impact of digital technology on contemporary Nigerian art, with a focus on sculpture. It explores how artists can integrate modern tools to enhance both artistic expression and

functionality. By analyzing the historical evolution of art and technology, evaluating the current state of Nigerian sculpture, and addressing the lack of scholarly documentation on kinetic art, the research aims to highlight ways for Nigerian artists to align with global artistic trends. Encouraging digital literacy and curriculum updates in art education will be key to fostering innovation in the field.

By highlighting the benefits of incorporating digital innovation and kinetics elements into sculpture, this study provides insights that can help Nigerian artists expand their creative boundaries. In achieving these objectives, the following Hypothetical questions were posed.

1. H_0 (Null Hypothesis): The integration of digital innovation into Nigerian visual art forms has no significant impact on the development of art and design.
2. H_1 (Alternative Hypothesis): The integration of technology into Nigerian sculpture significantly enhances the development of kinetic and functional art forms.

This study examines the influence of digital innovation on art generally and focuses on the impact of technology on Nigerian sculpture, particularly kinetic and functional art. It covers an analysis of historical and contemporary influences of technology on art, with a case study approach to selected Nigerian sculptors. The research explores materials, techniques, and tools used in kinetic sculptures while assessing the challenges and opportunities within the Nigerian art industry.

Limitations of the Study include the fact that there are very Limited Scholarly Documentation There is a scarcity digital transformation of art in Nigeria and on kinetic and functional sculptures in Nigeria, making it difficult to find extensive literature on the subject. Furthermore, the research focuses on a small number of Nigerian practicing artists especially sculptors who engage in kinetic and functional sculptures, which may not represent the entire artistic community.

Methodology

The research employed a combination of qualitative and studio-based approaches to examine the influence of digital reformation and technology on art, particularly kinetic and functional sculptures in Nigeria. The following methods were utilized: Literature Review which involved a comprehensive review of relevant literature was conducted to establish historical and contemporary perspectives on the relationship between art and technology. Sources included books, journal articles, and online references related to kinetic sculpture, Nigerian art history, and technological advancements in artistic production.

Studio practice: Practical experiments were carried out in the studio to explore the incorporation of technology in sculpture. This included the use of mechanized and digital tools, as well as the integration of movement in sculptural forms.

Photography and Documentation: Photographs of relevant art works are included to further highlighting the claims

4. Case Study Analysis – Two kinetic and functional sculptures, namely Ogboju Ode by Seyi-Gbangbayau and Tomorrow by John Sunday, were selected for in-depth study. Their design, materials, and technological applications were examined to highlight the practical aspects of integrating technology in Nigerian sculpture. Through these methods, the study provides empirical insights into how Nigerian sculptors are engaging with technology and the potential for expanding its application in contemporary art practice.

Literature review

During the course of this research, some relevant literatures reviewed to examine previous scholarship on the topic. The integration of technology into the arts has transformed artistic practice, particularly in sculpture and textile design. This review examines scholarly works that discuss the intersection of technology and art, emphasizing Nigerian artistic developments, functional and kinetic sculpture, and textile waste upcycling. The relationship between art and technology has evolved significantly over time. Almeida (2012) explores how artists have historically incorporated scientific innovations into their work, a practice dating back to Leonardo da Vinci's time. Strosberg (2010) highlights how technology has influenced art, citing examples from kinetic sculptures and modern digital tools. Seyi-Gbangbayau, (2012) and Codreanu (2015) examine the use of multiple bronze casting techniques in Nigerian sculpture, underscoring how contemporary artists blend traditional methods with technological advancements. This also aligns with Codreanu (2015) who further discusses the increasing role of digital tools in contemporary art.

Traditional Nigerian artistic practices have evolved to incorporate modern techniques. Early Nigerian artworks, such as Nok terracotta, Ife bronzes, and Benin sculptures, demonstrate early technological applications in art (Price, 1994; Eyo, 1976; Bascom, 1973). More recently, Nigerian artists have integrated digital tools and industrial materials into their work (Adepegba, 1995; Azeez, 2006). Kinetic and functional sculptures, which incorporate movement, have roots in the works of Marcel Duchamp and

Alexander Calder (Art history sources, 2019). In Nigeria, Seyi-Gbangbayau (2019) has explored mechanomorphic and kinetic art, with his sculpture Ogboju Ode serving as both an environmental and functional piece, integrating an electric motor for movement and lighting for security. However, kinetic art remains underdeveloped in Nigeria. Meanwhile, digital advancements in textile and fashion design have encouraged innovative material reuse (Marros, 2016).

THE INFLUENCE OF DIGITAL INNOVATION ON VISUAL ARTS

Drawing and Painting

Traditional drawing and painting have undergone a significant transformation with the advent of digital tools such as Corel Painter, Adobe Photoshop, and Krita. These software applications allow artists to create, manipulate, and refine their work with greater precision, offering features such as layering, digital brushes, and lighting effects. Digital painting, in particular, has eliminated many limitations associated with physical media, enabling artists to experiment with textures, colors, and styles in real-time. In Nigeria, digital illustration is gaining recognition, with artists leveraging technology to produce dynamic and interactive artworks for commercial and creative purposes.

Graphic Design

Graphic design has perhaps experienced the most profound impact from digital technology. The introduction of design software like Adobe Illustrator, InDesign, and CorelDraw has streamlined the creative process, making design work more efficient and precise. The traditional method of hand-drawn signboards has been replaced by digital printing technologies such as flex and large-format printing, allowing for high-quality mass production. Additionally, the internet has expanded design possibilities, granting access to extensive resources, fonts, and templates that enhance artistic innovation. In Nigeria, digital graphic design has become a vital industry, supporting advertising, branding, and multimedia production.

Textile and Fashion Design

Digital technology has revolutionized textile and fashion design, replacing manual production techniques with computer-aided design (CAD) software. Programs such as Clo3D, Adobe Illustrator, and AutoCAD enable designers to create intricate patterns, simulate fabric draping, and test color schemes before production. Digital textile printing has replaced traditional dyeing methods, making it easier to produce

complex and customized designs. The integration of laser cutting and 3D printing has further enhanced the precision and efficiency of garment production, allowing for innovative fashion designs that were previously unattainable.

The impact of technology innovation on Sculpture: From Static Forms to Kinetic and Functional Art. sculpture, historically a static and labor-intensive art form, has begun incorporating digital techniques, enabling greater flexibility and innovation. Digital modeling software such as Blender and ZBrush allows artists to create detailed 3D forms before execution, while technologies like Computer Numerical Control (CNC) machining and 3D printing have streamlined the sculptural process. Despite these advancements, Nigerian sculptors have yet to fully explore kinetic and functional sculptures. Pioneering artists like Seyi-Gbangbayau Paul and John Sunday have experimented with mechanized elements, blending movement and functionality into their works. "Ogboju Ode," a kinetic sculpture by Seyi-Gbangbayau, functions both as an artistic installation and a security device. Similarly, John Sunday's "Tomorrow" incorporates moving parts to symbolize the evolving relationship between art and technology. While kinetic art has gained traction in the Western world, Nigerian artists remain largely focused on traditional sculptural methods



Figure 7: Ogboju Ode, (Finished work)

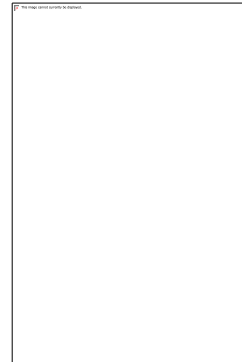


Figure 8: Ogboju Ode in progress

The above work by Seyi-Gbangbayau is a kinetic sculpture with the head capable of 180-degree rotation

The medium include concrete, metal and fiber glass. In Fig. 8 the hunter's light is on

Stainless steel, electric motor, wires and led

Photograph courtesy: Seyi-Gbangbayau P.

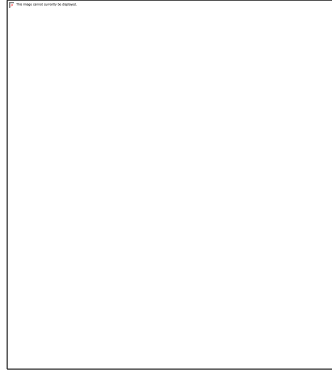


Figure 9: Tomorrow, Metal and Fibre glass, 12ft, Oyu, Nigeria by John Sunday, 2012,
Photograph courtesy: Omoniyi Oluwaseun, 2012.

Findings and Discussions

This research revealed several key insights into digital reformation of art and the relationship between art and technology in Nigeria, particularly in sculpture:

Absence of comprehensive details of the knowledge of digital art in school curriculum across all levels of education and lack of enough skilled teachers to deliver the curriculum

Insufficient equipment and materials for effective teaching and learning in tge schools. Concerning sculpture, there is limited adoption of kinetic and functional Sculpture. Despite technological advancements, only a handful of Nigerian sculptors actively engage with kinetic and functional sculptures. The majority of artists still focus on static forms, often for aesthetic purposes. However, the few practitioners in this field demonstrate the vast potential of technology-enhanced sculpture.

Stylistic Analysis of Kinetic Sculptures

Ogboju Ode by Seyi-Gbangbayau is a kinetic and functional sculpture that serves as both an artistic piece and a security device. The head moves 180 degrees, scanning its environment while an LED light enhances its functionality. This work exemplifies how traditional African themes can be combined with modern mechanical systems. Tomorrow by John Sunday integrates mechanized movement in its design,

symbolizing the connection between art and technology. The sculpture's moving hand and illuminated eyes emphasize the role of art in shaping the future of technological advancements.

Technological Influence on Nigerian Sculpture

Nigerian sculptors incorporating technology often work with metal, fiberglass, and discarded mechanical components, aligning with global trends in mechanomorphic and kinetic sculpture, which emphasize movement and interactivity.

Challenges and Opportunities

Challenges: Limited access to technological tools, lack of formal training in kinetic sculpture, and financial constraints hinder technological integration. Many artists rely on self-taught, experimental approaches.

Opportunities: The growing availability of digital fabrication tools (e.g., 3D printing, programmable electronics) creates new possibilities. Educational institutions can integrate technology into sculpture training to enhance artistic innovation.

Conclusion and Recommendations

The paper concludes that the integration of technology into art is transforming creative practices globally, with digital tools and the internet expanding artistic reach and economic impact. While kinetic and mechanomorphic arts are closely tied to technological innovation, they remain underexplored in Nigeria. Embracing technology, particularly in sculpture, could redefine Nigerian art as both functional and interactive.

To enhance this integration, it recommends that reforms in art education are needed, incorporating digital tools, automation, and mechatronics into curricula. Additionally, increased funding from government and

private organizations would provide artists with access to modern tools, software, and training, fostering innovation in the field.

Directions for Future Research

Further studies should investigate the reasons behind the limited adoption of kinetic and functional sculptures in Nigeria and how digital art could be incorporated into the curricula across all levels of education in the country.

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