



ADVANCED INTERNATIONAL JOURNAL
OF BUSINESS, ENTREPRENEURSHIP
AND SMES
(AIJBES)

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THE LOCAL WISDOM OF PRODUCT DESIGN AS A CULTURAL HERITAGE IN THE DIGITALIZATION ERA

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Article Info:

Article history:

Received date: 29.01.2026

Revised date: 26.02.2026

Accepted date: 16.03.2026

Published date: 31.03.2026

To cite this document:

Dewanto, R. A., Ezran, M., & Tarmizi, A. (2026). The Local Wisdom of Product Design as A Cultural Heritage in The Digitalization Era. *Advanced International Journal of Business Entrepreneurship and SMEs*, 8 (27), 411-422.

Abstract:

The integration of local wisdom into product design is becoming increasingly important in the digital era, especially as cultural heritage faces the risk of marginalization due to globalization and rapid technological advancements. The purpose of this study is to examine how local wisdom can be preserved, transformed, and reinterpreted through the implementation of practices in product design supported by digital technology, positioning design as a medium for sustainability and cultural innovation. This study adopted a qualitative research approach, which used a literature review and comparative analysis of selected case studies in contemporary product design. Data were collected from academic journals, scientific books, and design documentation focusing on cultural heritage, digital design processes, and sustainable design practices. Digital technologies, such as digital modelling parametric design, and digital fabrication, enable the reinterpretation of local wisdom into contemporary design products without diminishing their symbolic meaning. The integration of cultural values in digitally driven design processes can enhance product identity and cultural relevance. Furthermore, products that incorporate local wisdom demonstrate strong potential for long-term differentiation and resilience of national culture in the global market. In conclusion, product design based on local wisdom can serve as a sustainable cultural heritage strategy in the digital age if supported by ethical design principles and a strong sense of national culture.

DOI:10.35631/AJBES.827027 **Keyword:**

Cultural Heritage, Digital, Sustainability, Local Wisdom, Product Design



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Introduction

Local wisdom is a priceless cultural asset, representing centuries of knowledge, traditions, and socio-cultural identity within a community. In product design, local wisdom can always influence the aesthetic, functional, and symbolic values that distinguish traditional products with culturally rooted innovations from mass-produced cultural goods. However, in the era of digitalization, globalization, and modern technology, traditional knowledge systems and practices face challenges. This study aims to investigate how local wisdom integrated into product design can be preserved and enhanced through digital technology, thereby contributing to cultural sustainability and heritage preservation. This paper explores how local wisdom, embedded in product design, serves as a source of cultural heritage that needs to be preserved in the digital era, although in practice there are some adjustments to cultural diversity that are not fully fulfilled in daily activities. As globalization and technological advances accelerate, traditional knowledge and cultural identity face significant threats and opportunities. This study investigates how digitalization supports the preservation, reinterpretation, and sustainability of cultural values in product design. Using mixed research methods including literature review and case analysis, this paper discusses the role of integrating supporting elements integrated into design products, digital platforms, digital documentation, and cultural heritage preservation strategies. The findings show that digital technology not only helps document local wisdom but also increases the cultural sustainability and market reach of culturally rooted designs. This study concludes that integrating local wisdom designed into a product by combining original product engineering with digital devices without reducing the cultural elements in the meaning of the mission and vision contained therein, so this is very important in maintaining the socio-cultural identity of local wisdom values and product design practices in form engineering that is still integrated with sustainable cultural heritage from generation to generation in the increasingly advanced and developing modern era.

Literature Review

Local Wisdom and Cultural Heritage in Design

Indigenous knowledge refers to traditional knowledge and practices passed down from generation to generation. In product design, indigenous knowledge shapes symbolic meanings, material use, and production techniques that reflect cultural identity, Victoria Jakes (2024) Preserving this knowledge is crucial for maintaining cultural diversity and heritage. Studies show

that indigenous knowledge supports community resilience and cultural sustainability when integrated into innovation and sustainability strategies.



Figure 1: Wood Leather Bag Batik Tarakan and Bakul Rotan Anyaman NTB and Cirebon Mask Craft

Source: Pelaku Bisnis – Info Bisnis Tersaji Tuntas dan Festival Karya Kreatif Benuanta, 2023

According to Koentjaraningrat (1990: 181), culture is the power of the mind in the form of creativity, intention, and taste. Life is the result of things related to the human mind, which is a reflection of the mind and the power of all that is thought, felt, and contemplated. Culture is the level of knowledge, system of ideas, or concepts contained in the human mind. In everyday life, it is an abstraction influenced by the processed results of creativity, initiative, and taste. Therefore, these processed results can form a design product that contains the values of local wisdom from the regional culture. The qualitative literature review aims to identify, analysis, and synthesize findings from previous research relevant to the themes: local wisdom, product design, digitalization, and sustainability in the context of culture and product design. This case is intended to look at the goals and approaches in examines how previous researchers understand the concept of local wisdom in product design and cultural preservation, exploring the relationship between digitalization and cultural preservation through digital technologies (digital platforms, social media, digital documentation). Local wisdom and cultural legacy are the key foundations for creating design identities that represent a community's cultural values. Local wisdom serves as both a cultural emblem and a knowledge system passed down through generations, contributing to a community's social and aesthetic identity (Kartono et al., 2024). In the context of design development, these values can serve as conceptual guides for creating products with significant cultural traits. This research explores the preservation of local wisdom in the digital age, with a particular focus on traditional knowledge systems in Indonesia. It highlights how indigenous knowledge, often embodied in heritage crafts, cultural regenerative production, and community-based resource management, serves as the foundation for environmentally friendly production systems, ethical trade, and inclusive entrepreneurship when empowered through digital technologies such as e-commerce, traceability systems, and product design. Maria Laura Nappi et al., (2024) stated that digital knowledge systems and technology integration enable the transformation of cultural heritage into innovative products that possess not only aesthetic value but also economic and sustainable potential in digital era. Chenming Lin et al., (2025) also advocate a systematic approach to product creation through the design process which are two approaches include identifying cultural carriers: Classifying cultural elements into physical/material (visible), social/behavioral (habits), spiritual/ideal (philosophies), and also Extraction & Translation: A model for transforming raw "cultural elements" into "design features" applicable to products. The case for doing research on product design based on user experience and sharing cultural heritage, Yue Jiang (2024) for the different types of product

innovation, user groups will resonate with each other, enhancing the participation and confrontation of user experience. With the development of product innovation and the continuous improvement of user experience

Digitalization and Cultural Preservation

The digital era has created platforms for documenting and disseminating traditional knowledge. Digital technologies such as social media, web-based documentation, and digital storytelling help preserve and share cultural heritage with a wider audience. For example, digital documentation and online platforms have proven effective in preserving authentic products by archiving cultural expressions and mobilizing community participation.



Figure. 2 Batik Clothes



Figure. 3 Digital Posters



Figure.4 Batik Lamps

Source: Baju Batik Wanita, Telitik, Digital Poster, Zkteco, Decorative Design Cahaya Lampu

Cultural heritage encompasses the legacy of physical artifacts and intangible attributes inherited from past generations, preserved in the present, and passed on for the benefit of future generations. This heritage includes buildings, monuments, landscapes, literature, artistic creations, and artifacts. Furthermore, cultural heritage encompasses traditions, languages, knowledge, and customs, which are important manifestations inherited from predecessors and transmitted to descendants. Cultural heritage encompasses not only the preservation of history but also the understanding and recognition of its significance for modern society, (M.Patintingana, 2024). This research explores the preservation of local wisdom in the digital age, with a particular focus on traditional knowledge systems in Indonesia. With rapid technological advancements, concerns have arisen about the erosion of local cultural knowledge passed down from generation to generation. The shift towards globalization and digitalization poses a significant threat to the survival of traditional wisdom, especially when this knowledge is replaced by rapidly produced mass information. Therefore, it is crucial to involve local communities in every stage of the digitalization process, ensuring that knowledge remains relevant to its context and does not become data, but is authentically accepted and used by the community, Christian Natanael (2025). A similar argument is also put forward by Navin Ramankutty (2023), transitioning to sustainability will require technological innovations in the short term, but also cultural change to embrace traditional and Indigenous ideas of respect, responsibility, sufficiency, and reciprocity to reduce consumption in the long term thus the correlation between scientific technology and cultural sustainability within communities, suggesting that technological advances should be

used to empower communities to preserve their knowledge so that it evolves over time, rather than to replace it. Husen Hendriyana et al. (2024) explain that incorporating local characteristics into product design can enhance aesthetics, cultural identity, and creative output to become Harmonising Local and Global Wisdom in the Design of Environmentally Friendly, Fashionable, and Sustainable Craft Products. Digitization plays a crucial role in transforming traditional cultural knowledge into forms that can be widely accessed and further developed. Astri Ayu Purwati and Muhammad Luthfi Hamzah (2026) state that digitization enables more effective documentation, processing, and dissemination of cultural information, thereby expanding opportunities for developing culture-based products in the digital era. This approach allows for the production of innovative products that continuously enhance local culture. Jan Oliver Schwarz and Bernhard Wach (2022) argue that utilizing cultural products (e.g., movies, literature, art) is an underestimated, yet highly effective method to deepen empathy and enhance foresight within the design thinking process. It emphasizes that cultural products help break conventional thinking patterns by providing rich, contextual insights into user behavior and future trends.

Sustainability and Digital Technology Innovation in Cultural Contexts

Economic sustainability and cultural visibility able to be increased through integrate local wisdom into digital platform. Digital transformation initiatives in cultural heritage aim to preserve traditional practices while fostering innovation. Research highlights that digital technology can enable communities to access global markets without losing cultural authenticity. This study examines the transformative potential of integrating indigenous knowledge, cultural values, and traditional ecological practices into digital platforms, Fitra Zahrotul Luqmi et.al.,(2025) to drive innovation and foster green economic growth, in line with the global sustainability agenda. It highlights how indigenous knowledge, often embodied in heritage crafts, regenerative agriculture, and community-based resource management, serves as the foundation for environmentally friendly production systems, ethical trade, and inclusive entrepreneurship when empowered through digital technologies such as e-commerce, traceability systems, and product design base on innovation in digital era. Traditional knowledge is an essential component of traditional heritage that encompasses production techniques, visual aesthetics, and philosophy that are applied to a particular product. According to Nazaruddin and Handaru (2024), traditional knowledge may be a source of innovation in the creation of creative products if it is integrated with contemporary design. As a result, traditional elements are not only preserved but may also be modified by integration of technology in the design process allows the combination of traditional cultural values with modern technological approaches. Marco Mason and Giasemi Vavoula (2021) explain that digital technology in cultural design practices can create more interactive, collaborative, and innovative design approaches, enabling cultural heritage to be adapted into contemporary design contexts.

Methodology

This study adopts a mixed-method approach combining, the first is Qualitative literature review of academic journals, conference proceedings, and community research related to local wisdom, product design, digitalization, and sustainability. Qualitative literature review aims to identify, analyse, and synthesize findings from relevant previous research. The objectives and approach of this method to examine how previous researchers understand the concept of local wisdom in product design and cultural preservation also to explore the relationship between digitalization and cultural preservation through digital technology (digital platforms, social media, digital

documentation) Christian Natanael (2025) in *Preserving Local Wisdom in the Digital Era: A Bibliometric Analysis of Traditional Knowledge Systems* presents a bibliometric analysis of how digitalization impacts the preservation of local wisdom and traditional knowledge systems. This helps understand research trends in digital preservation and local wisdom in a global context. then to analyse how the integration of local wisdom and digitalization supports sustainability (social, economic, and cultural sustainability). The Case analysis of documented practices where traditional design knowledge was digitally preserved and commercialized. Data was collected from peer-reviewed journals, open-access articles, and digital culture heritage reports, with emphasis on post-2020 sources. The stages that will be performed are: First, the researcher does preliminary study and to do context mapping in research. This is intended so that the preliminary study can direct research to obtain an overview and mapping context for more comprehensive research. Second, focusing on the research field by conducting interviews with experts from several research ideas as input and conducting observations in the research field so that it is in accordance with the final results. Third, creating a prototype in research as a form of output that can be produced and evaluating the output results to see deficiencies that need to be reviewed in order to obtain optimal and perfect results. In this methodology, data collection and analysis strategies are also needed to obtain accurate and optimal output results, which are carried out using a technical approach and the use of research tools. Literature Review which is required a lot of data to see how far away the local wisdom of product design as a culture heritage develop in digital era, doing for Expert Interviews as input of knowledge from a few researcher perspectives, and Design Documentation, this study analysis es digital strategies for documenting and preserving local products lost in local wisdom. It uses a qualitative approach through interviews and observations to identify how digital media can expand the reach of local cultural products, Patintingan, Pakiding & Pare (2024). In this case, analysis is based on the successful practice of digitally documenting design traditions or knowledge, as well as the transformation of cultural commercialization through digital technology. According to Anil Mital and Anoop Desai (2007), the product development process requires a sequential approach involving needs analysis, design concept development, product function evaluation, and efficient design implementation. This approach emphasizes the importance of a systematic process in producing products that meet functional, aesthetic, and manufacturability requirements. Furthermore, Foo Shing Wong and David C. Wynn (2023) developed a methodological approach that supports systematic product modelling and functional integration. This method enables an adaptive design process, allowing product development to be more flexible in responding to varying design requirements. Additionally, Bradley Camburn et al. (2015) introduced a systematic method in the design prototyping stage, emphasizing the importance of an iterative process in evaluating and refining designs. This approach allows for repeated testing of design concepts, significantly improving the quality of the resulting product. By integrating these three approaches, the methodology in this study is designed to support the process of transforming local wisdom and traditional knowledge into innovative design products through digitization, digital documentation, and technology integration.

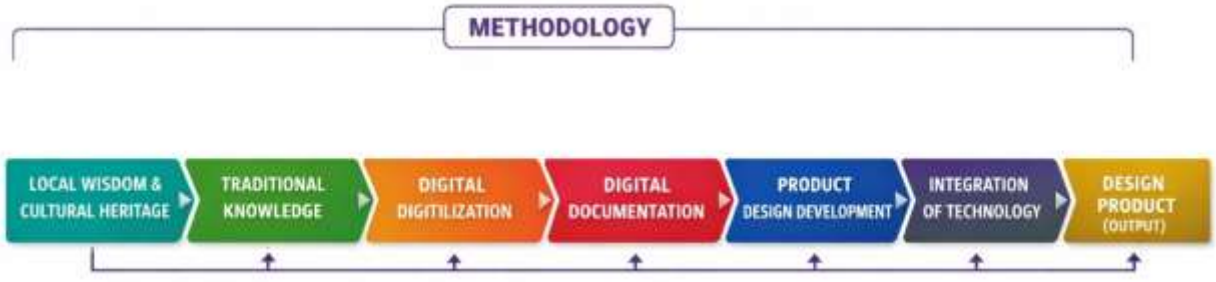


Figure. 5 Schematic Methodology

Source: Systematic Design Approach, Product Modelling & Function Integration, Method for Design Prototyping

Result

Cultural preservation through product design, as a development of traditional heritage, produces product designs that utilize a wealth of data on product designs from industries that value local wisdom. Consequently, the resulting local wisdom in a product design can embody a diverse range of cultural styles with a strong regional character, contributing to the sustainability of cultural heritage products, boosting the commercial micro and macro-economic landscape. The results of this research can be integrated through digitalization by enhancing cultural preservation through digital documentation. This is evident in case studies demonstrating that digital documentation, including multimedia and online repositories, successfully preserves cultural expressions and design practices, enabling them to be used for education and heritage promotion. Communities using digital platforms can generate broader cultural visibility, preserving the narrative meaning embedded in traditional product designs. Furthermore, digital platforms can expand market reach by facilitating broader exposure and sustainable economic opportunities for cultural products. Small producers and artisans who incorporate local wisdom into product designs benefit from online marketing, promotions, and branding strategies that emphasize their regional cultural identity. Sustainability through the integration of technology and tradition can synthesize traditional and modern knowledge through digital innovations that support ecological sustainability, economic resilience, and cultural continuity, for example strategies involving digital documentation, interactive platforms, and heritage-based branding contribute to social and economic sustainability through creative design products that can elevate the value of local wisdom.



Figure.6 Manual Rendering



Figure.7 Digital Rendering

Source: <https://jogjapolitan.harianjogja.com/read/2025/10/02/511/1230282/kisah-perjuangan-batik-tulis-giriloyo>
<https://id.mashable.com/tech/5037/sentuhan-lokal-di-huawei-matepad>

Discussion

These findings underscore that local wisdom is not merely a cultural artifact but also a dynamic resource that can adapt and evolve through collaboration with digital technology. Integrating cultural narratives into design practices and digital tools enhances cultural sustainability and product marketability. Within the framework of design education and policy, promoting digital literacy among artisans and communities strengthens the transmission of cultural heritage in the digital age. Furthermore, digital tools help bridge the gap between previous generations who hold strong traditional values so that they are not eroded, enabling younger generations to engage with cultural knowledge through interactive platforms that are easily accessible and used throughout life in the form of design products, thus supporting the sustainability of cultural heritage practices based on their local wisdom values. Internal integration in Product Design constitutes a connecting Bridge between Cultural Heritage and Digital Sustainability, while the bridge is influenced with 2 factors, namely Traditional and Digitalization. Local wisdom and Cultural heritage are form traditional knowledge, symbols, craftsmanship, and value. Digital Documentation is as a layer of cultural preservation which is related on Product Design Development in interpretation of heritage values, form, function, material adaptation, and as user digital design tools (CAD, parametric design), also making for prototype in design validation. While Digital Platforms as market reach and dissemination layer that have e-commerce and creative marketplaces, social media, digital storytelling, branding based on cultural identity, user engagement and also feedback loop. Integration of Technology and Tradition as sustainability layer have cultural sustainability (identity continuity), economic sustainability (creative economy), social sustainability (community empowerment), and environmental sustainability (local material wisdom).



Figure.8 Fabric Material

Figure.9 Wood Material

Figure.10 Plastic Material

Source: <https://www.tokopedia.com/find/sketsel>

Digital cultural heritage design is driven by the need to provide visitor experiences and services that integrate digital and physical interactions. This need raises complex design issues that extend beyond interface usability to encompass the physical, social, and cultural positioning of digital elements.

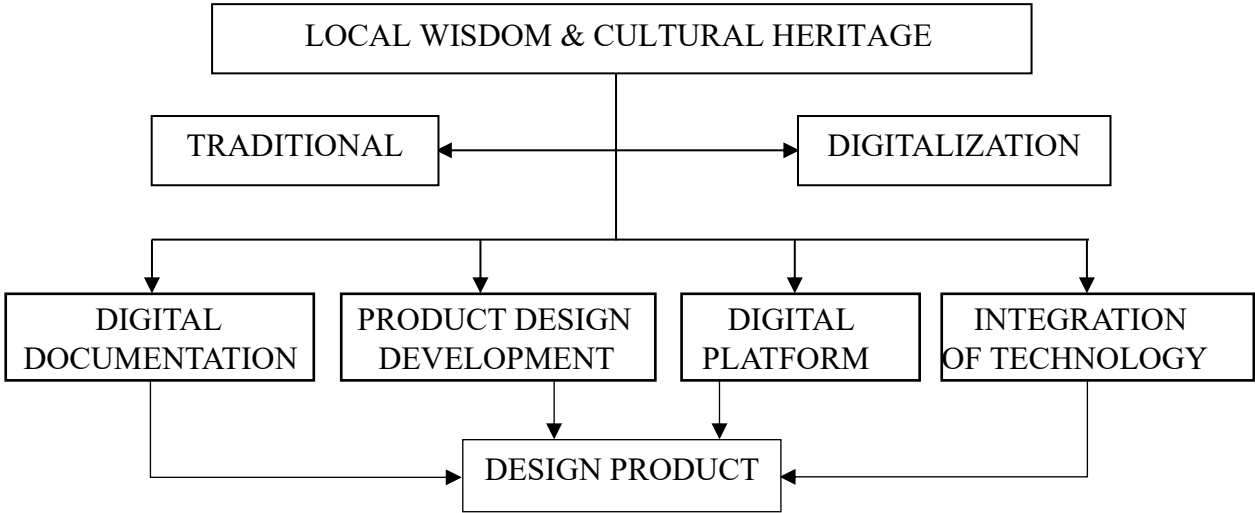


Figure. 11 Schematic Framework

Source: Author’s elaboration based on literature review on local wisdom, digitalization, and product design development (2020–2026).

Conclusion

This study set out to examine the relationship between a few of elements to support the local wisdom of product design as a cultural heritage in the digitalization era in the explanation on the schematic framework that integrated into innovative design products through the integration of traditional knowledge and digital technology. Local wisdom serves as the fundamental source of cultural values, symbols, and identities that shape the conceptual basis of design. Traditional knowledge, including techniques, motifs, and philosophical meanings, provides the cultural content that can inspire creative development, Through the process of **digitalization**, traditional cultural elements are converted into digital formats that can be accessed, analysed, and preserved. Design work makes extensive use of objects and tools within purpose-built spaces (such as design studios) that foster creativity. Design objects are artifacts that facilitate design activities (sketchbooks, prototyping materials, spatial configurations) but also artifacts that are the result of design activities (blueprints, sketches, prototypes) to allow the term to encompass non-material constructs that encode the conceptualization of design situations digital entities such as vector-based graphics or performative actions like role-playing. While the analysis of activities presented in the previous section acknowledges the mediating role of design objects as "tools," it does not reveal the mechanisms by which these objects mediate design actions. These mechanisms are important because they drive design work and shape design practice and are more easily recognized when viewed through the analytical lens of external design representations. This is followed by digital documentation, which systematically records cultural information in digital archives to ensure sustainability and accessibility for research and design purposes. The documented cultural data is then utilized in product design development, where designers transform cultural values into applicable design concepts. The use of digital platforms facilitates collaboration, development, and dissemination of design ideas, while the integration of technology enables the combination of traditional cultural elements with modern design tools and digital systems. Ultimately, this framework leads to the creation of innovative design

products that integrate cultural heritage with digital technology, resulting in products that not only preserve cultural identity but also enhance aesthetic value, economic potential, and sustainability in contemporary design practice.



Figure. 12 Schematic Framework

Source: Stand display digital Sketsel based on local wisdom with digitalization in product design by ChatGPT

Acknowledgements: The authors would like to express their sincere gratitude to [Universiti Malaysia Kelantan, Malaysia, Fakulti Teknologi Kreatif dan Warisan. Universitas Trisakti, Fakultas Seni Rupa dan Desain, Indonesia for providing the necessary resources and support throughout the course of this research. Special appreciation is extended to colleagues and peers who contributed valuable insights and constructive feedback, which greatly enhanced the quality of this paper.

Funding Statement: No Funding

Conflict of Interest Statement: The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the Advanced International Journal of Business, Entrepreneurship and SMEs (AIJBES).

Ethics Statement: This study did not involve any human participants, animals, or sensitive data requiring ethical approval. The authors confirm that the research was conducted in accordance with accepted academic integrity and ethical publishing standards.

Author Contribution Statement: All authors contributed significantly to the development of this manuscript. [Author 1] was responsible for the conceptualization, methodology, and overall supervision of the study. [Author 2] handled data collection, analysis, and interpretation of results. [Author 3] contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.

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