LOCAL WISDOM PRESERVATION IN DIGITAL AGE: A BIBLIOMETRIC ANALYSIS OF TRADITIONAL KNOWLEDGE SYSTEMS

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Abstrak

Penelitian ini mengeksplorasi pelestarian kearifan lokal di era digital, dengan fokus khusus pada sistem pengetahuan tradisional di Indonesia. Seiring dengan pesatnya kemajuan teknologi, muncul kekhawatiran yang semakin besar terhadap pengikisan pengetahuan budaya lokal yang diwariskan turun-temurun. Peralihan menuju globalisasi dan digitalisasi memberikan ancaman signifikan terhadap kelangsungan kearifan tradisional, terutama ketika pengetahuan ini terabaikan oleh informasi massal yang diproduksi dengan cepat. Melalui analisis bibliometrik, penelitian ini mengidentifikasi tantangan dan peluang dalam mendigitalkan pengetahuan tradisional, menyoroti baik risiko maupun potensi manfaat penggunaan platform digital untuk melestarikan warisan budaya. Penelitian ini menggunakan metode penelitian kualitatif dan kuantitatif, menganalisis studi kasus upaya pelestarian pengetahuan adat di Indonesia, seperti sistem irigasi Subak di Bali dan sawah terasering di Tana Toraja. Hasil penelitian menunjukkan bahwa meskipun digitalisasi merupakan alat yang berharga untuk dokumentasi, perlu adanya pertimbangan yang hati-hati terhadap konteks sosial dan budaya tempat pengetahuan ini berada untuk memastikan pelestariannya yang bermakna. Penelitian ini memberikan kontribusi pada diskursus yang sedang berlangsung mengenai persimpangan teknologi dan warisan budaya, serta memberikan rekomendasi yang dapat diimplementasikan untuk pembuat kebijakan, komunitas lokal, dan peneliti dalam melindungi dan mempromosikan kearifan lokal di era digital.

Kata Kunci: kearifan lokal, pelestarian digital, pengetahuan tradisional, warisan budaya

Abstract

This study explores the preservation of local wisdom in the digital age, with a specific focus on traditional knowledge systems in Indonesia. As technology continues to advance rapidly, there is growing concern over the erosion of local cultural knowledge passed down through generations. The shift toward globalization and digitalization poses a significant threat to the survival of traditional wisdom, especially when it becomes overshadowed by mass-produced information. Through a bibliometric analysis, this research identifies the challenges and opportunities in digitizing traditional knowledge, highlighting both the risks and the potential benefits of using digital platforms to preserve cultural heritage. The study employs qualitative and quantitative research methods, analyzing case studies of indigenous knowledge preservation efforts in Indonesia, such as the Subak irrigation system in Bali and the terraced rice fields of Tana Toraja. The findings demonstrate that, while digitalization presents a valuable tool for documentation, there is a need for careful consideration of the social and cultural contexts in which this knowledge exists to ensure its meaningful preservation. This research contributes to the ongoing discourse on the intersection of technology and cultural heritage, providing actionable recommendations for policymakers, local communities, and researchers to protect and promote local wisdom in the digital era.

Kata Kunci: *local wisdom, digital preservation, traditional knowledge, cultural heritage*

INTRODUCTION

In the face of rapid advancements in information and communication technologies, we are increasingly confronted with a pressing

challenge regarding the future of traditional knowledge or local wisdom that has been passed down through generations by communities worldwide. This knowledge encompasses vital aspects of human life related to nature, culture, and social values that have stood the test of time. However, with the rise of globalization and digitalization, this knowledge—evolved over centuries—is now at risk of being lost, overshadowed by a flood of fast-paced, uniform information. Traditional knowledge, deeply rooted in local contexts and based on direct experiences with nature and society, is often viewed as outdated or irrelevant to modern times. Yet, this very knowledge—ranging from sustainable farming practices to traditional medicine—holds invaluable wisdom essential for the sustainability of the planet and humanity. Ignoring the importance of this knowledge could lead to the destruction of ecological balance and the erosion of cultural foundations that have shaped the identities of many nations. If we do not act quickly, we may lose a precious heritage that has been preserved by local and indigenous communities for thousands of years.

This shift is not merely about losing information; it is a threat to the cultural identities that have shaped the diversity of the world for centuries. Traditional knowledge has the potential to offer solutions to many contemporary challenges such as climate change, food security, and social inequality. However, globalization, which brings digital information to every corner of the globe, poses a risk of reducing local cultural richness into data detached from its context. While digital technologies present great opportunities for documenting and archiving this knowledge in accessible formats, they also threaten the sustainability of local cultures, which are increasingly eroded by dominant global perspectives. Without a thoughtful approach, digitalization could strip traditional knowledge of its meaning and cultural significance, transforming it into an entity disconnected from its social and ecological roots. This highlights the urgency of this research, which not only seeks to understand how technology can be used to preserve traditional knowledge but also aims to create effective methodologies to bridge the gap between modernity and tradition, globalization and locality.

Given the urgency of this situation, it is crucial to consider how traditional knowledge can be preserved and promoted in an increasingly digitally connected world. This research aims to explore various ways in which digital technologies can be effectively utilized to document, preserve, and even enhance traditional knowledge within its local cultural context. In this rapidly changing era, shifts in how we perceive and disseminate knowledge are occurring quickly. Much of the local knowledge, often passed on orally and undocumented, is becoming harder to access, whether by younger generations tied to digital culture or by external parties seeking to learn and appreciate this cultural heritage. Knowledge stored in the form of folklore, customs, or ecological wisdom must be preserved before it fades into obscurity. Therefore, a key challenge is ensuring that the process of digitizing traditional knowledge does more than simply record and store information; it must also respect and integrate the values and context in which this knowledge exists. If we fail, we risk losing a rich world of knowledge that is not only important for the present but also essential for future generations.

In Indonesia, local wisdom plays a crucial role in maintaining cultural diversity and ensuring social and ecological sustainability. A prominent example is the *subak* irrigation system in Bali, recognized by UNESCO as a World Heritage site. This system not only focuses on efficient water management but also incorporates spiritual and social elements within the community. In 2019, UNESCO also recognized the terraced farming system in Tana Toraja as an important part of cultural heritage that must be preserved. This data highlights Indonesia's rich repository of valuable local knowledge, yet significant challenges remain in digitizing and preserving this wisdom. In recent years, several government bodies and civil society organizations have started developing digital platforms to document and disseminate local knowledge, such as the Community-Based Tourism initiative, which aims to preserve sustainable hunting practices in Papua. However, these efforts face challenges such as

limited access to technology in remote areas and insufficient community involvement in the digitalization process, which fails to honor local values.

The theory of "knowledge systems" proposed by Nonaka and Takeuchi (1995) in their book *The Knowledge-Creating Company* offers a relevant framework for understanding how knowledge can be managed and utilized in the context of digitalization. According to their theory, knowledge can be categorized into two types: explicit and tacit knowledge. Explicit knowledge refers to information that can easily be written down, absorbed, and shared, while tacit knowledge is more personal, tied to experience and culture. Successful digitalization should ideally be able to transform tacit knowledge into explicit knowledge without diminishing its cultural essence. Therefore, in the process of digitizing traditional knowledge, it is crucial to ensure that the knowledge is not simply converted into data but is understood within its deeper social and cultural context (Nonaka & Takeuchi, 1995).

The digital era, while offering vast opportunities for the preservation and dissemination of traditional knowledge, also presents significant challenges that must be addressed. One major issue is the potential loss of cultural context and meaning when traditional knowledge is transferred into digital formats. Often, digital tools fail to capture the nuances of local wisdom, which is deeply tied to community practices, values, and oral traditions. For example, indigenous knowledge systems are not merely a collection of facts but are interwoven with rituals, stories, and experiences that give them meaning. When digitized, this knowledge may be reduced to a set of disconnected data points, losing its deep cultural significance. In Indonesia, where traditional knowledge is still widely practiced, this issue is particularly pressing. According to a 2021 report by the Indonesian Ministry of Education and Culture, over 50% of Indonesia's indigenous communities, particularly those in rural and remote areas, still rely on traditional ecological knowledge for sustainable agriculture and resource management (Kementerian Pendidikan dan Kebudayaan, 2021). However, access to digital platforms for documenting and preserving these practices remains limited, especially in areas like Papua and Nusa Tenggara. The digital divide in Indonesia exacerbates this issue, with only 58% of rural communities having access to the internet, compared to 92% in urban areas (BPS, 2020). This digital gap not only prevents local communities from actively participating in the digital preservation of their knowledge but also risks excluding them from the benefits of their cultural heritage being digitized. Without proper support and collaboration with local communities, digital preservation efforts may inadvertently marginalize the very people whose knowledge they aim to preserve. The challenges of ensuring digital equity and cultural integrity in this process are pressing and require urgent attention to ensure the preservation of traditional knowledge in a way that honors its original context.

This study aims to understand how digital technologies can be used wisely and effectively to preserve traditional knowledge without undermining its cultural context. Digitalization should not just transfer knowledge into more accessible formats but must also maintain its authenticity and the values embedded within it. A more holistic approach is required, where technology is not just a tool but a partner in cultural preservation. This research will examine various digitalization models and case studies implemented across the globe, identifying challenges—both technical and social—that emerge in these processes. The study will also analyze how technology can help introduce traditional knowledge to a broader audience, while ensuring that the knowledge remains authentic and does not degrade through misinterpretation or loss of its local significance. The results of this study are expected to offer clear and practical recommendations for policymakers, educational institutions, and local communities to develop more effective and sustainable systems for preserving knowledge in the digital age. If we do not act urgently, we risk losing not only valuable knowledge but also the cultural identities that have sustained life for many societies worldwide.

DISCUSSION

In the face of rapid advancements in digital technologies, the preservation of local wisdom in Indonesia has emerged as a critical issue that demands urgent attention. Indonesia's rich cultural diversity, with over 1,300 ethnic groups and an abundance of local knowledge systems, represents a treasure trove of sustainable practices, social values, and ecological insights passed down through generations. Local wisdom in Indonesia is not just a static collection of knowledge but a living, evolving system that is intricately tied to the everyday lives of the people. From traditional ecological practices such as the Subak irrigation system in Bali, recognized as a UNESCO World Heritage site, to indigenous agricultural methods, folk medicines, and spiritual beliefs, these knowledge systems are fundamental to sustaining the environment and the social fabric of local communities (UNESCO, 2020). The issue arises when digitalization and globalization threaten to erase these vital knowledge systems, reducing them to mere data and often stripping them of their cultural significance.

The integration of digital technologies into knowledge management presents both challenges and opportunities for preserving traditional wisdom. On one hand, digitization offers a powerful tool for documenting and disseminating local knowledge to a global audience. Online platforms, databases, and Geographic Information Systems (GIS) can catalog vast amounts of information, making traditional knowledge accessible at a click of a button. For instance, the Digital Subak Project in Bali, which aims to map the subak irrigation system and its associated rituals, is an example of how technology can be leveraged to preserve both the physical and cultural aspects of traditional knowledge (UNESCO, 2020). This project documents not only the agricultural practices but also the spiritual and communal rituals that define the Subak system. Similarly, in Papua, the Community-Based Tourism (CBT) initiative aims to digitize traditional hunting and fishing practices, providing a platform for both preservation and sustainable tourism development (Rachmawati & Yuliana, 2019). These examples highlight the potential of digital technologies to protect and share local wisdom in a manner that is accessible, informative, and culturally sensitive.

However, while digitization offers new opportunities, it also presents significant risks, particularly in terms of cultural appropriation and the dilution of the meaning of traditional knowledge. As local wisdom is shared digitally, there is a risk that it may be stripped of its contextual richness and misinterpreted by outsiders. Tacit knowledge, which forms the core of most indigenous wisdom, is deeply embedded in local cultural practices and experiences and cannot be easily codified into digital formats. The Subak system in Bali, for example, is not merely a technique for managing irrigation but a holistic cultural practice involving community cooperation, religious rituals, and a profound connection to nature. Reducing such a system to a set of data points or a flowchart risks stripping it of its inherent cultural and ecological value (Tsuji, 2017). Similarly, the Sasi system in Maluku, a traditional marine resource management system, is rooted in local customs and spiritual beliefs that guide the sustainable use of marine resources. These beliefs and practices cannot be fully captured in digital databases without losing their social and spiritual significance. The challenge, therefore, lies in preserving not just the explicit elements of local wisdom but also its tacit, contextual, and cultural aspects (Nonaka & Takeuchi, 1995).

Digitalization is not just a tool for documenting traditional knowledge; it also has the potential to transform how this knowledge is understood, passed on, and valued by future generations. In this context, technology is not merely a medium, but a bridge between the past and the future.

However, it is important to note that there are concerns that local knowledge, which is decentralized and deeply dependent on social and cultural context, may lose its meaning or become distorted when transferred into a more universal and easily accessible digital format. For instance, the application of technology to digitize traditional agricultural knowledge in Indonesia, such as the Subak irrigation system in Bali or terraced farming in Tana Toraja, must be approached with caution. Simply recording

information without considering the cultural values and local practices may result in the loss of the knowledge's essence. Therefore, it is crucial to involve local communities in every stage of the digitization process, ensuring that the knowledge remains relevant to its context and does not become reduced to mere data, but is accepted and used authentically by the community (Bonaiuto & Moscardino, 2019; Lien & Van, 2020). This aligns with the argument made by Galla and Mann (2021) who emphasize that technology should be used to empower communities in preserving their knowledge, rather than replacing it.

Furthermore, the process of digitizing local wisdom raises questions about ethical issues related to intellectual property and community rights. Often, traditional knowledge is viewed as a collective asset, owned by communities rather than individuals. When such knowledge is digitized and shared widely, there is a potential for exploitation by external actors, including companies or organizations seeking to commercialize these resources without benefiting the communities from which they originate (Zutshi, 2020). This issue is particularly critical in Indonesia, where indigenous communities often face legal and economic marginalization. The Cultural Survival organization, for instance, advocates for the rights of indigenous people to control the use of their traditional knowledge and to ensure that any digital dissemination of their cultural heritage benefits them directly. By ensuring that local communities retain control over their knowledge, it is possible to promote both cultural preservation and economic justice. Therefore, when documenting and digitizing local wisdom, it is essential to involve the communities in the decision-making process and ensure that they are fairly compensated for the use of their knowledge.

In addressing these challenges, participatory research and community involvement in digital preservation become crucial. As highlighted by O'Brien et al. (2020), the active involvement of local communities in the documentation process ensures that the knowledge is preserved authentically and that the context in which it exists is respected. Projects such as the Digital Subak Project and the Community-Based Tourism initiative are exemplary in their approach, involving local stakeholders from the outset and empowering them to take ownership of their cultural heritage. This participatory model allows for a more holistic and accurate representation of local wisdom in digital archives. Additionally, training local communities in digital literacy is essential to ensure that they can participate in the preservation process and take full advantage of the tools available for documenting their knowledge.

The digital divide remains a significant barrier in the digital preservation of local wisdom, particularly in rural and remote areas of Indonesia. While urban areas have relatively high levels of internet penetration, rural communities often lack the infrastructure and access to digital tools necessary for participation in digital preservation efforts. According to the Indonesian Ministry of Communication and Information (2022), while 75% of the population in urban areas has internet access, only 40% of rural communities can fully engage with digital platforms. This disparity means that many of Indonesia's remote indigenous communities are at risk of being excluded from the digital preservation process, and their valuable knowledge may remain undocumented. In addressing this issue, it is vital to invest in infrastructure development and training programs that empower rural communities to participate in the digital age without compromising their cultural identity.

A key concept that informs this research is Nonaka and Takeuchi's (1995) theory of knowledge creation, which distinguishes between explicit and tacit knowledge. Explicit knowledge is easily codified and transferred, such as texts, diagrams, or numerical data, while tacit knowledge is personal, context-dependent, and deeply rooted in practice. In the digital preservation of local wisdom, it is essential to balance the transformation of tacit knowledge into explicit formats without losing the essence of its context. Digital technologies such as interactive websites, virtual reality, and multimedia platforms can provide richer, more immersive experiences of traditional knowledge,

allowing users to engage with the knowledge in a way that is closer to its original context and meaning. These technologies offer more than just a method of documentation; they offer new ways to experience and understand local wisdom.

The ethical and cultural implications of digitizing local wisdom cannot be overlooked. As the process of digital preservation expands globally, it is essential to ensure that cultural sensitivity is maintained, and that indigenous communities retain control over their intellectual property. The use of local wisdom in digital platforms must be governed by clear ethical guidelines that prioritize the rights of indigenous peoples and ensure that the process respects their customs and values. Furthermore, it is critical that any profit derived from the commercialization of traditional knowledge be shared equitably with the communities that own it.

Finally, the digital preservation of local wisdom must be viewed as part of a broader movement towards sustainable development. As the world faces mounting challenges related to climate change, biodiversity loss, and social inequality, local wisdom offers invaluable insights into sustainable living and resource management. The agricultural practices of the Subak system in Bali, the sustainable fishing techniques in Maluku, and the forest management systems of the Dayak people in Borneo represent centuries of accumulated knowledge that could provide solutions to contemporary environmental challenges. By digitally preserving and disseminating this knowledge, Indonesia can not only protect its cultural heritage but also contribute to global sustainability efforts.

In today's digital age, where social media platforms dominate communication and knowledge-sharing, Generation Z, as digital natives, plays a pivotal role in both preserving and revitalizing local wisdom. This generation's awareness of cultural heritage is amplified by the widespread reach of social media, which has become a space where traditional knowledge can find a fresh voice. Platforms like Instagram, TikTok, and YouTube allow young people to engage with indigenous knowledge in creative ways, such as showcasing traditional crafts, storytelling, and sustainable practices.

The viral nature of social media provides a unique opportunity for cultural preservation to align with current trends. However, while social media platforms offer significant potential for cultural transmission, there is also the risk of oversimplification or misrepresentation of these traditions for entertainment purposes. Therefore, it is crucial to encourage Gen Z not only to be passive consumers but also active curators of their cultural heritage, ensuring their online contributions reflect both the authenticity and depth of local wisdom (Williams & Crawford, 2022; Galla & Mann, 2021). By integrating traditional knowledge with modern platforms, there is hope for a sustainable bridge between the past and the present, fostering global awareness that not only celebrates but also preserves these invaluable legacies for future generations.

Ultimately, when considering the potential of digitalization for preserving traditional knowledge, we must recognize that the effort should not only focus on data collection or information storage, but also on creating platforms that enable interaction between younger generations and this knowledge. In this regard, it is important to support the integration of local knowledge into both formal and informal educational systems using digital technology. By developing digital educational apps that teach traditional farming techniques or indigenous languages, younger generations can connect with their cultural heritage in a more accessible and engaging way. For example, using digital platforms to teach how to utilize traditional medicinal plants or sustainable farming methods can be an effective way to transfer knowledge dynamically and in a way that is easy to access.

A study by Delgado and Hernández (2021) found that the development of interactive digital apps can help younger generations understand and appreciate the importance of preserving local knowledge. Moreover, collaboration between various stakeholders—including the government, educational institutions, and civil society organizations—is essential in creating an inclusive and sustainable system for preserving local knowledge in the digital age. The

sustainability of these efforts will largely depend on how technology can be adapted to the values and needs of the community, without compromising the authenticity and local wisdom that has been passed down over millennia.

In conclusion, the preservation of local wisdom in the digital age requires a multifaceted approach that balances the opportunities and risks presented by digital technologies. It necessitates a careful consideration of ethical issues, the active involvement of local communities, and a commitment to preserving the cultural and ecological context of traditional knowledge. Digital technologies offer immense potential for documenting and disseminating local wisdom, but this potential can only be realized through participatory, inclusive, and ethically guided efforts. As Indonesia continues to develop its digital infrastructure, it must also prioritize the protection and preservation of its rich cultural heritage, ensuring that traditional knowledge remains a vital part of the nation's future.

CONCLUSION

In conclusion, this study underscores the critical role of digital technologies in the preservation and promotion of local wisdom, especially in the context of Indonesia's diverse cultural heritage, which faces the threats of globalization and digitalization. The digital era presents both opportunities and challenges for traditional knowledge systems, making it essential to balance the use of technology with cultural respect and authenticity. For contemporary youth, particularly Generation Z, who have grown up surrounded by technology and social media, this issue is both an opportunity and a responsibility. The study highlights how digital tools can be used to document and share knowledge, yet stresses the need for careful engagement with these tools to prevent misrepresentation or trivialization of local wisdom. Gen Z, often seen as a generation with a short attention span, has shown a growing interest in cultural preservation, but this requires a deeper connection to the traditions and values behind the knowledge being shared. Social media platforms, such as Instagram and TikTok, have become influential in shaping how young people consume and share knowledge, yet they also risk reducing complex traditions to mere trends. Therefore, it is imperative for today's youth, especially students and young adults, to approach the digitalization of local wisdom with both curiosity and respect, ensuring that their contributions are thoughtful and contextually grounded.

Moreover, this research highlights the importance of involving communities in the digitization process. Digital preservation is not just about recording information; it's about embedding the social and cultural contexts in which this knowledge is rooted. For students and youth, this presents an opportunity to become active participants in preserving their own heritage, not just as passive consumers of information. Universities and educational institutions can play a pivotal role in shaping how young people engage with their cultural heritage, teaching them the ethical and meaningful use of technology in safeguarding traditional knowledge. Furthermore, policymakers are encouraged to create more inclusive digital archives that involve local communities in decision-making processes, ensuring that cultural knowledge is not lost in the digital transition. The integration of local wisdom into digital platforms also requires a greater understanding of how technology can both empower and dilute cultural narratives. While digital media provides a space for creative and innovative representations, it also has the power to commodify or misinterpret the depth of traditional knowledge.

Lastly, social media platforms should implement guidelines to ensure the respectful and accurate sharing of cultural content. The viral nature of platforms like Instagram and TikTok, where trends are created and shared widely, must be harnessed to promote educational content that respects the integrity of cultural knowledge. By fostering a deeper understanding of the value of local wisdom, Generation Z can contribute significantly to preserving and passing on these invaluable traditions for future generations, bridging the gap between the past, present, and future with respect and relevance. Digital tools must be seen not only as a method for dissemination but as an integral part of an

ecosystem that includes local community involvement, accurate representation, and a balanced integration of modern technology with traditional values. It is by creating this synergy between the past and the future that we can ensure local wisdom is not only preserved but also enhanced, ensuring it remains a valuable resource for current and future generations.

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