

THE USE OF TECHNOLOGY IN CAPTURING VARIOUS TRADITIONAL MOTIFS AND ORNAMENTS: A CASE OF BATIK FRACTAL, INDONESIA AND TUDITA-TURKISH DIGITAL TEXTILE ARCHIVE

Olivia Gondoputranto^{1*}; I Wayan Dibia²

¹Fashion Product Design and Business, School of Creative Industry, Universitas Ciputra Surabaya
CitraLand CBD Boulevard, Made, Sambikerep, Surabaya, Jawa Timur 60219, Indonesia

²Magister Program, Performing Arts Faculty, Institut Seni Indonesia
Nusa Indah street, Desa Sumerta, East Denpasar Timur, Denpasar, Bali, Indonesia

¹olivia.gondoputranto@ciputra.ac.id; ²w_dibia@yahoo.com

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ABSTRACT

Technological development and digitalization were often identified as the cause of traditional culture elimination. There was an antithesis when it came to technology and digitalization. Therefore, with these two representative cases, the research aimed to show that these developments did not eliminate existing traditions but could instead preserve the almost gone cultures. The material objects were traditional textile motifs, namely Indonesian batik and Turkish Sumerbank, while a descriptive qualitative method was applied via a collective case study. First, it involved batik fractal by Pikel Indonesia, where the community used an algorithm, and the Turkish Digital Textile Archive (TUDITA) by Izmir Economic University. These two case studies were selected based on the same material object and traditional motifs but using different technological application processes. The data sources were observation and reviews of literature and audiovisuals. At the same time, the analysis of the two cases was described, analyzed, and performed via Contemporary Cultural theory in the digital age perspective, explicitly using the three indicators for viewing cultural perspectives in the digital era by Piliang. Each indicator was applied to analyze the technology implementation for each case and afterward showed the impact of technology implementation for each indicator. Subsequently, the results show that the traditional Indonesian batik and Turkish Sumerbank motifs are successfully preserved by technology. Batik fractal shows that it has been a great help for the batik artisans to recreate the traditional motifs by using Jbatik software. The traditional batik motifs can be preserved and reproduced into other implementations. While TUDITA also shows how the process of digitalization can restore the lost traditional motifs to build a digital archive of traditional motifs and results in more explorative implementation. Furthermore, although both cases use different technological methods, their implementation produces a new form of traditional textile synthesis without eliminating the essence of the local values contained.

Keywords: traditional motifs, traditional ornaments, technology implementation, batik fractal, digital archives, Turkish textile

INTRODUCTION

There are numerous arguments regarding the existence of modern technology and digitalization in various sectors. Many assume they indirectly generate propaganda, eroding local cultural traditions and values, especially for the younger generation. This degeneration is often associated with modern technology, which is considered to shift existing

local cultures, traditions, and values. This is a current phenomenon that could not be ignored lightly. This phenomenon exists as the antithesis of technology and digitalization. In an effort of preservation, these ties may be cut off by leaving computers, mobile phones, and the internet employed in accessing and searching for needed information. However, this is impossible, as people currently live in the digital era, where technology and digitalization have been adopted,

implemented, and are proven to impact and change the advancement of several fields of life.

The research objective is to show that technology implementation with the right approach would show some beneficial results. The Contemporary Cultural theory by Piliang (2020) would be used in the research because this theory could explain the perspective of culture in this digital era, especially using the three specified indicators. Those indicators are system technology, economic discourse, and ethical factors. The three indicators of the Contemporary Cultural theory in the area of the digital age would be used to analyze each representative case to see the results. The first representative study case is Batik Fractal from Indonesia, which considers marrying science and art to create a software called Jbatik. The second representative case is TUDITA (Turkish Digital Textile Archive) as the digital archive created to preserve Turkish's traditional motifs' Sumerbank'. Before this, some fields of studies had already implemented how technologies had some impacts in their field. Visvizi and Daniela (2019) have highlighted that information and communication technology (ICT) has enhanced the teaching process using animation and interactive virtual reality in the classroom. Putri (2020; 2019) has also asserted how technology has triggered and impacted education, empowering students to work collaboratively and conduct a whole new learning process. While in the healthcare field, technology has a vital role in improving various services for patients, like the implementation of RFID (Radio Frequency Identification) to track medical supply stock, identify each patient, and reduce any medical errors (Abugabah, Nizamuddin, & Abuqabbah, 2020).

Furthermore, Salehan, Kim, and Lee (2018) have affirmed that technology affects social structures and values, and indications also reveal that it is the main driver of cultural convergence worldwide. Based on the implementation and enormous effects in various fields, its use has inevitably become an integral part of life in the modern community. Hence, people should endeavor to befriend and use it, and one of such ways is to preserve the existing local values. Traditional culture can be perpetuated and passed on to the current young generation through an understandable and accepted approach, namely technology and digital media use. This approach can also promote culture (Rosa & Sunarya, 2020), thereby proving that it plays a role in its strengthening.

Therefore, the research focuses on technology's implementation to preserve material objects, particularly traditional motifs. The research aims to show how technology and digitalization could preserve traditional motifs using two representative cases from Indonesia and Turkey, with the same material object, traditional motifs. The two study cases are analyzed with Contemporary Cultural theory related to the digital era. Specifically, these cases would be described and performed via three indicators for viewing cultural perspectives in the digital era by Piliang. McInnis (2019) has stated that the evolution

of intelligence creates a digital environment where lies the mythical character of machine language and is dominated by code that can transform minds and behaviors into binary or digital. Subsequently, this digital era allows a change in the way reality is viewed and generates new awareness regarding the mix between the past, present, and future in electronic simulations and hallucinations of space (Piliang, 2020). This situation is useful for various positive benefits, such as preserving traditional culture. A form of traditional cultural heritage that has often received attention from the government and community is the variety of traditional motifs and ornaments.

According to Suhersono (2005), motifs are designs of various shapes, lines, and elements from different forms of stylized nature and objects that have their distinctive styles and characteristics. Saragi (2018) has defined motifs or ornaments as a pictograph or visual language as an expression of the soul. Apart from the aesthetic value possessed by a sheet of cloth with certain motifs and ornaments, it stores past historical stories and sometimes has a spiritual and traditional dimension that can describe the high level of Indonesian culture (Widagdo, 1997). The visual aspect of each motif is usually associated with philosophical values contained in the motifs. Certain figurative motifs are even associated with human correlations with Cosmos (Winarno, 2017). Sedana (2017) has stated five interpretable clues to predict that traditional cultures may contain these five clues called 'Sasmita', including Sipta, Smita, Signal, Sign, and Prediction. 'Sasmita' is the transcendent aspect embedded in traditional cultures such as clothes, motifs, dance, and beliefs. These transcendent aspects are usually fading through generations. Every motif or ornament printed on this cloth symbolizes a nation's cultural wealth, shows cultural variety and diversification, and represents a region's identity and depth of history through its philosophy and meaning.

Since these patterns are part of the culture in a certain nation or area, there is a need for preservation and maintenance efforts. Hence, traditional motifs and ornaments, along with the development of the era, can be immortalized and applied in various fields of life. Many owned by each region have changed and shifted because of this development, while some have been lost due to the absence of a cultural inheritance process for younger generations, coupled with the occurrence of theft. According to Republika (2008), the 'Tulangnaga' or dragon bone motif, commonly seen on the bracelet worn by the painting of the governor, Gajah Mada, was stolen by foreigners. Previously, there was also a loss of the copyright of 800 traditional Balinese silver motifs suddenly patented by foreigners. Based on this problem, there is a need for a system to record, document, and compile these traditional patterns and promote their use and application for various purposes. This neatly systemized documentation will also help with archival and protection.

Meanwhile, textile motifs and technology have often been linked and used as objects in previous

research (Ferri et al., 2017; Lu, Mok, & Jin, 2017; Massaroni et al., 2018; Zhou et al., 2019). Several have also mentioned other studies carrying specific ethnic and cultural themes. These include tracing past patterns (Gleba, 2017; Iancu, 2018; Nelson et al., 2020; Sardjono, 2017) and discussing the relationship with the maker's community (Arnold, 2018). Although efforts have been made to recreate these patterns (Rani et al., 2019; Sarri & Mokdad, 2019; Yusof, Aris, & Sajar, 2018), the research focuses on technology and digitalization, which help to preserve motifs, as similar research is rare. Therefore, it aims to fill the gap and use technology to recreate and reconstruct traditional motifs from the past and promote their application in the textile and fashion fields.

Two case studies with similar objects, namely traditional motifs, are used. The first is Batik Fractal, Indonesia, which is considered the result of combining traditional arts, science, and technology. Widodo (2019) has explained that the basic concept used in Batik Fractals is using geometric figures consisting of various characteristics; some parts have the same form and shape as a whole are fragmented, duplicated, and repeated. This community is initially introduced by members of Pikel Indonesia, namely Nancy Margried, Muhamad Lukman, and Yun Hariadi, with a vision to continue preserving Indonesian batik. They observe that combining mathematics, batik art, and technology generates innovations and finally creates the software called 'jBatik'. This software manufactures motifs made by craftsmen from all over Indonesia, which produce batik to be archived and stored for other purposes. Djulius (2017) has explained that Batik Fractal is the perfect success story to show the process of how to transform creative ideas into innovative products. This software is also cost-effective, as it uses integrated cost management, which enables the company to undertake cost-effectiveness and produce their products at competitive prices (Rahmawati & Rahadi, 2019). This technology can empower local artisan batik to develop their creativity to create batik motifs (Maryunani, 2019). This innovation will also help the local artisans to sell their products on international markets (Febrianti et al., 2019). The second case is the Turkish Digital Textile Archive (TUDITA) by Izmir Economy University, which aims to preserve Sumerbank's various motifs. Sumerbank factory was once one of the oldest and well-known textile producers in Turkey and is still believed to symbolize their economic independence; therefore, their patterns are considered icons representing the country. Subsequently, Izmir Economy University creates an online database for storing and archiving iconic motifs from Sumerbank Turkey, ensuring their legacy can be preserved and passed down later. It is also used for various purposes in advancing their textile industry (İlker, 2019). Therefore, the research is expected to provide a clearer description of technology use perpetuating an area's local wisdom, especially traditional motifs and ornaments. Apart from being a step to perpetuate, it is also applicable to

design or industrial needs.

Consequently, the research also provides knowledge and information regarding using technology for researchers, artisans, or related industry players to better appreciate and preserve traditional motifs in their area. Also positively, the result of the research would give some outlook and insights from Contemporary Cultural theory's point of view, especially in the area of the digital age about how technology implementation could preserve and revive some traditional motifs and patterns. The result could also be used as a paradigm of how technology implementation could be used to preserve traditional culture using Contemporary Cultural theory in the area of the digital age. Accordingly, these patterns, alongside their meaning and philosophy, will be preserved and passed down to the younger generations.

METHODS

The research is conducted by applying qualitative methods via a collective case study. Rahardjo (2017) has defined a case study as a series of scientific activities performed intensively, in detail, and in-depth regarding a program or event at the level of individuals, groups, institutions, or organizations to gain knowledge. Although the research raises more than one case (multi-case), the procedure is the same as single research because it develops the method (Edraswara, 2017). According to Baxter and Jack (2008), similarities or differences can be observed and drawn in multiple cases. Hence the research examines the Indonesian Batik Fractal and the Turkish Digital Textile Archive (TUDITA), with the same object, traditional motifs, and ornaments. The data mining is performed by observing, documenting, and collecting literature data related to both cases, such as books, journals, news, internet, and audiovisual sources. Furthermore, intrinsic research is used to obtain more profound results regarding the problems or phenomena that occur in society (Rahardjo, 2017).

There are three major phases in the research. The first phase is collecting literature data for Batik Fractal and TUDITA case. After examining the data, the second phase analyzes the data using three indicators of Contemporary Cultural theory in the area of the digital age. The last stage is delivering the analysis of the results to conclude. The research is conducted explicitly using Contemporary Cultural theory in the area of the digital age. The data collected from both study cases would be analyzed using three indicators to see how technology implementation would have resulted for each case study. Piliang (2020) has explained three main indicators that are useful for viewing cultural perspectives in this digital age. Those indicators are system technology, economic discourse, and ethical factors. After being analyzed with the three indicators, there are results to show the impacts of technology implementation for each case.

RESULTS AND DISCUSSIONS

All respondents (100%) have acknowledged the considerable authority of the executive board to lead and direct the foundation, including setting the The research examines two case studies with the same object, traditional motifs and ornaments, but different technology applications and uses. The objectives and results obtained from this implementation in the two cases are explained.

The first case study is about batik fractal Indonesia. It combines art and science that uses technology as the medium. Sumardjo (2000) has stated that there are differences in their nature, as art contains transcendent components, while science is more directed towards immanent elements. Fractals generally familiar in mathematics usually identify as sets of dots with bigger dimensions than their typological dimensions (Wulandari, Purnomo, & Kamsyakawuni, 2017). The basic concept of batik fractal is using the fractal concept of generating graphical images with similarities to fabricate the new shape and form (Isnanto, Hidayatno, & Zahra, 2020). According to Hariadi, Lukman, and Destiarmand (2010), batik and fractal are entirely different concepts, where batik is a part of art, and fractal is a concept of Mathematics that uses the principle of repetition and can detect similarities. However, their collaboration births a new concept is known as the batik fractal. Generally, fractals are used to design or redesign motifs or ornaments using the 'jBatik' software, coordinated and conditioned to arrange new compositions. This use is not coincidental because previous research discusses similar characteristics, such as studying and measuring fractal dimensions using the Box-Counting and Fourier Transformation methods (Tian et al., 2019). Also, the employment of this concept provides a possibility for the exploration of new motifs and ornaments based on traditional formulas, which are bridged by the technology embedded in the jBatik software. This application is created with the Java programming language, with a user-friendly GUI for ease of use. With this technology, such designs can be applied effortlessly. Figure 1 shows the example of batik fractal.

The jBatik software technology recognizes similarities in batik's shape and fractal dimensions and categorizes them based on specific groups. Therefore, it will significantly facilitate the grouping of various motifs and ornaments of the Nusantara Batik. The process of technology implementation in batik fractal is quite simple, as shown in Figure 2.

Several benefits can be obtained by using jBatik technology. It can be operated as a motive filling method. As a motive filling method, jBatik analyzes the fractal dimensions of a motif and uses Fourier Transformation to identify forms of patterns and sort them into several categories. This is possible because each possesses fractal characteristics, from the similarity in geometrical detail to the motif, which helps compile a database and category for Indonesian

batik (Figure 3). For example, five groups are differentiated from their regional origins based on their characteristics. Judging from the fractal formula, batik Jogja and Solo are at the midpoint between Madura and Garut. Conversely, Lasem has one category with Tasik Batik, while Cirebon has a separate group without any similarities with other regions.

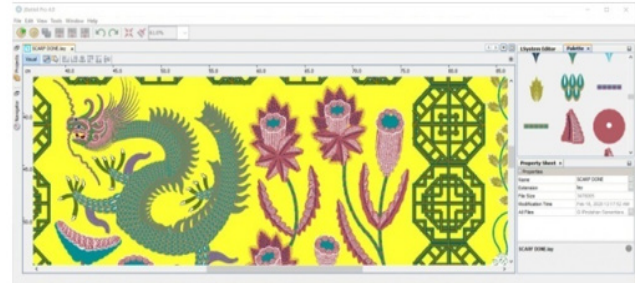


Figure 1 Batik Fractal
(Source: batikfractal.com)



Figure 2 The Process of Technology Implementation in
Batik Fractal, Indonesia
(Source: Gondoputranto, 2021)

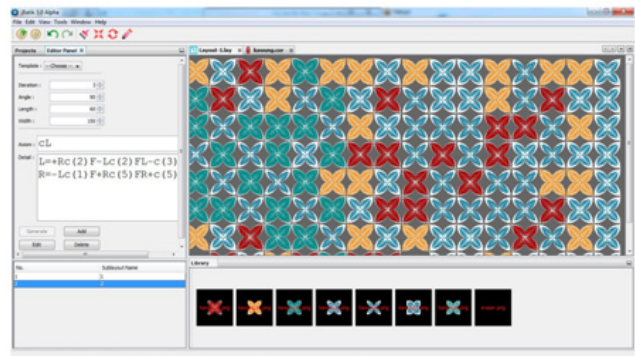


Figure 3 How jBatik Software Works in Grouping Motifs
and Compiling Databases
(Source: idntimes.com)

Another benefit of using jBatik software is that it has become an extension of batik artisans to design and develop their motifs. By using the software, batik artisans are greatly assisted in creating any motif according to their thoughts. Many have difficulty expressing ideas, and their results are occasionally not or less precise or rough, causing them to discard the materials and tools used because of the need to repeat the process until the desired outcomes are obtained. The principal base method in batik fractal can be used effectively to transfer the uniqueness of the particular batik motif as a result (Jaya et al., 2021). After that, at the transfer stage, each pattern is adjusted according

to the artisan's needs. For instance, to make written batik, the printing results are traced to the fabric, then the designer performs the canting process. Meanwhile, for stamped patterns, the print results make a stamp. Consequently, the software facilitates access to technology for crafters, stores data, and information about the motifs. It is expected to be increasingly competitive in the market. Figure 4 shows the training process of jBatik.



Figure 4 Training on the Application of Batik Fractal for Tulungagung Craftsmen (Source: batikfractal.com)

This software can be adopted for industry and other disciplinary fields as well. With further development, this technology can also be applied and implemented in industries and other areas, such as product design and architecture. It can be seen in Figure 5.

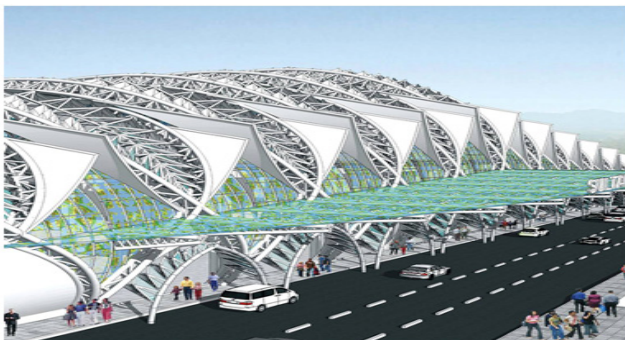


Figure 5. jBatik Technology Development in the Architectural Field (Source: batikfractal.com)

The second case study is the Turkish Digital Textile Archive (TUDITA). Turkey TUDITA was designed and developed by the Izmir University of Economics, which is committed to preserving the heritage and continuing the history of the Sumerbank textile factory. Although the factory is no longer in existence because complex political and economic problems have displaced it, several parties are still trying to continue the legacy. This includes producing various motifs and textile ornaments, which is considered a symbol of independence in the economic sector. Sumerbank textile factory significantly influences the development of Turkey's industrial

revolution, and its existence has had a good impact and has improved the country's economy. It produces textiles with local materials using the slogan, "local products are from the nation, and everyone must use them." This has been their national strategy to date, which has led Turkey to become one of the most successful countries in the textile and apparel industry (Figure 6). According to the World Trade Organization (WTO) data, this industry is the sixth-largest supplier globally and the third supplier in the European Union in 2016 (Akhter & Mahfuz, 2018).



Figure 6 The Turkish Apparel Industry (Source: textiletoday.com.bd)

The observer site 'Textile Today', Akhter and Mahfuz (2018), have stated that the Turkish textile and apparel industry has experienced a transformation from low to high commodity manufactured and fashion goods in 36 years. Therefore, the main strengths of this industry consist of investments in technology, educated quality and resources, design capacity, accumulation of knowledge and operations, dynamic and flexible production capacity, the advancement in the apparel sector, and care for quality, health, and the environment.

One of the main strengths of Turkey's textile and apparel industry is the courage to invest in technology as one of their valuable assets. Therefore, what Sumerbank previously pioneered has become one of the contributors to the advancement of the industry. It has turned into a school where textile designers are produced and trained; hence although the factory has closed its operations, this replacement continues to run and tries to preserve the heritage and traditions. Many of Sumerbank's textile motifs and ornaments are starting to disappear and be forgotten, increasing the importance of inventorying and recording. Therefore, Izmir Economy University is trying to create an online database called the Turkish Digital Textile Archive (TUDITA) to record all Sumerbank motifs and ornaments that are also considered iconic

features of the country. The process of technology implementation in the TUDITA case can be seen in Figure 7.



Figure 7 The Process of Technology Implementation in TUDITA, Turkey
(Source: Gondoputranto, 2021)

According to Er, Bulgun, and Adanır (2018), the methods used in compiling the TUDITA digital archive are (1) Protecting and maintaining existing Sumerbank cloth swatch books; (2) collecting data through interviews, literature studies, and surveys; (3) choosing motifs and ornaments to be archived; (4) digitizing motifs and ornaments; (5) setting up software and a website; (6) preparing activities used in the implementation of TUDITA through workshops, exhibitions, and seminars. Figure 8 shows an exhibition of the Sumerbank motifs.



Figure 8 An Exhibition of the Sumerbank Motif Implementation Results from TUDITA
(Source: www.ieu.edu.tr)

The steps taken by the Izmir Economy University to digitally archive Sumerbank's distinctive motifs, also considered icons of Turkish textile, are by saving and keeping them, ensuring they remain known and are passed on to future generations. This corresponds with Piliang's (2020) statement that reviving local culture is the same as identity, as both are inseparable elements. In this case, the Turkish cultural identity is restored through Sumerbank's motifs and ornaments with the help of technology and digitization.

According to Ciptandi et al. (2018), the traditional work of material culture in the form of traditional clothes and traditional motifs is born from the creator's thoughts, ideas, and tastes that contain ritual and spiritual purposes. Also, it is supported by factors related to discoveries in science and technology, social environment, value system, culture, aesthetics,

political economy conditions, and projections on developments that may occur in the future. Therefore, the previously existing culture is not lost but is born with a form that has dissolved from past links, a touch of technology, modern society demands, and the changing times.

Piliang (2020) has stated three useful indicators for viewing cultural perspectives in this digital age. Those indicators are, first, there is a continuous and increasing development of technology towards complex systems, affecting aesthetic decisions. Therefore, it will create cultural complexity in objects, technology, methodology, and idioms. The second is in the economic discourse of this era, space and time are increasingly centralized and concentrated in following the market rhythm through a series of images that change at high speed. The third is increasing ethical and moral pressure concerning humanity and the environment, including cultural objects.

Furthermore, the research examines the cases to determine the actual manifestation of the cultural perspective indicators in this digital age and how significant the impact and change are on society. There are some manifestations of indicators for each case study. Manifestation of indicators in the first case study, Batik Fractal Indonesia, is shown in Figure 9.

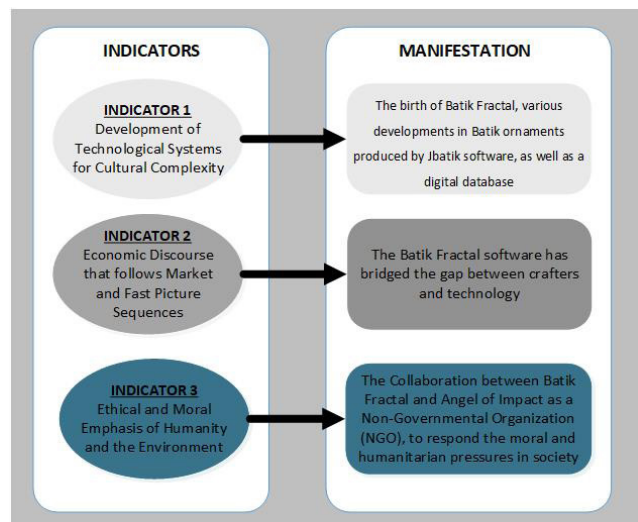


Figure 9 The Suitability of the Indicators for Cultural Perspectives in the Digital Age by Piliang (2020), with aspects in Case Study Batik Fractal, Indonesia
(Source: Gondoputranto, 2021)

Figure 9 shows that Indicator 1 states the development of technological systems for cultural complexity, which manifests in the ever-evolving technological system that leads to batik fractal's birth, a marriage between art, science, and technology. Consequently, this software produces various developments in Batik ornaments, as well as a digital database. Indicator 2 states the economic discourse that follows markets and fast picture sequences, which leads to a manifestation of the batik fractal software. It has bridged the gap between crafters and technology

to increase the productivity and competitiveness of their products in the market. As Indicator 3 states, the ethical and moral emphasis of humanity and the environment. The result manifests that batik fractal also collaborates with the Non-Governmental Organization (NGO), Angel of Impact, which focuses on poverty alleviation. This organization cooperates with social entrepreneurs led by women and responds to moral and humanitarian pressures in society. This result shows that technological developments in the first case have reached a cultural complexity that combines several completely different disciplines, namely art, science, and technology, resulting in batik fractal, Indonesia, and the jBatik software. In the following indicator, the software, through this community, provides tangible benefits as a medium for artisans to quickly develop traditional batik motifs while still following market tastes. Therefore, more real productivity and competitiveness in the industrial arena can be achieved. The third indicator and benefit involve accountability in terms of morals. Here, the batik fractal community also collaborates with the Non-Governmental Organization (NGO), Angel of Impact, to alleviate poverty by cooperating with social enterprises led by women as agents of change.

The second case study is the digital archive TUDITA-Turkey. Figure 10 shows the manifestation of indicators of TUDITA-Turkey.

Figure 10 shows Indicator 1, which states the development of technological systems for cultural complexity. It manifests in the ever-evolving technological system that leads to the production of the TUDITA digital archive. It is helpful as a container for compiling, classifying, and storing all Sumerbank Turkish motifs. While Indicator 2 states about the economic discourse that follows markets and fast picture sequences, which lead to a manifestation through TUDITA. Sumerbank motifs and ornaments can be applied to various production and industrial needs. Hence, these items are reproducible, especially considering that one of Turkey's strengths is this industry. As Indicator 3 states about the ethical and moral emphasis of humanity and the environment, the result manifests that with the existence of TUDITA, traditional Sumerbank motifs and ornaments can be saved, revived, and passed on to the next generation. Consequently, this can be an answer to the moral

responsibility involved in preserving cultural heritage. Table 1 shows the result of both representative cases that have been analyzed using the Contemporary Cultural theory in the digital age by Piliang (2020).

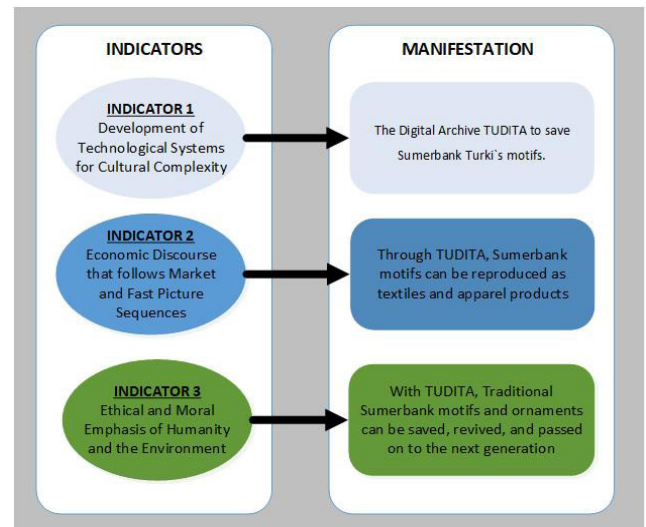


Figure 10 The Compatibility between the Indicators of Cultural Perspectives in the Digital Age by Piliang (2020) with the Aspects in Case Study Digital Archive TUDITA, Turkey (Source: Gondoputranto, 2021)

These results indicate that in the second case study regarding the procurement of the digital archive to collect and re-archive, Sumerbank's motifs correspond with the cultural perspective indicator in the digital age, as stated by Piliang (2020). Technological developments have led to efforts to save these patterns by creating the Turkish Digital Textile Archive (TUDITA). This leads to the second indicator and benefit, which applies Sumerbank's motifs and ornaments in various textile and apparel products, according to the Turkish market demand and the support of this industry's progress. Finally, the third indicator and benefit is the answer to the moral responsibility of preserving these motifs and ornaments, which have become Turkey's icons, preventing their loss and promoting their passing on to future generations.

Table 1 Manifestation Result of Each Representative Case to the Indicators

Indicators		Manifestation Result	
Representative Case	Batik Fractal	TUDITA (Turkish Digital Textile Archive)	
System Technology	Jbatik software to develop various Motifs and as Digital Archive as well	Batik	Collecting and Digitizing Sumerbank motifs and store it in TUDITA as Digital Archive
Economic Discourse	Jbatik software has bridged the gap between crafters and technology, increased productivity and competitiveness of their products in the market.	Batik	The reproduction of Sumerbank motifs into Textile and Apparel products

Table 1 Manifestation Result of Each Representative Case to the Indicators (Continued)

Indicators		Manifestation Result
Representative Case	Batik Fractal	TUDITA (Turkish Digital Textile Archive)
Ethical Factor	The born of collaboration between Batik Fractal & NGO Angel of Impact, which focuses on poverty alleviation.	With the existence of TUDITA, Traditional Sumerbank motif are revived, and passed to the next generation.

CONCLUSIONS

The description of the two case studies shows that technology can act as an appropriate medium and tool in preserving various traditional motifs and ornaments. The first case with batik fractal shows that Jbatik, as a hybridization result of science and art, succeeded in developing various batik motifs and functioned as a digital archive as well. Jbatik can bridge the gap between batik crafters and artisans in the economic discourse and increase their productivity. For the ethical factor, batik fractal's collaboration with Angel of Impact NGO can help to reduce poverty alleviation. The second case with TUDITA (Turkish Digital Textile) shows that it is possible to collect and digitize the lost Sumerbank motifs and store them in TUDITA as a digital archive with system technology. With TUDITA, the Sumerbank motifs can be reproduced into various textile and apparel products in economic discourse.

While in the ethical factor, obviously with TUDITA, traditional Sumerbank motifs are revived and can be passed on to the next generation. Therefore, the assumption that technology shifts or eliminates indigenous traditions and culture is inappropriate. The reason is that the research shows that cultural traditions in the form of traditional motifs and ornaments can be preserved through technology and help to promote better life with the proper application. Also, other perspectives and broad views that digitalization should not shift tradition and culture but produce a new synthesis of its fusion with traditional arts are expected. This can, in turn, recapture the aesthetics and beauty of tradition through a form that is diffused through modern technology. The result of the research optimistically would give insights and inspirations for other researchers and scholars on how technology implementation can positively impact, particularly viewed in the contemporary digital age perspective.

Furthermore, the research is anticipated to be an introduction to a contemporary discussion regarding the implementation of technology by combining different disciplines that produce new wonders and charms in the complexity of this digital age. Piliang also states that this corresponds with the paradigm of the 21st century, where various exploration possibilities are created through formal and virtual aspects. Although these aspects stand on the dynamic, spontaneous, and fast conditions created by the world of reality, they are still in the moral-ecological area. Consequently, a projection of cultural reality in this digital age, which is a harmonious combination of

technological, economic, and ethical factors, will eventually be formed.

The research focuses on traditional motifs as objects. Though each study case applies different methods and processes to utilize the technology, it shows that traditional motifs could be preserved and revived using accurate technology implementations. Furthermore, the results reveal that the three indicators of cultural perspective in the digital age have the matching and parallel results with its manifestations, which significantly impact the process of saving and preserving the traditional motifs and positively impact society.

Future research could explore different approaches to show that technology implementation can also be used to preserve other traditional cultures with varying subject materials because it could also be used to preserve intangible objects like oral traditions, performing arts, or folklore. Consequently, this research can be perceived as a standpoint to see the constructive perspective of technology implementation to save and preserve a local tradition.

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