Integrating Local Culture into Digital Creativity (A Study on Digital Creative Economy Actors in Banda Aceh)

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	Although the digital infrastructure in Banda Aceh City is adequate, the growth of the digital creative economy in this region remains limited, particularly in terms of integrating local culture into digital content. This study examines the role of cultural elements in digital creative works produced by digital creative economy actors in Banda Aceh, with a primary focus on the sources of creative ideas and the mechanisms for incorporating cultural elements. The novelty of this study lies in the use of Creative System Theory with an autopoiesis approach, which views creativity as an emerging process that arises from the interaction between external (hetero-referential) and internal (self-referential) elements. This study uses a qualitative approach with in-depth interview techniques with 19 digital creative economy actors from the music, film, animation, application, and game development sub-sectors. The results show that the sources of creative ideas include collaborative discussions, involvement in traditional practices, historical research, personal experiences, social anxiety, spiritual inspiration, studies of existing works, participation in

	creative communities, and institutional support. This diversity triggers an autopoietic cycle in the formation of ideas, where the relationship between internal interactions and external stimuli produces creative works that are full of cultural values. Cultural integration is realized through the digitalization of traditional music, culturally nuanced storytelling in films, folklore-based animations, and local-themed applications and games.
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INTRODUCTION

The advancement of information and communication technology has driven the emergence of the digital transformation era, where almost every aspect of human life has undergone significant changes. One of the biggest changes has occurred in the world of the creative economy, which is now increasingly dominated by digital technology-based innovations (Schwab, 2017). The digital creative economy is very closely related to digital creativity, where digital creativity is one of the main drivers of the development of a technology-based creative economy. According to Lovink (2008), digital creativity includes the ability to produce new or innovative ideas that are realized using digital technology, such as software, animation, graphic design, and multimedia content, as well as application and game development. This provides opportunities for creative economy actors to produce more varied and innovative works (Howkins, 2007). The digital creative economy utilizes digital creativity as a foundation in the development of products and services that can be marketed globally, thus opening up opportunities for digital creative economy actors to access wider and more efficient markets and create a new economic ecosystem based on the added value of creativity (Hartley, 2005; Manovich, 2013).

Concerning culture, the digital creative economy not only has an impact on economic growth but also strengthens cultural identity. As stated by Cunningham, S., & Flew (2019), digital creativity plays an important role in strengthening local cultural identity by adapting cultural elements into various digital products. In addition, the use of culture in digital creativity can also be a marketing strategy that attracts the attention of a wider audience (Mantzou et al., 2023). On the other hand, the integration of culture in digital creativity is a complex challenge in maintaining cultural authenticity, where access to technological information is very open, but local culture is often threatened by commodification and losing its essence (Urbaite, 2024).

Banda Aceh City, as the capital of Aceh Province, holds considerable potential to develop a culture-based digital creative economy, supported by

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the presence of robust digital infrastructure. The city benefits from extensive telecommunications networks comprising both fiber optic and wireless systems that reach even rural villages. According to the Central Bureau of Statistics (Badan Pusat Statistik Kota Banda Aceh, 2018), internet penetration in Banda Aceh had reached 58.22% of the total population, or 154,348 individuals out of 265,111. This infrastructure theoretically provides an enabling environment for the growth of digital creative subsectors.

Despite these infrastructural advantages, however, the actual growth of key digital creative subsectors, namely music, film, animation, and video (FAV), and application and game development (AGD), has been stagnant or fluctuating in recent years. Data from the Banda Aceh City Tourism Office (2024) show that in the music subsector, the number of industry actors dropped from 12 in 2019 to zero in 2022 before rebounding to seven in 2023. Similarly, the FAV subsector decreased from five actors in 2019 to none in 2022, rising slightly to three in 2023. The AGD subsector showed more consistent growth, increasing from two actors in 2019 to ten in 2023. It is important to note that no official data collection was conducted in 2020 and 2021 due to the COVID-19 pandemic. These patterns suggest a significant gap between the availability of digital infrastructure and its effective utilization, not only in terms of economic or technological output but specifically in fostering the creation and dissemination of cultural content through digital creative practices. Despite having the tools and connectivity in place, the translation of local cultural values into digital formats remains weak, limiting the ability of creative sectors to reflect and preserve cultural identity through digital media.

Ideally, digital infrastructure should not only support connectivity and information access but also be used to enhance cultural innovation. Mantzou, P., Bitsikas, X., & Floros (2023) emphasize that digital media holds strategic potential as a means of preserving and revitalizing cultural heritage while also expanding the reach of local cultural expression to wider audiences. In the case of Banda Aceh, a city rich in history, tradition, and cultural symbolism, local heritage should serve as a core source of inspiration in the creation of digital content.

In light of the conditions described, this study aims to explore the dynamics of creative idea generation and the integration of local cultural content within digital creative works produced by digital economy actors in Banda Aceh City. Specifically, the research addresses two central questions: (1) What are the sources of creative ideas that inspire the incorporation of local cultural elements in digital content? and (2) How is local cultural content integrated into various forms of digital creativity? By examining these questions, the study seeks to understand the mechanisms through which cultural heritage is preserved, transformed, and represented in the digital domain, highlighting the role of individual creativity, community engagement, and technological mediation in shaping a culturally rooted digital creative economy.

The slow and uneven development of the digital creative economy in Banda Aceh may not be solely attributed to limitations in infrastructure or technical capacity. Rather, it can be understood as a consequence of the absence of a functioning creative system that continuously connects technology,

creativity, and cultural values. To examine this phenomenon, the study employs Takashi Iba's Creative System Theory as its conceptual framework. The theory provides a conceptual framework for understanding how various components in a creative system, including culture, technology, and innovative processes, interact and influence the outcome (Iba, 2010a). The creative system is an autopoiesis system, where the element is "discovery," which is produced through a synthesis process of ideas, associations, and findings (Iba, 2010a, 2011a).

An autopoietic system is characterized by its capacity for self-reference, meaning it operates by referring to and reproducing its internal elements and structures (Luhmann, 1995). The concept of autopoiesis was first introduced by Chilean biologists Humberto Maturana and Francisco Varela to describe biological systems that generate and maintain themselves through continuous internal processes (Maturana, H.R.&Varela, 1980; Mingers, 1995; Vanderstraeten, 2012). Etymologically, the term derives from the Greek *autos* ('self') and *poiein* ('to produce'), emphasizing the self-producing nature of such systems. In essence, autopoietic systems preserve and reproduce their components from within, much like biological organisms such as plants that generate new cells from pre-existing ones (Wahyuni, 2025).

In Iba's perspective, autopoiesis refers to a self-producing system in which the components, namely "discovery," are continuously created and re-created through the interaction of elements within the system itself, without relying on external inputs for its core functioning (Iba, 2010a).

"Discovery," in the context of creative systems, is defined as follows:

first, discoveries are produced by previous findings, based on ongoing creations. So, discovery is a momentary element that has no duration, so it must be continuously reproduced to realize a creative system. Second, "discovery" arises from the synthesis of three components, namely "idea," which is hetero-reference; "association," which is self-reference; and "consequence," which only occurs as a combination of hetero-reference and self-reference (Iba, 2010a).

Iba explained that hetero-referenced ideas in creative systems refer to concepts or inspirations that come from outside the system/external environment or the individual. This means that ideas for creativity or innovation do not only come from within the individual or system (self-reference) but are also influenced by interactions with external elements such as culture, technology, global trends or ideas from other disciplines. Luhmann (in Ritzer, G., & Goodman, 2009; Ritzer, G., & Stepnisky, 2017, 2018) explained that self-reference is used by the system to build relationships within itself, as well as to differentiate itself from other systems and its environment. Meanwhile, hetero-reference expands the boundaries of creativity by opening up opportunities to accept, adapt, and modify ideas that emerge outside the system or individual context. Iba concluded that the synthesis of ideas in autopoiesis is the key to the sustainability of creativity in the system, because the creative system allows it to continue to develop by combining various components of existing knowledge and experience to produce new ideas that are relevant and innovative. This opinion is consistent with the explanation of Shao et al. (2019) that effective idea synthesis involves the creative combination of different

elements to produce new and relevant solutions in different contexts.

Furthermore, association in autopoiesis is the process by which ideas are connected to find new patterns that enable the creation of innovative ideas. Association, which is self-referential in Creative Systems Theory, is a concept that explains how a creative system is able to maintain, adapt, and reproduce itself independently. A self-referential creative system means that the system not only responds to external stimuli but also refers to its structure to form decisions, innovations, and changes within itself. This process allows the creative system to continue to develop and innovate without relying entirely on external input (Gloor & Grippa, 2018; Sakama et al., 2018). Iba (2013) concluded that associations of dynamically interconnected ideas play an important role in forming new patterns that enable the creation of innovation.

The final element in autopoiesis, according to creative systems theory, is "finding and consequence", where the creative system finds new results or innovations as a result of the synthesis of ideas and associations. Csikszentmihalyi (1997) describes creativity as the result of a complex system that continuously interacts with its environment, which can produce findings and innovations. The dynamic and adaptive nature of the elements of this system is key in presenting unexpected new ideas. Sawyer (2012b) strengthens this view by showing that findings in creative systems often emerge unexpectedly due to the dynamic nature of the creative system itself. Keith also explains that the continuous interaction between elements in the system and adaptation to the external environment can give rise to new, innovative, and often unpredictable ideas.

METHODOLOGY

This study uses a qualitative approach to explore and describe the social situation being studied comprehensively, broadly, and in-depth (Sugiyono, 2017). Denzin & Lincoln (2018) stated that qualitative research aims to understand the meaning constructed by individuals or groups in a particular social environment. The main data source in this study was in-depth interviews with 19 digital creative economy actors in Banda Aceh City, covering three sub-sectors, namely music, Film, Animation, Video, and Application and Game Developers. This interview was intended to gain an understanding of how digital creative economy actors get ideas, transform ideas, and collaborate with previous digital works, as well as how digital creative economy actors integrate local culture into digital products. In addition, government representatives, namely the Head of Service and Head of Division at the Banda Aceh City Tourism Office, were interviewed to understand the role of the government in supporting the digital creative economy sector and promoting local culture through digital platforms. Data collection was carried out through semi-structured interviews with digital creative economy actors and government authorities. In addition, data will be collected through observations of the creative digital processes and products produced by creative economy actors in Banda Aceh City.

The collected data is analyzed using the flow chart analysis technique proposed by Miles and Huberman. Miles, M. B., Huberman, A. M., & Saldana (2014) explained that flowchart analysis consists of three activities, namely data reduction, data display, and concluding/verification. In principle, this data analysis activity is carried out

throughout the research activity (during data collection) until complete and until the data is saturated. The core activities in this analysis include data simplification (data reduction), data presentation (data display), and concluding (verification/conclusion) (Sugiyono, 2017).

RESULTS AND DISCUSSIONS

This section presents the key findings of the field research. highlighting the dynamics of local cultural integration within the digital creative economy ecosystem in Banda Aceh. The analysis focuses on two critical aspects: first, the sources of creative ideas that serve as the foundational basis for the production of culturally rooted digital content; and second, the mechanisms through which local culture is integrated into various subsectors of the digital creative economy.

The Sources of Creative Ideas

In the digital creative economy ecosystem in Banda Aceh, the sources of ideas that inspire the integration of local cultural elements into digital content show diversity that reflects complex creative dynamics. Based on field data, there are at least nine main sources that trigger the emergence of creative ideas. One of the most dominant is collaborative discussions between actors. In various formal and informal forums, creative ideas often emerge from a dialogical process between creative teams and cross-sector partners. Zulkarnain Masry, a musician and songwriter, emphasized

the importance of the discussion process as the beginning of the emergence of ideas: *"Ideas do not appear by chance but always begin with a discussion process"* (Interview, November 26, 2022). A similar thing was expressed by Nuzul Ilham, a film music arranger, who explained that script reviews with the director were the trigger for the birth of creative cultural narratives (Interview, June 17, 2023).

Furthermore, direct experience with local traditions is also a strong trigger in the creative process. Rahmat Amjusfa, a composer of traditional Acehnese music, admitted that his Involvement in playing *rapa'i*[1] musical instruments from various regions gave him an understanding of the richness of sound and characteristics of local culture. *"I understand a little bit of tradition because I have been playing rapa'i from the start… each region has its uniqueness"* (Interview, August 12, 2022). This understanding inspired him to create digital music based on traditional elements, including the transformation of serune kalee sounds into a digital format for creative dances.

Historical and cultural research is another conceptual approach widely used by digital creative actors. Masridho Rambe, a local animator, developed the animated film "*Sinong and Sigam*"[2] by first conducting in-depth research on Sultan Iskandar Muda. He highlighted irrigation and leadership as historical aspects that are raised in the story (Interview, August 2, 2022).

In addition, personal reflection also plays an important role in developing

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[1] *Rapa'i* is a traditional Acehnese musical instrument that is played using bare hands, not using sticks.

[2]**Footnote:**

The characters *Gam* and *Nong* in the animated film titled "Sinong & Sigam - Animasi Sultan Iskandar Muda" on the YouTube platform with the link: https://www.youtube.com/watch?v=5yrszHdPAfE.

ideas. Munzir, a young filmmaker, stated that reading books, traveling, and personal contemplation help broaden horizons and trigger fresh ideas (Interview, May 30, 2022). Wilda Sofia, a scriptwriter, added that fictional ideas often come from social phenomena that she experiences every day, although they are then packaged in a light way so that they are easily accepted by the audience (Interview, June 19, 2023).

Another form of source of ideas is social unrest and the desire to voice local values. Several content creators, such as Sri Tilla Wahyuni and Belli Bel Fatjeri, develop documentary works based on social unrest in the surrounding community. Documentary films are used as an advocacy medium to convey criticism of public issues such as the role of women or the loss of tradition (Interview, June 18 & 15, 2023). One example is the documentary *"Tanoh Akhe"*[3] about the *beulangong tanoh*[4] culture in Gampong Ateuk Jawo, which voices the importance of preserving cultural heritage.

Equally significant, some creative actors acknowledge that ideas can also arise from spiritual inspiration or transcendental insight. T. Abdul Malik emphasized that creative ideas can emerge as divine inspiration obtained through spiritual reflection and closeness to God (Interview, 12 August 2022). In the Acehnese context, which implements Islamic law, this religious dimension strongly influences perspectives and creative expression, including in discussions with like-minded peers who help revive postponed ideas.

Meanwhile, studies of existing digital works also serve as innovative references for content developers. Alfiz Zikra explained that he reviewed existing applications and videos as references for creating new features in digital animation and game works (Interview, August 19, 2022). This approach is a form of creative benchmarking, where previous digital works serve as inspiration for adapting local Acehnese culture.

Creative community forums function as idea incubation spaces that allow for the collective exchange of ideas. Munzir and Muhammad Faris emphasized the importance of community spaces as places to discuss, test, and select ideas that are worthy of being produced (Interview, May 30 and June 17, 2023). Forums such as Lamp On Aceh Film Community and Aceh Documentary serve as creative spaces and as a means of democratizing digital production.

Finally, institutional forums and government support serve as strategic channels for ideas. The Banda Aceh City Tourism Office actively collects and implements ideas from creative actors through public and digital forums (Interview, September 29, 2022). As a facilitator, the government is also an active partner in realizing ideas into concrete programs. One example is the "*Ekonomi Kreatif Go Digital*" (Creative Economy Go Digital) training, which aims to equip young people with digital skills in the creative economy sector.

This multilayered configuration of idea sources and their applications is visually represented in Table 1, which

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[3] *Tanoh* (Acehnese) means "earth/tanah", *akhe* (Acehnese) means "last". So *tanoh akhe* can be interpreted as "last earth". The film can be traced through the YouTube platform with the link:

https://www.youtube.com/watch?v=zUmsgaF2BHM.

[4] The word *beulangong* is a large pot or container for cooking, while *tanoh* means earth. *Beulangong tanoh* can be interpreted as a pot made of clay.

categorizes the origins of creative ideas alongside the specific forms of local cultural integration within digital products, including digital music, animated films, educational apps, and documentaries. Each source directly correlates with distinct modalities of cultural expression in digital media, illustrating the dynamic interplay between tradition, innovation, and digital creativity in Banda Aceh's evolving cultural economy.

Table 1. Sources of Creative Ideas in the Digital Creative Economy Ecosystem in Banda Aceh

No.	Source of Ideas	Description & Examples	Related Subsector(s)
1	Collaborative Discussions	Ideas emerge from formal/informal dialogues with teams or partners.	Music, Film, Animation
2	Direct Experience with Local Traditions	Cultural understanding arises from hands-on involvement in traditional practices like playing rapa'i.	Music, Digital Dance
3	Historical and Cultural Research	Research into Acehnese history (e.g., Sultan Iskandar Muda) is used to construct narratives and characters.	Animation, Film
4	Personal Reflection	Reading, travel, and contemplation serve as inspiration for fictional and narrative digital content.	Film, Scriptwriting
5	Social Unrest & Advocacy	Issues like women's rights and cultural loss inspire documentary storytelling as a form of public criticism and advocacy.	Documentary Film
6	Spiritual and Transcendental Inspiration	Ideas emerge through divine inspiration, reflecting Islamic spiritual practices and religious dialogue.	Music, Animation
7	Review of Existing Digital Works	Benchmarking previous apps, videos, and games to create new features integrated with local content.	Application, Game Development, Animation
8	Creative Community Forums	Forums like Lamp On Aceh and Aceh Documentary are platforms for collective ideation, incubation, and peer validation.	Film, Documentary, Digital Storytelling
9	Institutional Forums and Government Support	Public forums and digital programs facilitated by the city government generate and support the realization of creative ideas.	Cross-subsector (All Digital Creative Fields)

Source: Field Interviews (2022–2023), Observation and Documentation Studies, Banda Aceh.

Integration of Local Culture in Digital Creativity in Banda Aceh

The integration of local culture into digital creativity in Banda Aceh illustrates a dynamic interplay between cultural preservation and technological adaptation, reflecting a multidimensional evolution in creative practices. Drawing upon field interviews, observations, and documentation studies, this research found that local creative actors actively transform traditional elements into audio-visual-narrative formats suited to digital consumption, rather than merely replicating heritage passively.

Furthermore, in the digital music subsector, cultural transformation is evidenced by the digitization of traditional instruments. Digital musician Rahmat Amjusfa noted that instruments like the *rapa'i* and *serune kalee* are now simulated through music production software: *"In the past, people who played rapa'i had to play directly using the instrument. But the digital world is no*

longer like that, so we can create the sound of this rapa'i through a computer" (Interview, August 12, 2022).

Consequently, cultural messages are also embedded through lyrics and visual symbolism. Zulkarnain Masry's work *Peukateun Uro Raya* exemplifies this practice by highlighting rituals surrounding Eid, such as visiting elders and communal dining: *"That's full Acehnese culture. When we celebrate Eid, people come to visit the house of the oldest person in the family, shake hands, and we sit in a circle with food served"* (Interview, November 26, 2022). Such representations reinforce intergenerational traditions in a modern audiovisual context.

Similarly, in the film subsector, cultural narratives are utilized to assert identity, critique societal norms, and generate economic value. Filmmaker Wilda Sofia described how the Acehnese dowry tradition (*jeulame*) becomes a feminist counter-narrative in her film: *"...in the film we try to break the stigma that women also have the right to be successful and have their careers"* (Interview, June 19, 2023). Meanwhile, Eva Hazmaini emphasized both cultural diplomacy and market strategy: *"Because we can introduce our culture outside... and we can profit from it"* (Interview, June 3, 2022). Another filmmaker, Muhammad Faris, reflected on the film *Eumpang Breuh*[5] as a cultural marker: *"...one way to strengthen the identity of Acehnese films is by including cultural elements"* (Interview, June 17, 2023).
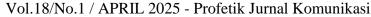
Likewise, the animation subsector manifests cultural integration through educational storytelling and historical character design. The *Sinong & Sigam*[6] series by Masridho Rambe reimagines the life of Sultan Iskandar Muda with engaging visuals aimed at youth audiences: *"We still have to include the characters of Si Gam and Si Nong... Sultan Iskandar Muda is famous for his irrigation"* (Interview, August 2, 2022). This strategy fosters cultural memory while enhancing digital literacy.

In addition, application and game development have emerged as a novel conduit for cultural transmission. The *Meureuno Beut* game exemplifies the digital embedding of Acehnese traditions, Islamic values, and linguistic heritage through interactive design elements such as traditional house architecture and regional dialects. As stated by its developer, T. Farhan, "The *game is designed to be both an educational and entertainment medium"* (Interview, February 8, 2022), indicating a hybridized approach to learning and cultural immersion.

Therefore, these varied forms of integration reveal that local culture in Banda Aceh is not a static artifact but a living system adapted for digital reinterpretation. As supported by the field data, creative communities engage in cultural research, collaborative ideation, and technological adaptation to embed meaning into their works.

As illustrated in Table 2, each subsector employs distinct strategies to incorporate cultural identity within digital formats. In music, digitized instruments and traditional lyrical themes dominate. In film, cultural content serves social critique, identity reinforcement, and market engagement. Animation repurposes historical narratives into

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[5] *Eumpang* means "sack"/"goni," while *Breuh* means "rice"/"beras." So *Eumpang Breuh* is translated as "*rice sack*" / "karung/goni beras."

[6] In Acehnese, "Gam" is a diminutive term for boys in Aceh, while "Nong" is a diminutive term for girls.

visual learning tools, while games and applications leverage cultural aesthetics and religious ethos for user engagement. This classification (see Table 2) underlines how innovation coexists with preservation, collectively sustaining the cultural ecosystem of Banda Aceh's creative digital economy.

Table 2. Strategies of Cultural Integration in Banda Aceh's Digital Creative Sub-sectors

Subsector	Cultural Elements Integrated	Integration Strategies	Example Works/Actors
Music	Traditional instruments (*rapa'i*, *serune kalee*), song lyrics, festive rituals	Digitization of instruments, narrative-based lyrics, and visual presentation of traditions	Rahmat Amjusfa (digital musician), Peukateun Uro Raya by Zulkarnain Masry
Film	Gender roles in *Jeulame*, local humor, and cultural symbolism	Social critique, identity reinforcement, and commercial packaging	*Jeulame* by Wilda Sofia, *Eumpang Breuh* by Muhammad Faris, works by Eva Hazmaini
Animation	Historical figures (Sultan Iskandar Muda), folklore characters	Educational character development; storytelling based on historical narratives	*Sinong & Sigam* by Masridho Rambe
Apps & Games	Traditional architecture, Qur'anic recitation, Acehnese language & culture	Interactive visual designs; local language interface, and gamification of religious and cultural content	*Meureuno Beut* game by T. Farhan

Source: Author's Analysis (2025)

Discussion: Discovery as the Synthesis of Ideas, Associations, and Consequences

The integration of local culture in the digital creative economy in Banda Aceh is a relevant empirical context for applying Takashi Iba's Creative System Theory, especially in understanding how "discovery" emerges as a systemic output. Iba (2010b) views creativity as a process of autopoiesis—a system that can produce and reproduce itself, where creative acts are born from the synthesis of three main components: ideas (hetero-reference), associations (self-reference), and consequences (discoveries or inventions). Each of these components plays an important role in the recursive logic of creative production, especially when cultural Meanings are recontextualized through digital media.

Ideas as Hetero-References: External Input as a Trigger for Creativity

According to Iba (2010b), the initial component in a creative system is an "idea" that enters the system through a hetero-reference mechanism, meaning it comes from outside the creative subject. In the digital creative subsector of Banda Aceh, including music, animation, film, and game development, ideas often emerge from interactions with cultural memory, religious contemplation, and collaborative dialogue with colleagues. Zulkarnain Masry, for example, stated that the ideas for his work came from a discussion process with artists and other cultural actors. Likewise, Masridho Rambe, in developing the animation *Sinong* and *Sigam*, utilized historical research on Sultan Iskandar Muda as the basis for creative ideas.

This is in line with Boden's view (2004) that creativity often begins in a "conceptual space" that is expanded by external input. In the context of Banda Aceh, these ideas include oral traditions, ritual symbolism, and institutional support that are hetero-referential sources

for the digital reconstruction process. Another example is musician Rahmat Amjusfa, who was inspired by the traditional musical instrument rapa'i to convert it into a digital format, signifying how cultural heritage can be a trigger for creative transformation. This practice reinforces the importance of openness to the external environment in keeping the system productive and innovative (Iba, 2011b; Zhang, 2023).

Association as Self-Reference: Internal Recontextualization of External Ideas

After an idea enters the system, the next stage is association, which reflects the process of self-reference. Iba (2011b) explains that association is an internal connection between a new idea that enters and the memory structure, experience, and internal logic that the system already has. In Banda Aceh, creative actors such as Wilda Sofia combine external cultural insights with personal experiences and social observations. Her film work raises feminist criticism through depictions of Acehnese rituals such as jeulame, reflecting how self-reference allows for cultural reinterpretation from within the system itself.

Similarly, Rahmat Amjusfa not only digitizes traditional musical forms for the sake of preservation but also reinterprets the *rapa'i* pattern with contemporary production technologies. This stage reflects what Gloor, P. A., & Grippa (2018) call "internal cognitive recombination" in Collaborative Innovation Networks (COINs), where prior knowledge and emotional memories are restructured to address new aesthetic or social challenges. This association process affirms the autopoietic nature of the system—that is, its ability to continuously evolve through

its internal mechanisms (Ritzer, G., & Goodman, 2009b).

Consequences as Emergent Discoveries: Systemic Outputs of Creative Integration

The outcome of the hetero-referential and self-referential processes is the emergence of consequences not as linear products, but as emergent discoveries from complex systemic interactions. In Banda Aceh, this form of discovery is seen in digital works that transform cultural narratives into new formats, such as *Peukateun Uro Raya*, *Sinong* and *Sigam*, and the educational game *Meureuno Beut*. These works reflect a synthesis between local narratives, modern media, and interactive design. This is consistent with Sawyer's (2012a) view that emergent creativity emerges unexpectedly through a recursive systemic process, not through a single inspiration.

Iba (2010b) states that discoveries like this are momentary, the product of a particular synthesis that must be continually renewed for the system to survive. These moments of convergence, although brief, they carry great cultural value. For example, the animation Sinong & Sigam is the result of a combination of historical research, educational goals, and animation technology, creating a new cultural representation that is only possible through the systemic interaction of ideas, association, and technology implementation.

Invention as an Autopoiesis Mechanism: The Logic of Self-Reproduction in Creative Ecosystems

Overall, the process from idea to association and consequence forms an autopoiesis cycle in the creative invention system. Iba (2011b) asserts that the strength of a creative system lies in its

ability to reproduce inventions internally, even without continuous external stimuli. This view helps explain why some creative ecosystems can thrive because they build strong internal associations and routines in creating inventions. However, in the context of Banda Aceh, the limited integration of local culture into digital content despite the availability of digital infrastructure indicates a gap in the process of idea synthesis or association validation.

Furthermore, creative inventions in Banda Aceh do not stand alone but are embedded in social and institutional contexts. Csikszentmihalyi (2015) states that creativity is born from the interaction between domain (knowledge structure), field (validation community), and person (creative actor). In this regard, community forums such as Lamp On Aceh or institutions such as the Banda Aceh City Tourism Office act as validation systems that support the circulation of ideas and the reproduction of inventions. They provide a feedback space where creative inventions are tested, refined, and sometimes redeveloped.

CONCLUSION

This study concludes that the development of digital creative works that integrate local cultural content in Banda Aceh is driven by the diversity and dynamics of complementary creative idea sources in the creative system. The sources of creative ideas that inspire the integration of local cultural elements into digital content include (1) collaborative discussions between creative actors, (2) direct involvement with traditional practices, (3) historical and cultural research, (4) personal reflection and experience, (5) social anxiety and advocacy motivation, (6) spiritual and transcendental inspiration, (7) study of existing digital works, (8) participation in creative community forums, and (9) institutional support and government facilitation. All of these sources represent a combination of hetero-referential (external) and self-referential (internal) input, reflecting the autopoiesis process in idea formation as explained in Takashi Iba's Creative Systems Theory.

Furthermore, the integration of local cultural content into digital creative forms is carried out by combining cultural preservation with digital innovation. In the music subsector, this is done through the digitization of traditional musical instruments and the delivery of cultural narratives in lyrics and visuals. In the film sub-sector, cultural identity is expressed through story themes, social critique, and market-oriented narrative approaches. Animation transforms historical figures and folklore into educational content that appeals to the younger generation, while apps and games combine interactive design with elements of local architecture, regional languages, and religious values. Across all sub-sectors, these integration strategies reflect a conscious effort to recontextualize cultural heritage in contemporary digital formats, thus maintaining cultural relevance while leveraging modern technology.

The creative outputs observed in Banda Aceh's digital economy are not isolated events but represent systemic discoveries that result from the continuous autopoiesis of the creative system. The use of traditional values, local identity, and cultural knowledge in digital formats is a dynamic process in which external stimuli (ideas) interact with internal structures (associations), producing culturally meaningful and innovative artifacts (discoveries). This synthesis not only ensures the survival of local culture in the digital age but also

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exemplifies the adaptability and vitality of creative systems.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Taufik: writing—conceptual, draft, methodology, data curation.
Hermin Indah Wahyuni: supervision, reviewing, and editing.
Muhammad Sulhan: supervision, reviewing, and editing.

DECLARATION OF COMPETING INTEREST

We certify that there is no conflict of interest with any financial, personal, or other relationships with other people or organizations related to the material discussed in the manuscript.

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