

Spatial Configuration of Ceramic Workshop Design for the Integration of Digital E-Commerce: Live Stream Facilities

Konfigurasi Ruang Reka Bentuk Bengkel Seramik untuk Integrasi E-Dagang Digital: Kemudahan Siaran Langsung (Live Stream)

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ABSTRACT - This thesis proposes the design of a Ceramic Upscaling and Cultivation Hub for Youth in Kuala Kangsar that seeks to revive local ceramic craft culture while enabling modern commercial growth through the integration of traditional labu sayong production with live streaming e commerce, skills cultivation and marketplace support. The study begins with a background of Kuala Kangsar as a heritage place strongly identified with labu sayong, a craft rooted in local materiality and place specific knowledge transmitted since the sultanate era by artisans such as Tuk Kaluk and sustained by clay deposits in Kampung Kepala Bendang. The research problem identifies two linked challenges: declining youth awareness and participation as a result of migration to larger cities, and limited adaptation of traditional handicraft businesses to digital commercial models. The aim is to propose a design that upscale and cultivate skill and awareness of ceramic art among youth by developing spatial strategies and a centralized hub model. The methods combine a focused review of literature (precedent studies) of overseas live streaming e commerce facility types with observational analysis of four labu sayong workshops in Kampung Sayong. The data is synthesized using a comparative synthesis. Observational findings show station based, linear workflows, interlocking production spaces, and reliance on natural ventilation and daylight. Literature review identifies several streaming configurations including centralized cubicles, modular pods and conference style setups, with studio style streaming judged most compatible due to controllable lighting and acoustics and integrated demonstration capacity. The comparative analysis supports a design that fuses station-based production zones with a studio style live streaming facility, educational and incubation spaces and communal areas for mentorship and cultural exchange. The proposed hub aims to strengthen youth engagement, preserve local material knowledge and expand market access. Limitations include a constrained literature scope and a 14-week observational window covering only four workshops. Future research should widen empirical observation across more workshops and pilot live streaming trials with artisans and youth to validate functional and commercial outcomes.

INTRODUCTION

Kuala Kangsar, known as the Royal Town of Perak, is rich in cultural heritage and traditions, notably its traditional crafts such as "Labu Sayong" and Tekat Benang". These crafts are not only a testament to the artistic mastery of local artisans but also form an integral part of the town's identity and economic history. However, in the contemporary era, the traditional craft business in Kuala Kangsar has faced a significant decline, raising concerns about the sustainability of this valuable heritage. Factors contributing to this diminishing presence include changing consumer preferences, limited market accessibility, and the absence of strategic business frameworks to support artisan enterprises. Consequently, these traditional craft businesses are no longer as active or economically viable as they once were.

Among these treasured crafts, "Labu Sayong" stands out as a particularly famous traditional handicraft, a water vessel crafted from clay, traditionally made purely by hand to create unique patterns and workmanship. Many believe that storing water in "Labu Sayong" is beneficial due to the clay's properties, which are thought to provide extra nutrients and potency. Despite the passion of many artisans in Kuala Kangsar who continue to use original techniques, often without machinery, such as "teknik picit cubit", the industry faces critical challenges. A significant concern for the preservation of this intangible cultural heritage is the declining interest from younger generations. The industry is predominantly sustained by older artisans whose extensive knowledge is not effectively transmitted to the youth, leading to a generational imbalance. Furthermore, studies indicate that younger generations in Perak tend to migrate to larger cities like Kuala Lumpur in search of better career opportunities, citing limited employment prospects and infrastructure challenges in smaller towns. The traditional craft sector also struggles with a severe lack of marketing and emphasis among the public, leading to difficulties in attracting new generations due to poor, orthodox marketing strategies, limited employment opportunities, and limited market reach. For instance, "Labu Sayong" primarily relies on local markets with minimal national or international exposure, hindering its growth and sustainability.

This research aims to address these critical issues by exploring the theory of business hubs in architecture, specifically focusing on traditional craft business hubs. A business hub, in an architectural sense, is a designed space facilitating commerce, cultural exchange, skill development, and community interaction. The study's primary goal is to propose a comprehensive design framework for a future traditional craft business hub in Kuala Kangsar, with a particular focus on integrating live stream e-commerce facility into existing "Labu Sayong" workshops. This framework seeks to revitalize the craft industry, enable artisans to sustain their livelihoods by adapting to contemporary economic and technological trends, and combine modern commerce, cultural tourism, and architectural strategies to create a thriving, future-proof hub for traditional crafts. The integration of business tactics, including digital marketing and e-commerce, is deemed critical for protecting cultural heritage and promoting economic development, as it allows local artists to reach wider audiences and attract younger generations. The research employs a qualitative design, utilizing a structured literature review of livestream e-commerce facilities in leading markets, an on-site observational study of "Labu Sayong" workshops in Kuala Kangsar, and a comparative analysis to derive design strategies.

LITERATURE REVIEW

The growth of Digital Marketplace

Body The evolution of the digital marketplace has profoundly reshaped global commerce, originating from early electronic data interchange (EDI) systems in the 1960s and 1970s, and then expanding with the introduction of "teleshopping" in 1979, which pioneered the business-to-consumer (B2C) model through television broadcasting. While initially slow to gain traction, the digital marketplace became mainstream in the 1980s and 1990s, evolving into a virtual venue where buyers and sellers transact products or services. Its rapid growth has transformed it from limited advertising platforms to a ubiquitous component of modern consumer behavior, driven by advancements in secure payment systems, improved search functionalities, and user-generated content. Jan (2018) identifies three pivotal milestones in this evolution: the emergence of early e-commerce platforms, the integration of trust-enhancing mechanisms like user reviews and rating systems, and the progressive establishment of regulatory frameworks designed to protect consumers. A fundamental thesis by Jan (2018) posits that digital marketplaces have matured into institutional assets, a transition primarily fueled by network effects that increase the marketplace's value as more participants join. This growth has been sustained

by robust trust mechanisms and effective security systems, fostering consumer confidence and transforming these platforms into complex ecosystems that facilitate transactions while providing long-term value and stability. Consequently, digital marketplaces have fundamentally altered traditional brick-and mortar commerce, enabling cost-effective and borderless transactions, leading to more competitive pricing, enhanced convenience, and a wider product range for consumers. This shift has also necessitated significant investments in cybersecurity, payment technologies, and data security measures, reflecting technological advancements, changing consumer behavior, and adaptive regulatory responses. The global pandemic further accelerated this digital adoption, particularly in Southeast Asia, where lockdowns and social distancing rapidly shifted both consumers and businesses online. Xiang Li (2022) details this surge, noting that despite economic slowdowns, e-commerce orders and overall market scale in Southeast Asia significantly increased in 2020, with projections reaching USD 234 billion by 2025. Consumer behavior in the post-pandemic era has drastically evolved, with a significant, tech-savvy, and urbanized youth population driving demand for seamless, mobile-first buying experiences and localized services.

Moreover, China's cross-border e-commerce has expanded into Southeast Asia, bolstered by new trade agreements like the Regional Comprehensive Economic Partnership, fostering increased competition and collaboration in digital infrastructure development. However, challenges persist, including inconsistent digital infrastructure between urban and rural areas, which limits market reach, and issues of consumer trust due to counterfeit goods and uneven product quality. Despite these hurdles, Shopee has emerged as the leading e-commerce platform in the region, attributed to its user-friendly interface, integrated ecosystem (logistics, payment, customer support), and localized promotional strategies, successfully building consumer trust and loyalty. The future of Southeast Asia as a major digital hub hinges on balancing technological advancement, regulatory support, and adapting to evolving consumer behavior.

The Integration of Digital Marketplace in Traditional Handicraft Business in Malaysia

In Malaysia, the e-commerce landscape experienced a significant uplift during the COVID-19 lockdowns, transitioning online shopping into a widespread habit, with 14.4 million Malaysians actively engaging in mobile shopping by late 2023. This local trend aligns with a global increase in online population, highlighting a fundamental shift in how products are discovered and purchased, presenting both opportunities and challenges for small businesses in their digital transition. Amidst this digital boom, TikTok has emerged as a key player boasting over a billion monthly global users in 2024 and reaching 83% of Malaysia's population through its ad network. Its success lies in its ability to deliver personalized, bite-sized video content (15 seconds to 10 minutes) that resonates with users and sparks curiosity through viral trends. TikTok Live further enhances engagement, allowing brands and creators to interact directly with viewers, launch products, and conduct live demonstrations, fostering a sense of community that appeals to Generation Z. For businesses, live-stream commerce on platforms like TikTok offers a perpetual virtual storefront, enabling instant feedback, fostering trust through real-time Q&A, and leveraging social proof from influencer endorsements. The platform's addictive scroll and seamless "buy-with-a-swipe" feature facilitate impulse purchases, especially among younger shoppers, and viral content can significantly expand brand reach without requiring large advertising budgets, making it accessible even for micro-SMEs. Despite its potential, success demands creativity and vigilance against misleading content, compliance with tax rules and e-commerce regulations, and continuous innovation to prevent audience burnout. The success story of Khairul Aming, who transformed a simple sambal side hustle into a multi-million-ringgit brand through engaging recipe videos and a commitment to quality, exemplifies the power of blending authenticity with savvy online platform utilization. This accelerated digital adoption has also compelled traditional industries, such as Malaysia's handicraft sector, to adapt. Chiam Chooi Chea et al. (2022) highlight that factors influencing consumer purchasing intentions for Malaysian handicrafts include consumer awareness, subjective norms, and inherent product qualities that convey heritage value and authenticity. The pandemic's travel restrictions particularly impacted traditional handicrafts, diverting consumer interest to online platforms where the product's history and heritage could be conveyed through digital descriptions and high-quality visuals. Integrating digital marketplaces allows artisans to overcome geographical barriers, reduce reliance on intermediaries, and connect directly with a wider audience, both domestically and globally. Enhanced digital features like secure payments, integrated logistics, and user-friendly apps meet the specific needs of craft merchants while preserving their heritage narrative through rich visual content and storytelling, further amplified by social media and influencer collaborations. However, challenges

such as limited digital literacy and technology access for rural artisans necessitate capacity-building initiatives and government-supported training programs. The Perak state government's focus on improving digital connectivity in Kuala Kangsar, through initiatives like "jalanan digital negara," demonstrates a supportive environment for integrating traditional handicrafts into the digital business model.

Live stream e-commerce typologies

Live-stream e-commerce facilities are increasingly designed as physical spaces that embody virtual interaction platforms, with various typologies emerging to support this new business model. Centralized cubical facilities are characterized by rows of compact, standardized cubicles (e.g., 1.83 m x 1.83 m or approximately 3.3 m²). Large complexes, like Xinxuan Group's Guangzhou live-broadcast centre spanning 12,000 m², house hundreds of these cubicles, demonstrating efficient, high-density deployment within conventional office dimensions. Their functionality relies on turnkey integration of technical and environmental systems, providing professional backdrops, prop storage, concealed power/data, and LED fixtures for immediate streaming. Design guidelines recommend room-within-room construction, floating floors, double-skin walls, flush-mounted acoustic panels, and centralized control rooms for consistent lighting, reliable connectivity, and acoustic isolation. Crucially, these cubicles must be fully contained volumes with airtight seals and high STC ratings (above 60) to prevent speech leakage and external noise intrusion, alongside matte-finish panels for consistent backgrounds and individual HVAC units for environmental control. The studio form layout configuration is a more upscale approach, offering larger footprints ranging from 300-500 ft² for pop-up studios to over 10,000 ft² for e-commerce mega-studios, accommodating elaborate backdrops and multiple props. These turnkey studios feature fully integrated AV, lighting, and display infrastructure, including professional three-point LED lighting arrays, modular backdrops, and adjustable shelving units. Like cubicles, studio-style facilities demand fully enclosed volumes with double-wall assemblies, floating floors, and high STC ratings (≥60) for acoustic control, and full height, matte-finish backdrops with individual HVAC units for optimal lighting and environmental conditions. Modular live-streaming pods prioritize compactness and flexibility, exemplified by Telebooth's TB-W model (1.6 m² usable area) and Cyberport's QUBIC LivePods (2 m²), designed as self-contained capsules bookable by the hour. Future designs may incorporate lightweight, prefabricated panels with snap-fit connections for rapid assembly and disassembly. Core functions include acoustic isolation, lighting control, power/internet access, and integrated set elements like green screens, providing a turnkey environment for content creation. These pods also require fully enclosed volumes and robust soundproofing to ensure privacy and sound quality. In contrast, conference-style live streaming setups are open-air and mobile, typically hosted in large flexible venues like exhibition halls, often with multiple streamers broadcasting simultaneously using minimal spatial partitions. These setups, ranging from 500 m² to over 5,000 m², depend on centralized power, shared high-speed internet, mobile lighting rigs, and multi-user sound isolation solutions. While lacking fixed walls or ceilings, their configuration is maintained through efficient layout planning with basic branding materials and portable backdrops. This approach is ideal for large-scale events focused on visibility rather than privacy, borrowing space temporarily rather than developing a new architectural typology.

Spatial configurations in live stream e-commerce facilities and set ups

From an architectural perspective, evaluating spatial configurations in livestream e-commerce facilities involves four key aspects: circulation and workflow, spatial zoning and configuration, lighting design and acoustic quality, and technical infrastructure and support. Streamers often function as a "single-person live production crew," facing challenges in managing complex technical setups, switching scenes, and interacting with viewers simultaneously, indicating a need for better tools to streamline workflows. While spatial zoning is considered in studio setup, specific details on distinct functional areas within these environments for product display, demonstration, or technical control are not extensively covered in the sources. Lighting is crucial, with professional equipment like LED panel lights, ring lights, and soft boxes used to achieve a professional visual appearance and accurate colour representation, impacting product presentation and user experience. Achieving good acoustic quality is paramount, supported by equipment like microphones, audio mixers, and soundproofing materials such as foam panels, as poor audio can deter viewers and negatively impact the streaming experience. The technical infrastructure encompasses the broadcasting computer, software (e.g., OBS Studio, vMix), capture devices, encoding hardware, cameras, and audio accessories, with integration complexity requiring

significant technical expertise. Ultimately, while mastering live-stream e-commerce requires specific knowledge and skills, government initiatives, such as Kuala Kangsar's "jalanan digital negara" for upgrading internet coverage, are vital to support entrepreneurs in areas with limited technological access.

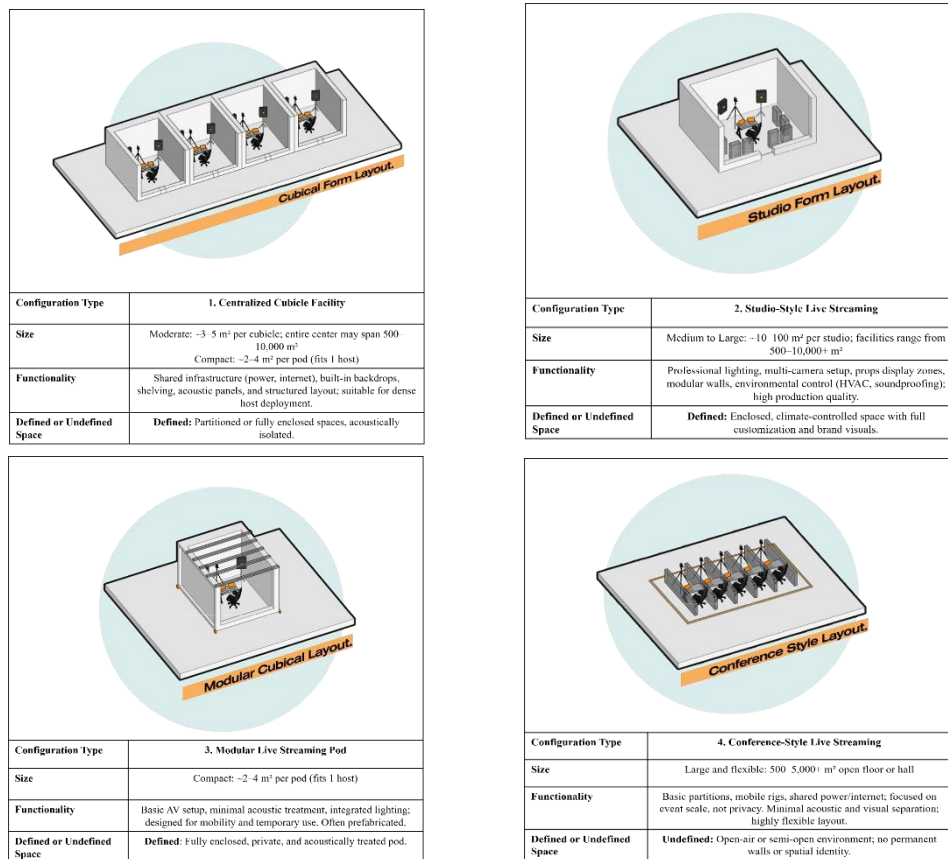


Figure 1. 3D model configurations of live streaming e-commerce from the literature review (Source: Affandy, 2025)

METHODS AND MATERIALS

This research employs a three-phase qualitative design to achieve its objectives. The initial phase, Phase 1: Literature Review (LR), focused on gathering secondary data to identify spatial design layout configurations for live-stream e-commerce and digital marketing spaces, primarily drawing from leading markets like China and Indonesia. Due to time and cost limitations, physical field trips to these overseas locations were not undertaken, meaning all data for this phase was sourced from articles and credible internet sources. This review specifically used selected design parameters, including size, functionality, and whether spaces were defined or undefined, to allow for a fair comparison of livestream e-commerce layouts. Following the literature review,



Figure 2. Overall flow of research method (Source: author, 2025)

Phase 2: Observational Study (OS) involved conducting a field study on-site at "labu sayong" workshops in Kuala Kangsar to collect primary data on their existing spatial configurations. This phase aimed to analyse the spatial arrangement of these workshops by observing key areas like clay preparation, moulding, sculpting, firing, and engagement zones. The observations were guided by spatial design elements identified in Phase 1, such as circulation and workflow, spatial zoning and configuration, lighting design and acoustic quality, and technical infrastructure. A limitation in this phase was the inability to capture all relevant information due to time constraints, necessitating the combination of primary field data with secondary data from internet sources to fill gaps, and specifically noting that the entire production cycle and customer circulation could not be fully observed.

Finally, Phase 3: Comparative Analysis (CA) integrated the findings from both the literature review and the observational study. This phase involved a comprehensive discussion of the gathered information to propose potential strategies for integrating live-stream e-commerce facilities into "labu sayong" workshops in Kuala Kangsar, ultimately aiming to bridge theoretical understanding with practical application and generate actionable design strategies. The overall methodology, by combining a parameterized literature review with a targeted observational study, was designed to ensure both breadth in analysing established e-commerce facilities and depth through detailed, context-specific insights into the "labu sayong" workshops. The outcome of this research method was intended to be presented as written explanations, discussions, and a proposed conceptual framework, outlining the chronology from phase one through three to determine the most suitable live streaming e-commerce facility for integration into existing "labu sayong" workshops.

RESULTS AND DISCUSSION

The research findings chapter details the "Labu Sayong" production, which primarily uses "tanah liat sayong," a unique raw clay found specifically in Kampung Kepala Bendang, known for its kaolinite mineral that strengthens the final product. Tests by Sirim Malaysia confirm water stored in "labu sayong" is safe with a pH of 8. While traditional methods involve extensive handwork, yielding small quantities over months, modern or industrial methods are predominantly utilized in Kuala Kangsar workshops due to their efficiency in producing high volumes quickly, relying on machinery such as blunger machines, electric pottery wheels, and gas kilns. The modern production process begins with clay or slip preparation, where a blunger machine refines raw clay by mixing it with water and sodium silicate for elasticity, a process taking 3-4 hours. Next, in slip casting, clay slip is poured into molds, with excess poured out after the plaster absorbs liquid to achieve a 1cm thickness, a 15– 20-minute process followed by drying within the mold. After removal, burnishing smooths and shapes the clay, often done by skilled women, though some artisans skip this for aesthetic rather than water-storing products. Decorating involves imprinting traditional motifs like clover or star anise, derived from local plants, onto the leather-hard surface using wooden stamps. The decorated clay is then naturally dried under the sun to harden. Finally, the firing process uses gas kilns for about 10 hours at 850°C, a safer, cleaner, and faster method than the traditional firewood firing, which is no longer practiced due to fuel scarcity and pollution. Notably, a pitch-black "Labu Sayong" model is achieved by firing with paddy husk, requiring a large open space.

Observational Study (os)

Observations across four "Labu Sayong" workshops in Kuala Kangsar Kz Kraf, Win Kraf, Labu Sayong Kraf Hanis, and Xtream Craft Deco N Pottery reveal common spatial configurations. Most workshops feature an interlocking space organization with a "linear workflow", where processes are sequential, creating a station-based layout. The display and showcasing area is typically the first point of contact for visitors, making it crucial for initial impressions and influencing customer purchasing intention. Kz Kraf, a well-known workshop with community ties, employs a linear layout, placing clay preparation adjacent to the molding/resting area for workflow efficiency. Its sculpting and firing areas are also strategically positioned, with paddy husk firing occurring in a hallway, requiring ample space. Kz Kraf extensively utilizes natural lighting through glass walls and high roofs, reducing reliance on artificial lighting during daytime operations. While the open-style layout leads to lower acoustic consideration, its remote location minimizes external traffic noise. Win Kraf also uses a central hallway, with clay preparation and molding areas located at the back for efficient movement. Their sculpting area is adjacent to a large engagement area capable of hosting up to 130 visitors for hands-on experiences. The firing area is detached, with products transported, likely due to the large open space required for paddy husk firing. A timber storage house at Win Kraf presents a significant potential for conversion into a live stream e-commerce facility, minimizing new construction costs. Labu Sayong Kraf Hanis adopts a clustered space configuration, with the display unit at the entrance followed by open spaces and the sculpting area. Clay preparation is efficiently located next to molding, though molding is further from sculpting, necessitating staff movement through a temporary engagement area. This workshop also benefits from ample natural light and ventilation due to minimal walls. Two gas kilns with exposed, centralized piping systems ensure easy maintenance, though exposed regulators near the showcasing unit pose a safety concern. Similar to others, acoustic considerations are minimal, but its secluded location ensures low traffic noise, making it suitable for video recording. Xtream Craft Deco N Pottery utilizes a cluster organization, featuring a visible front-facing sculpting area with electric wheels, designed to engage passersby and build trust by demonstrating the production process (as supported by Islam et al., 2019). Their open-air molding/resting and clay preparation areas, housed under a separate roof, optimize workflow. The simple, functional timber-constructed engagement area serves for activities like ceramic coloring and filming, benefiting from natural lighting that eliminates the need for additional lighting gear for filming.

Drawing from these observations, the research discussion proposes several potential improvements for "Labu Sayong" workshops and strategies for integrating live stream e-commerce. Display and showcasing areas are critical, as their organization and presentation significantly influence customer entry and purchase decisions. Studies by Randiwela (2007) highlight product display and cleanliness as key factors for store choice, while Cornelius et al. (2009) note that innovative storefronts attract attention and convey positive store images, increasing visits and purchase intent. Ibrahim et al. (2019) emphasize how well-executed visual displays trigger impulse buying. Enhancing these areas with creative display methods can further attract customers. Acoustic quality is an overlooked aspect in the open-air workshops, but crucial for live streaming. A well-contained existing space, such as Win Kraf's storage area, could be converted into a live streaming room. Good audio is paramount for engaging viewers (Ian Drosos, 2022), and simple solutions like acoustic foam or entry-level microphones can significantly improve sound quality without major renovations. Refurbishment and annual maintenance of the workshop building's physical aspects are also vital, as neglected tangibles like hygiene and equipment functionality negatively impact perceived service quality and customer behavioural intentions (Hooper, Coughlan, & Mullen, 2013). The engagement area is crucial for cultural and community interaction, experiential learning, and filming activities, as demonstrated by Xtream Kraf N Deco's effective design.

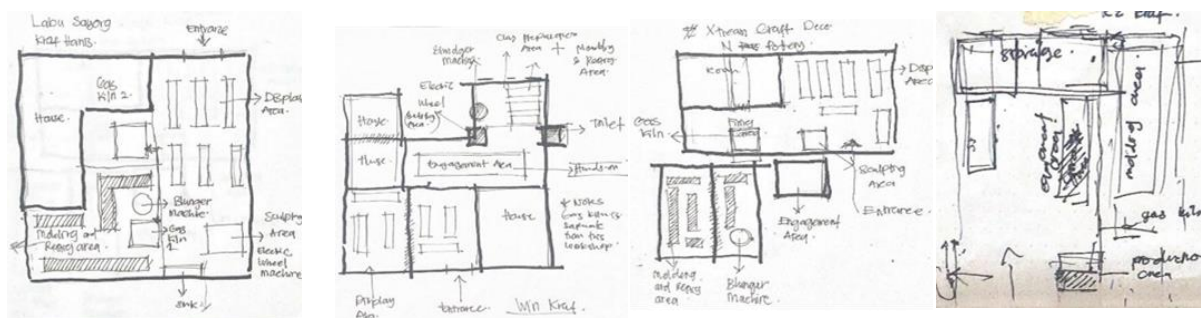


Figure 3. Field notes on the interior layout of the "labu sayong" workshop (Source: Affandy, 2025)

Live streaming e-commerce offers substantial benefits for traditional handicraft businesses like "Labu Sayong" workshops. It enables direct engagement and trust building, as artisans can explain the unique production process of niche products like "Labu Sayong" in real-time, boosting viewer purchasing intention. This real-time interaction fosters authenticity, which is especially crucial for young consumers (Ibrahim, 2025). Platforms like TikTok and Shopee Live also stimulate impulse purchases due to their algorithm-based, visually appealing short videos that can be linked directly to products, making buying seamless for younger demographics (Keenan, 2023; Ibrahim et al., 2025). Moreover, these platforms allow for wider market reach and brand awareness, promoting Kuala Kangsar's heritage products nationally and potentially globally, as TikTok videos can easily go viral across various social media platforms (Ibrahim et al., 2025). The success story of Khairul Aming, who scaled his "Sambal Nyet" brand from a small rented space to a large factory, illustrates that online businesses can start modestly and grow gradually.

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live stream e-commerce facilities can be integrated into the existing "Labu Sayong" workshops in the form of studio layout configuration as supported by (Mathan.Y, 2022) gradual adaptation and improvement with existing asset for example converting an extra storage area to a mini studio for live streaming e-commerce is a valid move. This scalable approach aligns with the success model of local entrepreneurs who began online operations from existing home environments before expanding. This layout provides ample space for both live streaming equipment and traditional "Labu Sayong" production tools like electric pottery wheels. It allows artisans to start with entry-level equipment and gradually upgrade as their audience grows, aligning with a budget-conscious approach. Existing spaces, such as Win Kraf's timber storage house, can be converted into mini studios, reducing the cost of new construction. Other live streaming typologies are less suitable for permanent private workshops: modular live streaming pods are better for temporary setups at expos; centralized cubical forms are inefficient for workshops with limited marketing staff and require significant space and cost; and conference-style live streaming with its open-air layout would generate excessive noise, detracting from the customer experience within the workshop (Khan, 2021).

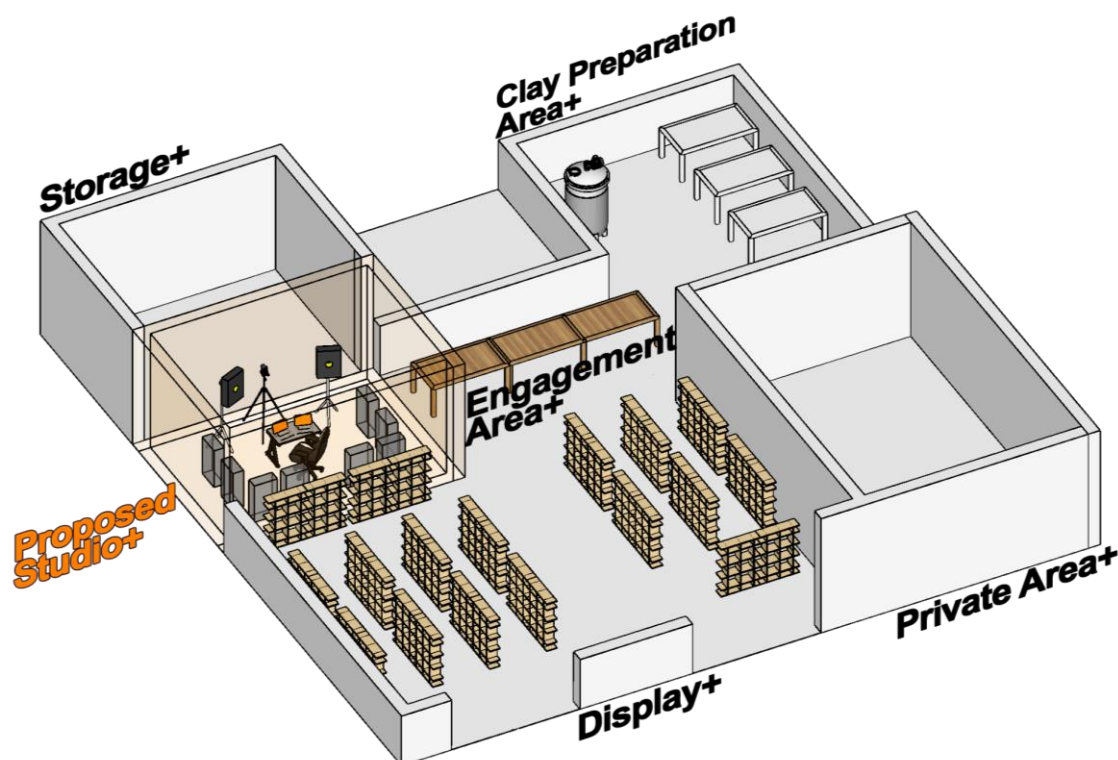


Figure 4. New proposed “labu sayong workshop” integrated with studio live streaming e-commerce layout. (Source: Affandy, 2025)

Therefore, successful integration requires matching the live-stream facility to the workshop's size, functionality, staff skills, and customer experience needs, enabling "Labu Sayong" producers to effectively enter the digital marketplace while preserving cultural relevance. The transition to integrating live stream e-commerce facilities into "Labu Sayong" workshops, while potentially a significant expenditure, can be achieved through strategic adaptation of existing spaces and a gradual investment in technology. The overall goal is to formulate a dynamic design framework that aligns with modern market needs while preserving the essence of traditional craft heritage, ensuring the revival and sustainability of traditional crafts in Kuala Kangsar. This study, though limited by its reliance on secondary data for overseas case studies and time constraints during local observations, provides a viable framework for future pilot projects aimed at elevating traditional heritage crafts within contemporary commercial landscapes.

CONCLUSIONS

Kuala Kangsar's rich heritage of traditional crafts, most notably Labu Sayong, faces mounting pressures from changing consumer tastes, limited market access and a lack of strategic promotion, all of which have contributed to waning interest among younger generations and confined sales to local markets. While artisans have already embraced modern machinery such as blunger machines, slip casting moulds and gas kilns to increase output, these production gains alone cannot guarantee the craft's long-term viability. Integrating live stream e-commerce offers a compelling path forward: real-time demonstrations of the kaolinite rich “tanah liat sayong” process build authenticity and trust, while algorithm driven platforms such as TikTok and Shopee Live stimulate impulse purchases and expand reach to national and international audiences. Moreover, this digital shift can engage younger viewers in the craft's narrative, helping to reverse the trend of dwindling local interest and reinforcing the cultural value of Labu Sayong.

Based on on site observations of four workshops, the studio form layout which provides dedicated zones for live stream equipment alongside pottery tools emerges as the most practical configuration for integrating e-commerce. Repurposing underused spaces such as Win Kraf's timber storage room into

mini studios minimizes both cost and disruption while offering room for gradual upgrades from basic to professional streaming setups. Complementary spatial improvements such as creative display arrangements with targeted lighting, simple acoustic treatments like foam panels and basic microphones, and regular maintenance of workspaces can further elevate both in-person and online customer experiences. Although this study was limited by reliance on secondary data for international comparisons and brief observation periods, the proposed framework provides a clear, scalable strategy for Kuala Kangsar's artisans to sustain their livelihoods, preserve their unique cultural identity and thrive in the digital marketplace.

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CONFLICT OF INTEREST

The author declares no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

AUTHORS CONTRIBUTION

The authors' contributions to this dissertation are as follows. **Author 1 Muhammad Haziq Erfan Mohd Affandy**, the primary researcher, conducted all phases of the study, beginning with the **literature review** on live stream e-commerce typologies to establish the theoretical foundation. This was followed by the **observational study** in Kampung Sayong, Kuala Kangsar, where Author 1 collected primary data through field notes, spatial analysis, and documentation of existing Labu Sayong workshops. In the final phase, Author 1 integrated the findings from both the literature review and the observational study to develop a comprehensive conclusion and design framework. **Author 2, Sayed Muhammad Aiman Abul Khair**, served as the main supervisor, providing continuous academic guidance, constructive feedback, and strategic direction throughout the research process to ensure scholarly

depth and relevance. **Author 3, Iryani Abdul Halim Choo**, contributed significantly to the refinement of the research writing, offering valuable insights and support in structuring and presenting the overall study.

AVAILABILITY OF DATA AND MATERIALS

Data is openly available in a public repository, with a permanent identifier (such as a DOI).

DECLARATION OF GENERATIVE AI

Throughout the research process, artificial intelligence (AI) tools such as ChatGPT/Draft Writing were utilized to assist in selected tasks, particularly during the early stages of brainstorming and gathering general information to support the development of the study. These tools were also employed to refine the written work by addressing grammatical accuracy and suggesting appropriate phrasing for academic writing. All AI-generated content was carefully reviewed, edited, and verified by the authors to ensure accuracy, originality, and alignment with the research objectives. The authors take full responsibility for the final content and interpretations presented in this research paper.

ETHIC STATEMENTS

Disokong. Pengecualian dari semakan etika- JKK PENYELIDIKAN PASCASISWAZAH UiTM

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