

Bridging Traditional Craftsmanship and Digital Interaction through User-Centered Design: Designing Intuitive Interfaces

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Abstract: Traditional craftsmanship served as both a manifestation of cultural heritage and a vital pillar of the global creative economy. However, its digital integration was frequently hindered by low technological literacy and misalignment between manual practices and standardized digital systems. Existing digital interventions primarily focused on passive e-commerce storefronts and often ignored the socio-economic precarity of craftsmen operating as independent contractors within a fragmented gig economy. This study aimed to design and evaluate Craft, an integrated digital platform that bridged the gap between manual skills and digital interaction by combining a product marketplace with a dedicated labor market (job-seeking) feature. Adopting a User-Centered Design (UCD) methodology, the research gathered requirements from craftsmen and business owners to develop a prototype focused on transaction transparency, cultural storytelling, and skill-based recruitment. Usability testing conducted with 82 respondents using the User Experience Questionnaire – Short (UEQ-S) yielded excellent scores in pragmatic quality (2.210) and hedonic quality (1.868). These findings indicate that the Craft platform demonstrated perceived usability aligned with literacy-sensitive design principles and suggest potential as a design-oriented framework to support economic resilience. However, economic impacts require longitudinal validation.

Keywords: User-Centered Design (UCD), Gig Economy, Traditional Craftsmanship, Digital Inclusion, Human-Computer Interaction (HCI), Labor Marketplace

Introduction

Traditional arts have a job as a key foundation of the global creative economy, fostering cultural conservation and economic diversity. In addition to their cultural intentions, these crafts characterized crucial economic assets. The international handicrafts market is predicted to outclass USD 1.22 trillion by 2029 (Research and Markets, 2024). In Indonesia, the creative economy mostly contributes 7.8% to the national GDP (Ministry of Tourism and Economy, 2024). During the first semester of 2024, Indonesian craft exports realized US\$ 4,755.79 million, constituting around 33% of the aggregate creative industry exports (Ministry of Tourism and Creative Economy, 2024). This economic dynamism is further enhanced by cultural tourism, which accounts for an

estimated 40% of all tourism worldwide (UNESCO, 2023).

Despite this tough potential, the craft subsector remains behind technology-driven industries in terms of digital adoption. While digitalization can enhance competitiveness by expanding into the global marketplace, a significant digital divide exists among craftsmen due to limited technological competence and a lack of digital knowledge (Khatri and Kothari, 2020). This condition is often exacerbated by technology-related anxiety when craftsmen are confronted with complex interfaces (Sun et al., 2024). Furthermore, the digital transformation of traditional crafts presents intrinsic tensions because craftsmanship depends highly on tacit knowledge, feel, and manual skills, whereas most digital fabrication systems prioritize automation and

standardized workflows (Zabulis et al., 2020; Bourgault, 2025). This misalignment often results in low acceptance rates among traditional artisans, who frequently find mainstream digital tools unfamiliar and culturally disconnected from their artisanal values (Liu, 2025).

A significant research gap exists in how craftsmen are placed within the digital economy. Most craftsmen work as independent contractors in a precarious gig economy where income is often unstable (Jaramillo and Raphaele, 2020). While the gig economy in Indonesia has flourished, its implementation remains largely confined to the transportation and delivery sectors (Septiani et al., 2025). Most existing platforms function primarily as "passive storefronts" that do not address the holistic challenges of the artisan value chain, such as labor recruitment, skill-based collaboration, and end-to-end development (World Bank, 2020; IFC, 2020). Moreover, adequate digital training and transformation have been shown to significantly increase the productivity, cost efficiency, and market reach of creative entrepreneurs (UNCTAD, 2024).

This study addresses these gaps by proposing the "Craft" platform, a multi-dimensional digital ecosystem. The objectives of this research are threefold:

First, to design an integrated digital system that combines a product marketplace with job-seeking opportunities and community interaction features tailored for craftsmen.

Second, to develop an inclusive user interface based on User-Centered Design (UCD) principles that remains accessible to users with varying levels of digital literacy.

Third, to evaluate the performance and user satisfaction of the platform through formal usability testing using the User Experience Questionnaire Short (UEQ-S).

By completing these objectives, this research seeks to answer the research question of how an integrated and inclusive digital platform can improve usability, economic participation, and cultural alignment for traditional craftsmen. This study contributes to the discourse on digital inclusion by providing a design-oriented solution that balances economic growth with the preservation of cultural authenticity.

Literature Review

Technological Evolution: Preservation and Industry 4.0

Digital interventions in craftsmanship are now categorized into two main streams: Constructive digital archiving and productive Industry 4.0 integration. Technologies such as 3D scanning, motion capture, and Virtual Reality (VR) are engaged to defend intangible knowledge and document complicated craft details (Zabulis et al., 2020). However, these preservation efforts

often remain static repositories that do not directly translate into economic viability for the artisans unless coupled with innovative business models (Liu, 2025).

In contrast, Industry 4.0 applications aim to improve production efficiency and design innovation through tools like CAD and CNC. These technologies allow for the rapid reproduction of intricate patterns while maintaining traditional cultural motifs (Song, 2022). Nevertheless, the high costs of digital adoption and limited internet infrastructure often exclude micro-level craftsmen from fully participating in this digital shift (Khatri and Kothari, 2020). Furthermore, an over-reliance on digital fabrication and automation risks eroding the intuitive handcrafting skills and tactile knowledge that fundamentally define the identity of the craft (Bourgault, 2025).

Critique of Existing Digital Platforms

The transition of traditional crafts to online commerce has primarily been mediated through specialized applications or mainstream global platforms.

Specialized Applications: Local initiatives like the "Batik 4.0" mobile app have demonstrated the strength of user-centered design in simplifying custom ordering processes (Suparmanto et al., 2024). However, these platforms often have a narrow focus, typically serving only one specific subsector like textiles (Cynthia et al., 2024).

Mainstream global e-commerce marketplaces, such as Etsy or Amazon Handmade, offer extraordinary market penetration. Yet, these platforms are primarily driven by profit-centric transactional logics that often marginalize traditional producers with limited digital familiarity, particularly through complex onboarding and registration procedures (Ithurbide and Singh, 2022; Khatri and Kothari, 2020). Furthermore, these mainstream platforms often lack structured spaces for the cultural storytelling and socio-cultural contextualization that are essential for establishing trust and communicating the authenticity of handmade goods (Zabulis et al., 2020; Liu, 2025).

The Gig Economy and Artisanal Labor

A major research gap exists in the placement of craftsmen within the digital job market. Craftsmen in the developing world essentially function as freelancers or independent contractors in a precarious gig economy (Jaramillo and Raphaele, 2020). While the job economy has thrived in Indonesia, its implementation remains mainly confined to the transportation and delivery sectors (Septiani et al., 2025).

The gig economy can serve as an effective mechanism to boost regional economic output through job diversification (Primasrani et al., 2025). However, current digital architectures for craftsmen are almost exclusively focused on product sales and e-commerce integration, often overlooking their precarity and the need for an integrated labor market (Ithurbide and Singh, 2022). This

creates a lack of steady or predictable income for craftsmen who rely on project-based work (Jaramillo and Raphaele, 2020).

HCI Principles for Inclusive Digital Adoption

The literature on Human-Computer Interaction (HCI) highlights that for marginalized populations, digital inclusion must go beyond mere internet access to incorporate adaptive, literacy-friendly design guidelines (Srivastava et al., 2021). Consequently, designers are advised against simply imitating standard, Western-centric interfaces without analyzing the specific cognitive requirements of users with limited digital familiarity.

Key design principles recommended for inclusive platforms include a strong preference for multimedia and visual cues over heavy text (Srivastava et al., 2021). Furthermore, decreasing extraneous cognitive load through minimalist navigation and clear visual signaling is essential to prevent user fatigue and confusion (Faudzi et al., 2024). Interfaces that rely on highly contextualized graphics and simplified workflows are proven to be particularly helpful in accommodating varying levels of digital literacy (Suryodiningrat, 2024).

Positioning the Craft Platform

This study positions the Craft platform as a multi-dimensional ecosystem designed to address the fragmented nature of previous interventions. Different from usual stores, Craft integrates a marketplace, a job-seeking feature, and a community feature.

Drawing on the principle that digital interventions should harmoniously support rather than replace traditional craftsmanship (Dong et al., 2025), our proposed Craft platform ensures that the artisan's manual skills remain at the core of the interaction. This is achieved by addressing identified research gaps through a simplified UI/UX framework specifically designed to reduce cognitive load for users with low digital literacy (Suryodiningrat, 2024). Furthermore, advanced digital platforms help standardize the informal gig economy by providing interfaces for skill-based job matching and recruitment, thus fostering economic resilience and strength through employment diversification (ILO, 2023).

Theoretical Basis

User-Centered Design (UCD) as the Framework for Interaction Development

User-Centered Design (UCD) serves as the primary theoretical framework for this study because it emphasizes designing solutions based on an explicit understanding of users, their tasks, and the contexts in which these tasks occur. According to ISO 9241-210 (2010), UCD consists of four core activities: Specify the context of use, specify user and

organizational requirements, produce design solutions, and evaluate design.

The adoption of UCD is relevant for the craftsmen community, whose work very much depends on tacit knowledge, manual production patterns, and workflows that are rarely documented formally. The Cognitive Engineering perspective introduced by Norman (1986) strengthens this foundation by asserting that effective system design should align with users' expectations so that system behavior is perceived as natural and easily understood. Furthermore, recent studies, such as Dananjaya et al. (2024), show that applying UCD with iterative refinement and continuous user involvement helps minimize gaps between designers' assumptions and users' actual needs.

Therefore, UCD provides a structured and user-oriented foundation that supports the theoretical direction of this study.

Intuitive Interaction: Mental Models, Affordances, and Cognitive Load

Intuitive interaction in interface design is shaped by three key concepts in HCI: Mental models, affordances, and cognitive load. Mental models define how users forecast and illustrate system behavior, making it key for interface structures to align with user expectations to decrease errors and enhance learnability. (Schirra et al., 2022) showed that elicitation methods like sketching can help uncover users' conceptualizations of system operations, enabling designers to build interfaces that match these expectations. This aligns with Hu and Twidale (2023), who stated that the compatibility among users' mental models and system work is central to interaction success.

Affordability enhances intuitive interaction, as consistent and recognizable visual cues help users identify possible actions more easily, especially in simplified interfaces (Yuchen et al., 2022). Cognitive load theory also emphasizes the need to minimize irrelevant load, such as dense layouts, unnecessary elements, or overly complex navigation to improve efficiency and comprehension (Faudzi et al., 2024; Suryani et al., 2024).

Highlighting these three concepts, the interface design in this study emphasizes streamlined navigation, clear visual cues, and structured information to support comprehension among users with varying levels of digital literacy.

UI/UX Principles and Digital Inclusion for Users

The interface design in this study is guided by Nielsen (1995) usability heuristics, such as system status visibility, real-world match, user control, consistency, error prevention, recognition over recall, flexibility, simple design, informative errors, and enough documentation, which were adapted for users with limited digital literacy. Recent discussions on digital inclusion emphasize developing meaningful digital skills, and studies indicate that interfaces for marginalized populations should reduce technology-

related anxiety through higher interactivity and lower cognitive complexity to support confident technology engagement (Sun et al., 2024).

In craft-based communities, system design should also respect the tacit knowledge underlying craftsmen's manual expertise. Research on traditional craft preservation highlights that technology acceptance depends on how the systems support tacit processes and maintain the authenticity of manual practices primary to craftsmen's competencies (Guo and Ahn, 2023). Thus, the UI/UX principles in this study have a role as a solution that balances digital efficiency with traditional craft worths.

A Socio-Technical Perspective on Craft Communities

The craft environment can be examined as a socio-technical system that integrates manual practices, tacit knowledge, informal work structures, and trust-based social relationships. Research on digital transformation in artisan communities states that technology adoption should align with the contextual realities and capacities of craft professionals (Cynthia et al., 2024), as extremely complex systems can impede adoption, especially for craftsmen who rely on embodied skills and non-formal routines.

Therefore, system design should strengthen core craft values such as collaboration, personalization, and manual craftsmanship rather than replace them, as highlighted in recent studies on digital transformation in the craft sector (Wahmud et al., 2025). These considerations guided the feature development of the Craft platform, including its marketplace, job-seeking functions, and community space that mirrors the social and economic contexts of craftsmen.

User Experience Evaluation: UEQ-S as a Quantitative Measurement Instrument

The User Experience Questionnaire – Short (UEQ-S) was introduced by Martin Schrepp, Andreas Hinderks, and Jörg Thomaschewski in 2017 as a concise alternative to the original UEQ developed in 2006. According to Schrepp et al. (2017), the UEQ-S is a quantitative instrument that employs semantic differential scales to

measure essential dimensions of user experience. The evaluation parameters include Dependability, Perspicuity, and Efficiency, which collectively represent the Pragmatic Quality dimension. In contrast, the parameters of Stimulation and Novelty belong to the Hedonic Quality dimension (Figure 1).

The UEQ-S is well-suited for iterative UCD cycles because it provides sensitive feedback on design changes across development stages. Despite its reduced number of items compared to the full UEQ, the UEQ-S has been shown to deliver reliable evaluation results and remains effective for rapid prototype assessments and lightweight usability testing.

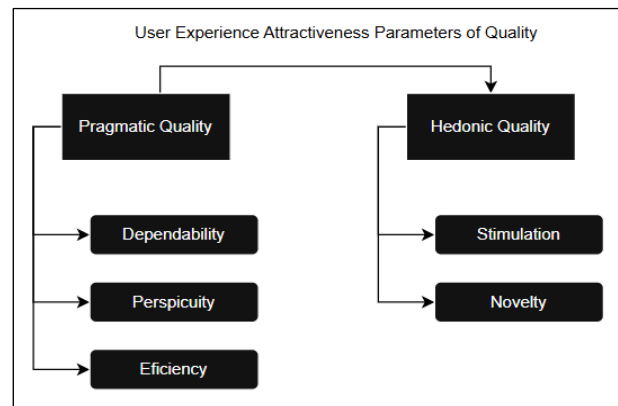


Fig. 1: User Experience Scales Structures

Materials and Methods

This study employs a User-Centered Design (UCD) methodology to develop and evaluate *Craft*, a web application prototype. To ensure a comprehensive approach, the study defines specific parameters across five main dimensions: The object of the study, the methods applied, the instruments used for data collection, the participant demographics, and the tools utilized during development and analysis. A consolidated overview of these research parameters is presented in Table 1.

Table 1: Study Data

Section	Description
Object	Craft (Web Application Prototype)
Method	User-Centered Design
Instrument	Qualitative evaluation using semi-structured user interviews and manual thematic analysis Quantitative evaluation using UEQ-S
People	Nine craftsmen and one business owner served as feedback informants, each with more than five years of experience in the craft industry. 82 prospective users participated as quantitative respondents for the UEQ-S, and they are active users of online marketplace and job-seeking platforms.
Tools	Google Forms for questionnaire distribution and data collection. Figma for prototype design and interface development. UEQ-S Excel Data Analysis Tool for usability test results.

Object

Craft is a web application designed to facilitate the buying and selling of craft products. It streamlines transactions through features such as item tracking, customizable pricing, and automated data recording. Beyond e-commerce, *Craft* integrates a job-seeking service that enables buyers and craftsmen to apply for available positions offered by business-owning craftsmen within the platform. The web application supports three primary user roles: Buyers, craftsmen, and company admins. The admin role, held initially by the owner, allows for additional admin recruitment among buyers or craftsmen. Role transitions can be managed through the Profile Page, ensuring flexibility and user role adaptability.

Figure 2 presents a user activity mapping that serves as a functional justification for design decisions grounded in the socio-technical ecosystem across the three primary roles in the *Craft* system: Buyers, Craftsmen, and Company Admins. Each circle represents activities exclusive to a specific role, while the overlapping areas illustrate functions shared across roles. Buyers perform purchasing-related tasks, including browsing products, placing standard or custom orders, and requesting product returns. Craftsmen engage in production and operational operations such as store management, order processing, handling returns, managing custom orders, searching job listings, and applying for jobs. Company Admins focus on recruitment by posting job vacancies and monitoring applicants. Several functions lie in partial overlaps, such

as viewing order status (Buyer–Craftsmen) and posting content (Craftsmen–Company Admins). The central overlap includes shared activities accessible to all roles, such as account registration, joining community groups, and creating community groups. This mapping provides a structural foundation for defining role-based access, guiding the interaction flow, and ensuring that system features align with the practical needs and behavioral patterns of each user group. As a result, Figure 2 not only illustrates the distribution of activities but also serves as a justification for system design decisions grounded in real user contexts within the traditional craft ecosystem.

Methods

A mixed-methods framework was adopted to close the gap between the nuanced, contextual experiences of local craftsmen and the statistical rigor required for wider usability validation. Specifically, the study utilizes an exploratory sequential design, a choice driven by the necessity to first grasp the unique requirements of the craft domain through qualitative inquiry. These insights then served as the fundamental blueprint for developing the prototype, which was subsequently subjected to a rigorous quantitative evaluation to verify its effectiveness and aesthetic aspects.

User-Centered Design

According to ISO 9241-210 (2010), the User-Centered Design (UCD) approach in this study is structured into four main phases:

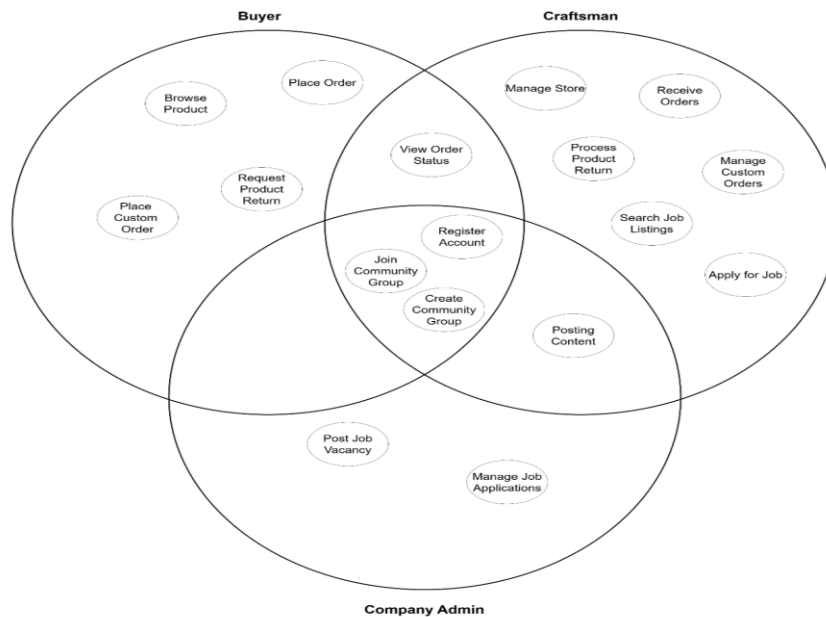


Fig. 2: Role-Based User Activity Mapping in Craft

First, the Specify the Context of Use was conducted to identify the current conditions and issues related to activities within the craft industry. This analysis was crucial to ensure that all relevant perspectives were taken into consideration prior to advancing with the prototype design.

Second, Specify User and Organizational Requirements, and identify the key challenges faced by stakeholders in the industry through an interview session. These requirements serve as the foundation for the proposed solution. In this study, users are categorized into craftsmen, buyers, and company admins.

Third, Produce Design Solutions outlines the steps undertaken to develop a system that effectively addresses the previously defined user goals. In this stage, the results of the user and organizational requirements analysis were translated into feature concepts and user interface designs. The design process was executed iteratively, ensuring that each design element remained user-centered.

Fourth, Evaluate Design involves assessing the feasibility of the design through a quantitative approach using the User Experience Questionnaire Short (UEQ-S). This evaluation provides measurable insights into the pragmatic and hedonic qualities of the proposed interface, ensuring that the design aligns with user expectations and established usability standards.

Instrument

Qualitative Instrument

This instrument comprehensively addressed Phase 1 (Understanding and Specifying the Context of Use) and Phase 2 (Specifying User Requirements) by capturing the nuanced workflows and technical constraints of ten domain experts. These empirical findings provided the necessary foundation for Phase 3 (Producing Design Solutions), ensuring that the resulting prototype was not merely a technical exercise but a targeted solution built upon the specific needs and sociocultural context of the craft industry.

Semi-structured user interviews were selected due to the varied profiles and behaviors within the craft industry, allowing flexibility for participants to freely express their experiences and perspectives. This approach also enabled the researcher to identify problems that may not emerge from structured interviews.

The interviews involved nine craftsmen and one business owner. These sessions were conducted through a hybrid approach, including on-site field visits to various craft workshops for direct observation and real-time online interviews via Zoom meetings to accommodate participants in different geographic locations. The collected qualitative data were analyzed using Manual Thematic Analysis to identify recurring patterns in user and organizational needs. The outcomes of this stage

included the User and Organizational Requirements from the analysis process.

Quantitative Instrument

Data collection was conducted using a quantitative method through the distribution of questionnaires. A questionnaire based on the UEQ-S (English version) was distributed to prospective users of the Craft web application interfaces, such as craftsmen, buyers, and company admins, using Google Forms. As detailed in Table 2, the UEQ-S consists of eight semantic differential items evaluated on a 7-point Likert scale ranging from negative to positive extremes. These eight items comprehensively measure two core user experience dimensions: Pragmatic Quality (assessed through dependability, perspicuity, and efficiency), which evaluates usability, and Hedonic Quality (assessed through stimulation and novelty), which evaluates emotional aspects of the design.

People

The evaluation phase of this study included 82 respondents chosen using a criteria-based convenience sampling approach. According to Stratton (2021), they utilized convenience sampling due to its practical efficiency and the high accessibility of the target user group. Convenience sampling has been marked as a valid approach in information systems research for obtaining crucial early-stage insights. While the initial qualitative requirements were gathered directly from senior craftsmen to ensure contextual authenticity, the quantitative evaluation targeted prospective users actively engaged in online marketplaces and the gig economy. Demographically, the sample comprises 61% male and 39% female participants (Figure 3). Despite the greater representation of males, the inclusion of a significant female segment ensures an inclusive usability assessment that considers various perspectives within the craft industry.

Table 2: UEQ Short Questionnaire

Scale	Negative	Likert	Positive
Dependability	Obstructive	0 0 0 0	Supportive
Perspicuity	Complicated	0 0 0 0	Easy
Efficiency	Inefficient	0 0 0 0	Efficient
Perspicuity	Confusing	0 0 0 0	Clear
Stimulation	Boring	0 0 0 0	Exciting
Stimulation	Not Interesting	0 0 0 0	Interesting
Novelty	Conventional	0 0 0 0	Inventive
Novelty	Usual	0 0 0 0	Leading Edge

Gender Pie Chart

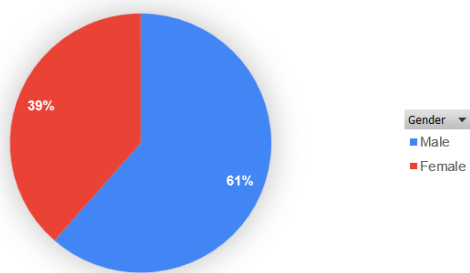


Fig. 3: Gender distribution of the evaluation participants (n = 82), showing a composition of 61% male and 39% female respondents

The age distribution is predominantly concentrated in the 19–34 age group (see Figure 4), representing 98% of the total sample. This demographic selection is highly intentional. First, it represents the primary demographic of digital buyers who will interact with the marketplace and product customization features. Second, because the platform introduces a digital labor market, this age group effectively represents the typical demographic of active digital job-seekers within the broader gig economy. Consequently, their sufficient digital literacy provides a reliable baseline for assessing whether the simplified workflows and cognitive load reduction that were designed initially for older craftsmen can successfully and efficiently serve a standard, tech-literate ecosystem without causing operational friction. Such an approach is widely accepted in early-stage usability evaluations, where prior experience with comparable digital systems serves as a reliable baseline for assessing user perception and system efficacy.

The sample size of 82 significantly surpasses the conventional minimum requirement of 30 participants for usability studies, thus improving the reliability and statistical strength of the evaluation in various aspects.

Age Pie Chart

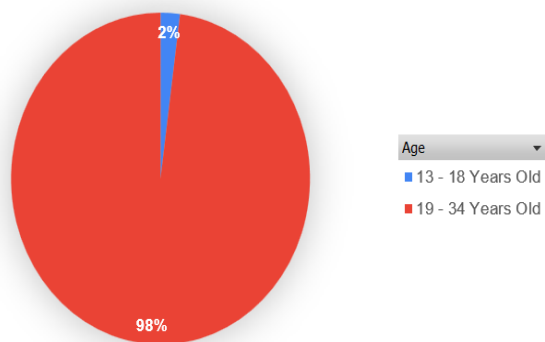


Fig. 4: Age demographic profile of respondents (n = 82), with a predominant 98% concentration in the 19–34 age bracket

Furthermore, during the initial requirements gathering phase, ten essential stakeholders, including nine experienced craftsmen and one business owner with more than five years of industry expertise, offered critical qualitative insights. These stakeholders were selected via purposive sampling to ensure that the design decisions were grounded in professional expertise and real-world domain requirements. This targeted involvement follows the established principle in usability engineering that a small, representative group of users is sufficient to uncover the majority of critical system requirements (Nielsen and Landauer, 1993). Additionally, this sample size aligns with recent methodological standards, indicating that data saturation in qualitative inquiries is typically achieved within 9 to 17 interviews, ensuring that the insights are comprehensive and non-redundant (Hennink and Kaiser, 2022). This approach facilitated a deeper contextual comprehension and more coherent decision-making throughout the User-Centered Design (UCD) process. Ultimately, the insights gained from this group formed the functional foundation of the prototype, which was subsequently validated through a quantitative evaluation involving 82 respondents to ensure broader usability stability.

Tools

Figma served as the primary tool for translating user requirements into a high-fidelity prototype. The prototype was used as the primary reference during the questionnaire distribution process, with the Figma access link embedded to enable respondents to evaluate the design through direct interaction with the prototype.

Google Form was then utilized to collect quantitative data through the User Experience Questionnaire – Short (UEQ-S), which was distributed to 82 qualified respondents. The questionnaire data were subsequently analyzed with the UEQ-S Data Analysis Tool in Microsoft Excel to generate numerical interpretations and user experience evaluations for the developed prototype.

Case Study

Contextual Analysis of Traditional Indonesian Craft Ecosystem

This study involved ten participants, including craftsmen and business owners from various craft sectors, such as wood, glass, stone, pottery, birdcage production, and batik box making, operating in Central Java and surrounding regions. All participants had more than five years of experience in their respective fields. Although their formal educational backgrounds varied, they acquired their skills through non-formal learning processes such as hands-on experience and social learning within small-scale, home-based production environments oriented toward local markets.

Production activities were mainly performed using conventional tools and manual techniques that emphasize precision and craftsmanship. The structure of these enterprises varied, ranging from independent craftsmen who worked individually to business owners who employed permanent or freelance workers, especially during periods of increased demand. Labor recruitment was conducted informally through social proximity, with the majority of workers being sourced from personal networks such as friends or neighbors rather than through formal procedures. While this informal system allows flexibility, it also creates uncertainty in labor availability and production capacity.

In the marketing and sales dimensions, the craftsmen adopted a hybrid approach that combines traditional practices with limited digital use. Direct sales at workshops and word-of-mouth referrals remain the main channels, while certain craftsmen have started utilizing digital platforms like WhatsApp, Facebook, Shopee, and TikTok to broaden their market reach. However, these online platforms mainly function as digital showcases, since the majority of transactions and communications still occur manually via messaging apps. Payment methods also vary, including cash, Cash-on-Delivery (COD), and an online payment gateway.

Beyond economic motivations, the craftsmen's participation in production is also influenced by cultural values, pride in craftsmanship, and a desire to preserve local traditions. Their work practices reflect a balance between technical skill, reliance on social networks, and gradual adaptation to digital instruments. Overall, the traditional craft ecosystem in Indonesia demonstrates a dynamic and decentralized nature in which manual production processes, trust-driven social connections, and limited digital adoption interact to sustain both the economic viability and cultural heritage of local craftsmen.

Results and Discussion

Requirements

The primary question guiding the interview process, "What challenges hinder the productivity of craft industry activities?" was expanded into several follow-up questions tailored to the specific profiles of each participant, including both craftsmen and business owners. Through this process, the study identified four major categories of challenges faced within the craft

industry: Marketing and sales constraints, labor and workforce challenges, technology adoption and application usage challenges, and operational and logistics-related problems.

Marketing and Sales Constraints

The main issue in this study is the restricted digital marketing capability among craftsmen. Although some have begun using platforms including Facebook, WhatsApp, TikTok, and Shopee, their understanding of effective digital marketing strategies remains insufficient. Many still depend on traditional promotional methods like word of mouth and consignment through local stores, which limit efficiency and market penetration.

Most craftsmen also manage transactions manually through direct interactions or personal communication channels. This manual reliance is often driven by the need for detailed product and price customization, where customers and craftsmen should negotiate specific designs, materials, or sizes, and a price that is not yet supported by standard digital platforms. This personalized approach lacks a centralized system for recording sales, making it difficult to track orders, calculate revenue and profit, and validate payments or deliveries.

These conditions highlight the absence of an integrated system for recording and processing transactions, an essential need for craft-based businesses seeking to enhance operational efficiency and accuracy. Thus, developing a digital sales system that integrates promotional activities, transaction processes, and financial recording is essential to support the digital transformation of the craft industry.

These challenges are further detailed in Table 3, which presents a structured mapping between the identified marketing and sales constraints along with the proposed system solutions.

Labor and Workforce Challenges

Within the labor dimension, craftsmen face persistent challenges in recruiting skilled and reliable workers. Craft production requires a high level of precision and manual dexterity, which not all workers are able to meet in accordance with the expected quality standards. This issue is further compounded by the limited availability of labor, which often disrupts production schedules whenever a craftsman is absent, consequently affecting overall productivity.

Table 3: System Requirements in the Marketing and Sales Aspect

Aspect	System Solution
Limited Digital Marketing Capability	A feed posting feature and a community space for sharing information on promotional content and campaigns.
Traditional Promotion Processes	A product catalog and digital showcase system featuring photos, videos, categorization, and filtering to support modern online promotion.
Manual Transactions	An integrated transaction system with online payment gateway, customization product features, negotiation features, and in app chat.
Difficulty in Recording Sales	A real-time transaction recording feature.

These circumstances highlight the need for a digital recruitment system that bridges the informal nature of traditional craft hiring with digital efficiency. Instead of relying solely on formal corporate resumes (CVs), the system should facilitate the identification of qualified candidates by allowing them to upload visual portfolios that document their manual skills and past work. This approach provides business owners with tangible, visual proof of an applicant's capabilities, enabling a more objective screening process. By centralizing the submission of skill-based documentation, the system simplifies the hiring procedure and helps ensure the continuity and quality of craft production without overcomplicating the user interaction.

These challenges are further detailed in Table 4, which presents a structured mapping between the identified labor and workforce challenges along with the proposed system solutions.

Technology and Application Usage Challenges

Given that many craftsmen are already accustomed to using basic features of various communication and social media applications in their routines, the development of this web platform ensures its design with familiar interface principles commonly encountered by these users. Rather than replicating existing applications entirely, the system adopts essential elements such as simple navigation patterns and familiar page-transition flows to support ease of adaptation and minimize the learning curve.

Furthermore, the user flow was designed to reflect typical interaction patterns found in widely used digital platforms, including buying–selling processes in e-commerce applications, job-search flows in job-seeking platforms, and content posting mechanisms in social media. Information presentation was also tailored to be highly intuitive, incorporating clear visual elements like videos, photos, icons, labels, and familiar terminology, all arranged within a structured and organized layout. This approach aims to facilitate user learning, reduce cognitive load, and support a smooth transition for craftsmen when smoothly adopting the new system.

Table 4: System Requirements in the Labor Management Aspect

Aspect	System Solution
Dependence on Core Workers Due to Limited Skilled and Trustworthy Labor Availability	A job posting feature that enables business owners to publish job vacancies, while allowing workers to browse available positions and submit applications directly through the platform.
Informal and Manual Recruitment Processes	A candidate selection feature based on digital skill portfolios and visual documentation of past work rather than formal resumes.

Table 5: Requirements in the Technology and Application Utilization Aspect

Aspect	System Solution
Craftsmen's familiarity with existing marketing applications, leading to expectations for simple design principles, easy-to-understand workflows, and intuitive information.	An interface design that applies simple design principles, clear and easy-to-follow user flows, and intuitive information presentation.

These challenges are further detailed in Table 5, which presents a structured mapping between the identified technology and application usage challenges along with the proposed system solutions.

Operational and Logistics Challenges

Craftsmen often encounter difficulties in recording and managing inventory, particularly in tracking the inflow and outflow of goods. Moreover, technical challenges like inconsistencies between ordered specifications and the final products shown in the catalog, as well as delays in production schedules, frequently result in mismatches between buyers' expectations and the craftsmen's output. These problems not only impact product quality but also compromise the reliability and predictability of the entire production process.

To address these issues, the system should incorporate integration with logistics or delivery services, either through third-party providers or internal delivery management, to show estimated shipping expenses and delivery durations while allowing real-time shipment tracking. A product return feature is also necessary to ensure conformity between product specifications and delivered items. Furthermore, a simple stock and production management feature is essential to assist craftsmen in organizing work schedules, monitoring order progress, and standardizing product measurement inputs, so it can improve consistency, minimize mistakes, and enhance overall operational efficiency.

These challenges are further detailed in Table 6, which presents a structured mapping between the identified operational and logistics challenges along with the proposed system solutions.

Design Solution

Based on the requirements gathered, the proposed design solution was developed to directly address the identified constraints in marketing and sales, labor management, technology adoption, and operational logistics.

Table 6: System Requirements in the Operational and Logistics Aspect

Aspect	System Solution
Difficulty in Recording Product Inventory	A product inventory management feature with manual updates and automatic stock adjustments during sales.
Product Output Inconsistencies	A product return feature to resolve specification mismatches or defective items.
Difficulty in Tracking Product Shipments	An order tracking feature with estimated shipping costs and delivery time information.

The system consolidates promotional, transactional, recruitment, and operational features into a unified platform that enhances efficiency, transparency, and usability while maintaining the interpersonal and cultural dynamics of traditional craftsmanship. Therefore, for international clarity, the prototype interfaces presented in this manuscript have been translated into English, even though user testing was conducted in the local language to ensure authentic feedback from Indonesian craftsmen.

The Login and sign-up interface in Figure 5 adopts a simple design to decrease technical difficulty and improve accessibility for users with different digital literacy levels. As the primary front door of the application, authentication screens significantly shape users' first impressions and long-term retention (Authgear, 2026). Therefore, visual simplicity and intuitive clarity are prioritized to minimize cognitive load and support a seamless onboarding experience.

The feed-posting and community features shown in Figure 6 address the limitation of digital marketing capability by making a centralized platform for craftsmen to share promotional content, product visuals, and updates. The media upload functionality and embedded interaction flow (e.g., like, comment, and share) support the change from fragmented, word-of-mouth promotion to a structured and visible digital marketing. Additionally, the community section facilitates information exchange and collaborative promotion among craftsmen, reinforcing peer-based support within the platform ecosystem.

The product catalog and digital showcase features in Figure 7 address the limitations of traditional promotion processes by changing offline to online, consignment-based promotion into a structured and searchable online catalog. The grid section layout, integrating product images, pricing information, categorization, and promotional elements (e.g., flash sale and discount sections), centralizes promotional visibility within a consolidated digital platform rather than fragmenting it across physical stores or informal networks. The integration of filtering procedures, visual previews, and direct access to detailed product pages confirms the requirement for a modern digital showcase system. This design allows craftsmen to show products in a standardized and scalable format while aligning with established e-commerce interaction patterns, thereby supporting expanded market penetration.

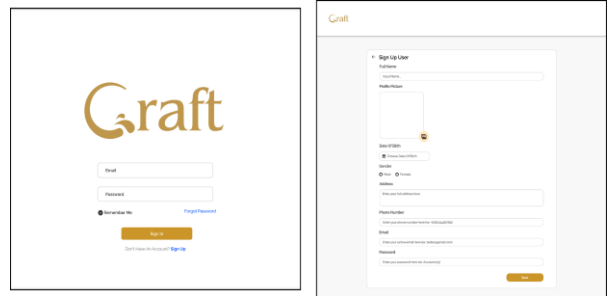


Fig. 5: Login and Sign up Interface

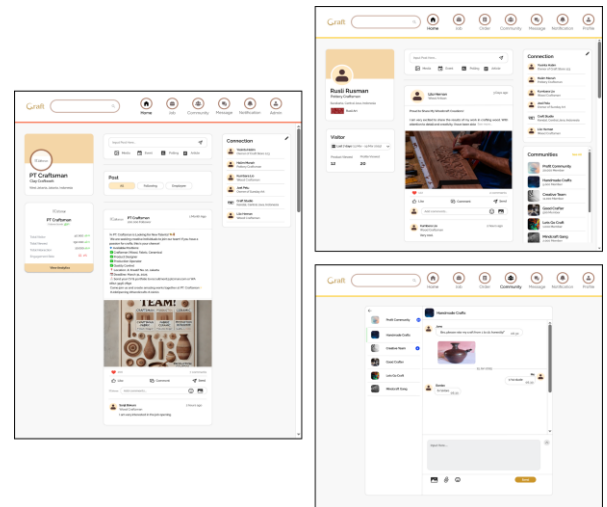


Fig. 6: Craftsmen Homepage, Company Admin Homepage, and Company Interaction Interface

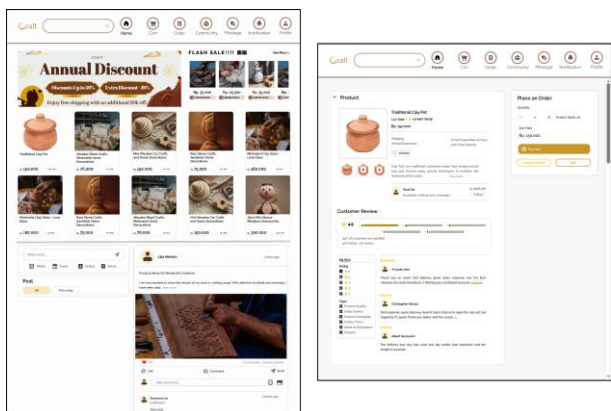


Fig. 7: Buyer Homepage and Product Detail Interface

The digital transaction system in Figure 8 addresses the requirement of marketing and sales constraints by centralizing manual transactions into a unified digital workflow. By integrating negotiation and customization features, the design facilitates customized craft adjustments often unsupported by conventional platforms. This architecture ensures that all specifications and price adjustments are systematically captured within the Order Summary, fulfilling the requirement for real-time transaction recording. Linked to an online payment gateway, the system demonstrates validated financial records, enabling craftsmen to maintain correct revenue tracking and overcome the limitations of manual documentation.

My Wallet interface in Figure 9 addresses a centralized financial system to address the industry's difficulty in tracking orders and revenue. By integrating data into a My Wallet dashboard, the design replaces fragmented accounting with real-time recording of order completions and withdrawals. This approach provides rapid visibility into store balances and pending funds, resolving the transparency issues inherent in manual transactions. Moreover, a detailed history, including order numbers and status updates, ensures rigid payment and delivery validation. Thus, this system enables craftsmen to change from inefficient manual recording to a data-driven model, supporting the industry's wider digital transformation.

The Job Posting and Seeking interfaces design in Figure 10 addresses the identified labor challenges by standardizing informal recruitment into a structured digital system. To ease the dependence on core workers, the system implements a job posting feature that allows business owners to define practical requirements, such as specific technical skills and non-technical skills, through simplified Job Qualification and Description features. This design provides a centralized List of Jobs for gig-workers to browse and apply for directly, translating the traditional word-of-mouth hiring process into a more transparent, accessible, and inclusive digital ecosystem.

The Manage Applicants interface in Figure 11 addresses the limitations of informal recruitment by converting candidate selection into a centralized workflow. Rather than depending on fragmented personal messaging, the interface organizes applicants and displays their digital portfolios and visual documentation of past work. This design operationalizes the requirement for skill-based screening by replacing formal CVs with a visual, portfolio-driven evaluation mechanism that aligns with the tactile and practical nature of craftwork. Therefore, the system improves transparency and decision traceability while respecting the socio-technical realities of artisan hiring.

The Product Management and Edit Product interfaces in Figure 12 address the requirement related to difficulties in recording product inventory by converting manual stock tracking into a structured digital control mechanism.

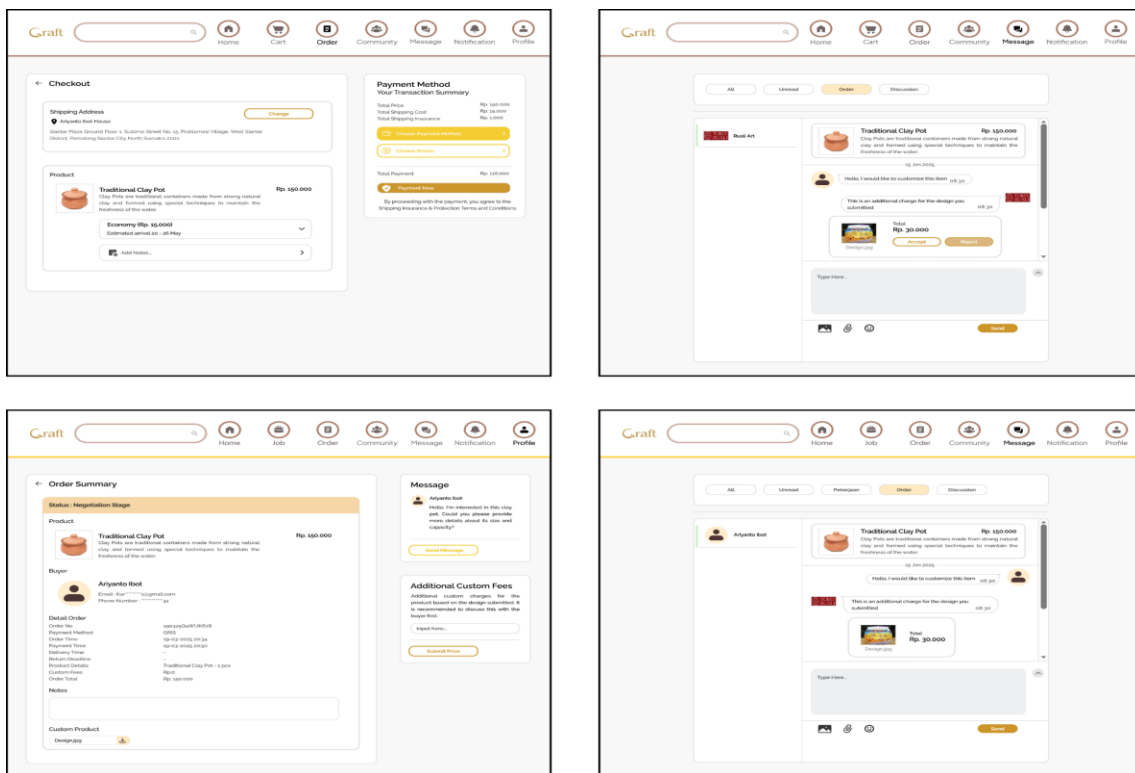


Fig. 8: Integrated Digital Transaction System with Embedded Customization and Negotiation Features

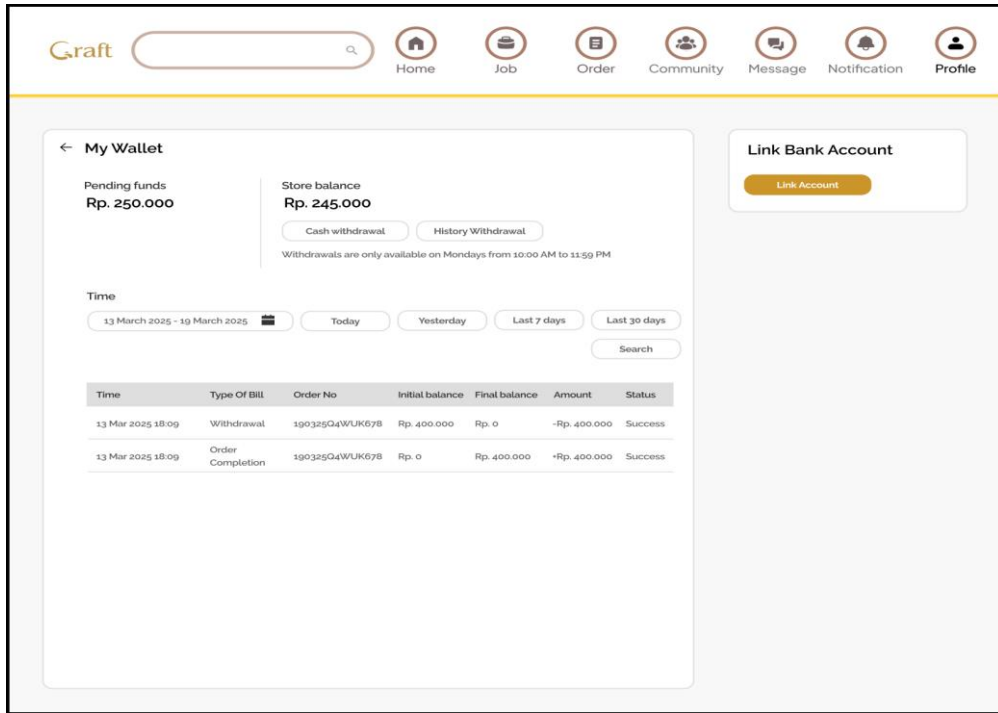


Fig. 9: My Wallet Interface

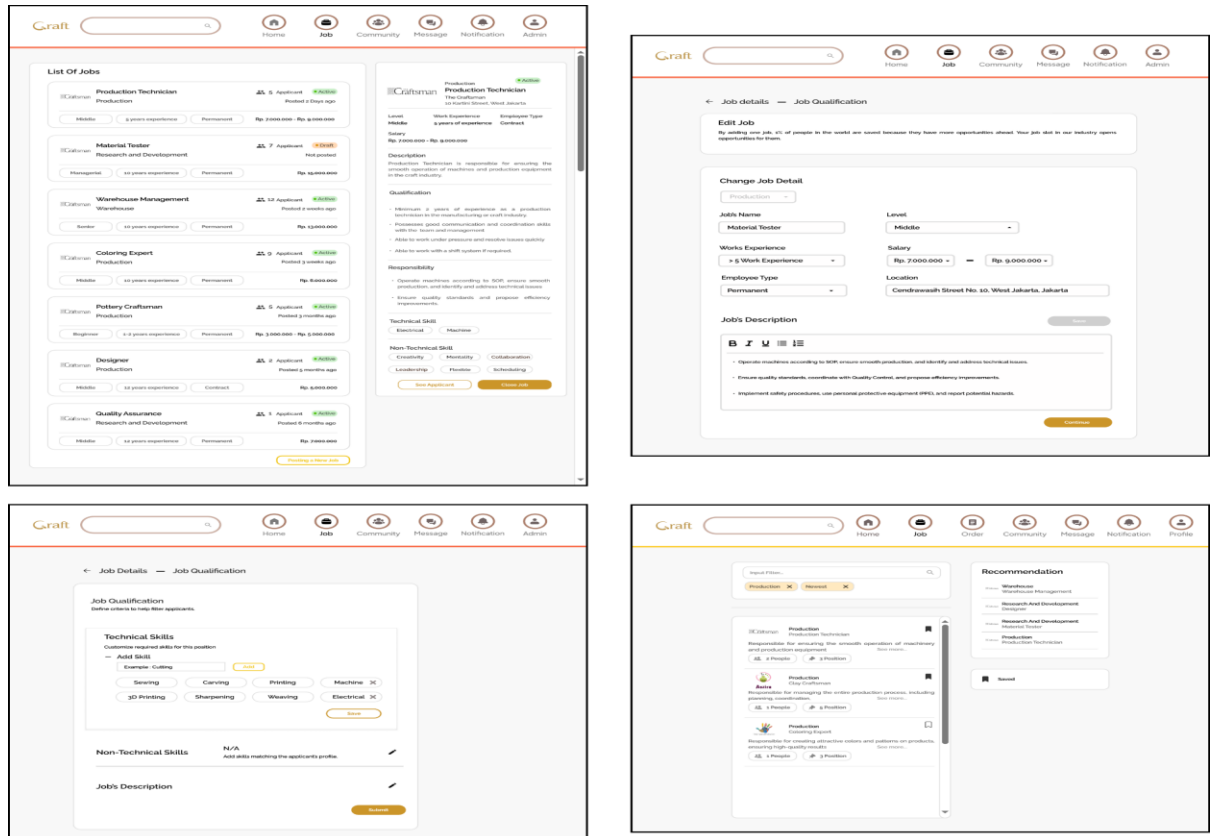


Fig. 10: Job Posting and Seeking Interfaces

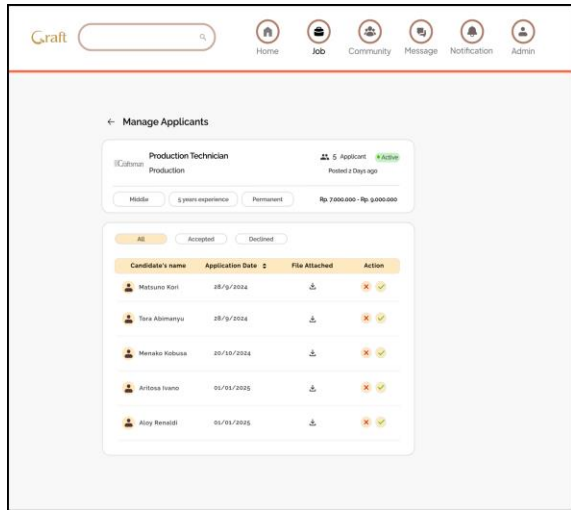


Fig. 11: Manage Applicants Interface

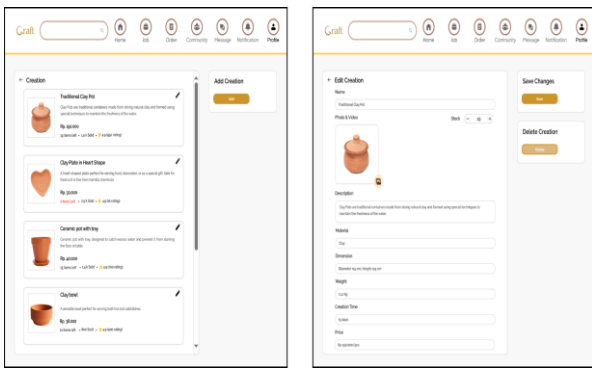


Fig. 12: Product Management and Edit Product Interfaces

The dashboard centralizes product listings with visible stock levels, sales indicators, and status information, allowing craftsmen to track inventory movements in real time. The detailed management interface further supports editable stock fields, product specifications, and standardized input forms, facilitating controlled stock adjustments and consistent data entry. Together, these interfaces function as an integrated inventory control system aligned with operational requirements for manual updates and automatic stock adjustments during sales. This integration enhances stock accuracy, minimizes recording errors, and supports more consistent production planning within craft-based businesses.

The Refund Interface in Figure 13 addresses a solution to the issue of product output inconsistencies by implementing a structured process for handling returns and refunds. The interface allows users to submit return requests for products that fail to meet the agreed-upon specifications, such as defects or damage in product features like size, material, or model. It offers an intuitive process for selecting the reason for the return and supports the submission of visual evidence (e.g., photos or videos), ensuring clear documentation of the issue. Additionally, the system is integrated with the refund process, facilitating reimbursement through the original payment method. This feature ensures a transparent, efficient mechanism for addressing product inconsistencies, thereby improving customer satisfaction and reducing operational challenges.

Order and Tracking interfaces in Figure 14 address the operational and logistics challenges, specifically the difficulty in tracking product shipments

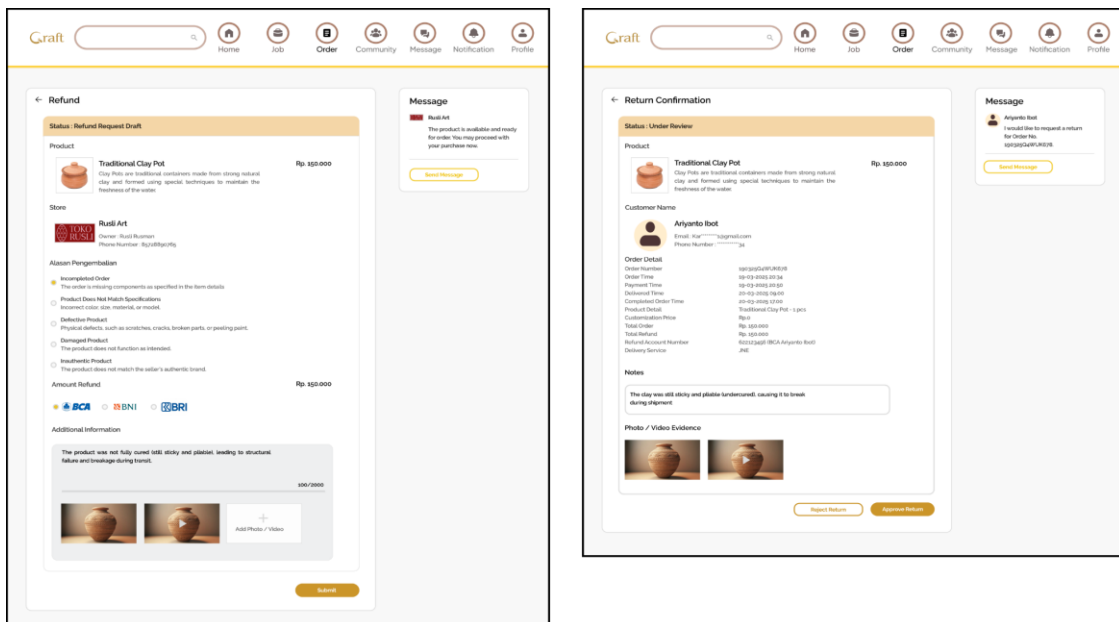


Fig. 13: Refund Interface

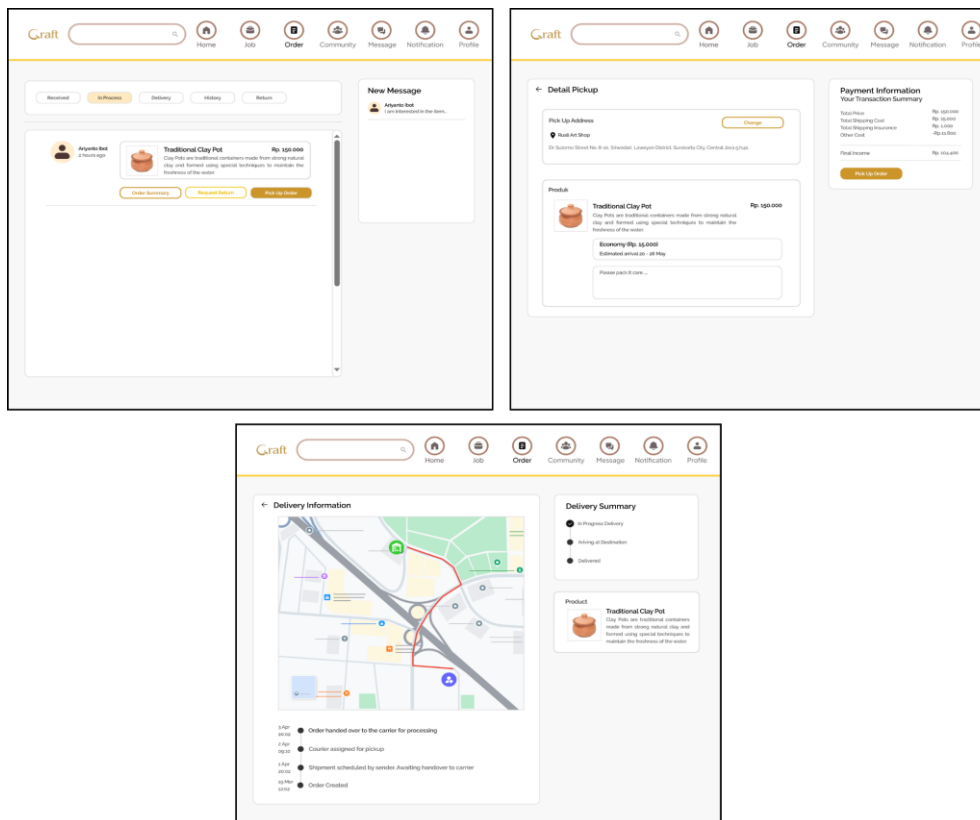


Fig. 14: Order and Tracking Interfaces

The interface integrates a real-time shipment tracking system that visually displays delivery progress on a map, highlighting key milestones such as order handover to the carrier and assigned pickup times. The delivery summary panel, along with product details, ensures users have full visibility into the shipment's status, estimated delivery times, and any potential delays. This feature streamlines the order management process, providing greater accuracy and transparency, thus resolving issues related to shipment tracking as outlined in the system requirements.

UEQ-S

After the prototype development phase, usability testing was conducted with 82 participants. The UEQ-S results are presented in Tables 7 and 8.

Table 7 presents the item-level scores, while Table 8 summarizes the aggregated Pragmatic and Hedonic Quality dimensions.

The UEQ-S evaluation results indicate an average score of 2.210 for pragmatic quality and 1.868 for hedonic quality. According to the international UEQ benchmark dataset, which includes 468 studies and over 21,000 respondents (Schrepp et al., 2017), these values fall within the Excellent category and are above the benchmark average (see Figure 15). It is important to clarify that this classification refers specifically to perceived user

experience quality within the UEQ framework and does not by itself demonstrate measurable economic impact.

In relation to the first research objective, designing an integrated digital system, the high pragmatic score suggests that users perceived the platform as clear, efficient, and supportive of their workflows. The strong results for Efficiency (2.16) and Perspicuity (2.23) indicate that the interface was relatively easy to understand and aligned with user expectations. This finding is consistent with previous UCD-based implementations in creative sectors, such as the Batik 4.0 application (Suparmanto et al., 2024), which similarly reported strong usability performance when emphasizing user empathy and contextual design.

Regarding the second objective of developing an inclusive interface, the slightly lower hedonic score reflects a deliberate design trade-off and the evaluation demographics. To accommodate diverse digital literacy levels, the interface prioritized minimalist navigation and workflow clarity over aesthetic complexity (Srivastava et al., 2021; Suryodiningrat, 2024; Faudzi et al., 2024). Although the tech-savvy youth evaluators (19-34 years old) may have expected higher visual stimulation typically found in mainstream apps, their Excellent Pragmatic rating validates the core UCD success: The literacy-sensitive design successfully maintained high functional usability.

Table 7: UEQ Short Result Table

Item	Q. Mean	UEQ Mean	Std. Dev	Variance	Negative	Positive	Scales
1	6.27	2.27	0.78	0.61	Obstructive	Supportive	Pragmatic Quality
2	6.23	2.23	0.85	0.71	Complicated	Easy	Pragmatic Quality
3	6.16	2.16	0.8	0.65	Inefficient	Efficient	Pragmatic Quality
4	6.18	2.18	0.83	0.69	Confusing	Clear	Pragmatic Quality
5	5.87	1.87	0.96	0.92	Boring	Exciting	Hedonic Quality
6	5.94	1.94	0.86	0.73	Not Interesting	Interesting	Hedonic Quality
7	5.76	1.76	1.16	1.36	Conventional	Inventive	Hedonic Quality
8	5.8	1.9	1.19	1.41	Usual	Leading Edge	Hedonic Quality

Table 8: Mean Short UEQ Scale

Short UEQ Scales	
Pragmatic Quality	2.210
Hedonic Quality	1.868
Overall	2.039

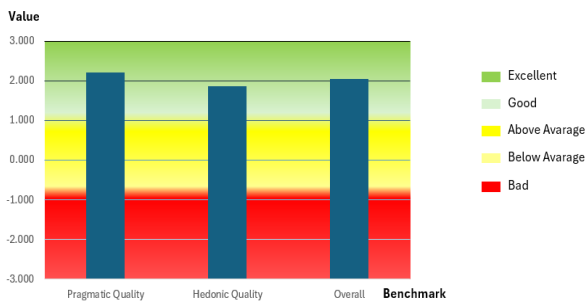


Fig. 15: Craft Web Application Benchmark

Furthermore, the Novelty score (1.76) highlights that integrating a job-seeking feature within a marketplace was still perceived as highly innovative.

In relation to the third objective, evaluating usability through formal testing, the comparison with the UEQ benchmark provides empirical validation of perceived system quality. Unlike passive storefront platforms such as Etsy or Shopee, which primarily facilitate product transactions, the Craft platform integrates a labor-oriented feature intended to support skill-based recruitment. However, while respondents perceived this integration as distinctive, implications regarding labor mobility or creative economy empowerment should be interpreted as exploratory. The current findings are based on perceptual usability data rather than longitudinal economic indicators.

Collectively, the results suggest that digital adoption in the craft sector may be facilitated when platforms move beyond purely transactional marketplaces and align more closely with the socio-technical realities of artisanal labor (Jaramillo and Raphaele, 2020; Ithurbide and Singh, 2022). Specifically, simplifying digital workflows to match intuitive craftsmanship practices may reduce early-stage adoption barriers. For designers and platform developers, this highlights the importance of literacy-sensitive interaction patterns. For policymakers and

creative economy stakeholders, the findings indicate that integrated marketplace–labor models warrant further pilot implementation and field validation before broader economic claims can be substantiated.

Beyond usability performance, the primary outcome of this study is the development and validation of an integrated socio-technical prototype that operationalizes User-Centered Design principles within the traditional craft ecosystem. Unlike prior single-focus digital interventions that emphasize either marketplace access or promotional visibility, this manuscript contributes a design-validated model that integrates transaction features, labor-oriented functionality, and literacy-sensitive interaction patterns into a unified system. This provides a clearer conceptual and practical framework for future research and pilot implementation in creative economy digitalization.

Conclusion

This study aimed to design and evaluate an intuitive digital system that integrates traditional craftsmanship with digital interaction through a User-Centered Design (UCD) methodology. User requirements were elicited directly from craftsmen and a business owner during the design phase, while prospective users participated in the usability evaluation. The resulting Craft application prototype addresses key industry needs, including transaction transparency, job-seeking opportunities, and product customization within a unified platform.

Usability evaluation using the UEQ benchmark framework indicates that both pragmatic and hedonic qualities achieved excellent ratings, suggesting that the integrated marketplace and labor-oriented model is perceived as usable, accessible, and contextually relevant. These findings provide empirical validation at the design level, demonstrating that aligning digital interfaces with intuitive work practices and varying literacy levels can enhance perceived usability and acceptance among target users.

However, the study’s contribution remains primarily at the design-validation stage. While results indicate strong perceived usability, broader claims regarding economic resilience, income stability, or long-term labor

mobility require real-world deployment, behavioral performance metrics, and longitudinal assessment to substantiate long-term impact. Future research should therefore extend this work through field implementation and impact evaluation to confirm the system's practical and socioeconomic effectiveness.

Limitations and Future Works

Prototype System and Real-World Deployment

The system remains at the prototype stage and has not yet been implemented in a production environment. Consequently, the findings reflect perceived design quality rather than operational performance. Issues related to scalability, infrastructure variability, and sustained adoption remain untested. Future work will focus on full system deployment and field studies across diverse real-world settings.

Lack of Longitudinal and Behavioral Data

The evaluation relied primarily on self-reported perceptions using the UEQ-S. Objective behavioral indicators, such as task success rates, time-on-task, and error frequency, were not measured. As a result, high usability scores should be interpreted as indicators of perceived experience rather than confirmed efficiency gains. Future research should incorporate longitudinal tracking and task-based performance metrics to validate sustained usability and productivity outcomes.

Sampling Bias and Representativeness

Convenience sampling was used, which may overrepresent participants with moderate digital familiarity. Extremely varying levels of digital familiarity or highly marginalized groups may not be fully represented in the dataset. Future studies should implement stratified purposive sampling across clearly defined literacy levels and user roles to improve representativeness.

Comparative Evaluation With Existing Platforms

No direct comparative testing was conducted between the Craft platform and existing marketplace or gig platforms. Therefore, conclusions regarding relative effectiveness remain provisional. Future research should incorporate A/B testing or controlled comparative studies to evaluate retention, task performance, and economic indicators relative to established platforms.

Geographic Generalizability

The empirical evidence is limited to the Indonesian context. Cultural transferability and cross-regional scalability have not been empirically tested. Future studies should extend evaluation to multiple regions and emerging markets to assess broader applicability across diverse socio-economic environments.

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Author's Contributions

Christopher Kevin Gunawan: Data analysis and manuscript preparation.

Ravi Ardiza Putra: User Interface (UI) design.

Steven Albert: Requirement gathering and questionnaire design, manuscript preparation.

Sugiarto Hartono: Contributed substantive input during the revision process, provided critical reviews, and approved the final manuscript.

Fathy Radhia: Provided direction, suggestions, and final approval of the manuscript.

Ethics

This manuscript is original and has not been previously published. It complies with ethical standards and does not present any ethical issues.

Dataset Availability

Data supporting this study are available from Zenodo at <https://doi.org/10.5281/zenodo.20055542>.

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