Contents lists available at www.journal.unipdu.ac.id
Register
Journal Page is available to www.journal.unipdu.ac.id/index.php/register

Research article

# Designing a Mobile Application to Assist Micro-Entrepreneurs in Understanding the Food Business Legality Process

*Izzatul Umami [a,*], Ahmad Naim Bin Che Pee [b], Hamzah Asyrani Bin Sulaiman [c], Ariy Khaerudin [e]*

[a] *Fakultas Teknik Program Studi Informatika, Universitas Darul Ulum, Jl. Gus Dur No. 29 A, Jombang, 61419, Surabaya Indonesia*
[b] *Fakultas Teknologi Informasi dan Komunikasi, Universiti Teknikal Malaysia Melaka (UTeM) Jalan Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia*
[c] *Fakultas Teknologi Informasi dan Komunikasi, Universiti Teknikal Malaysia Melaka (UTeM), Jalan Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia*
[d] *Fakultas Hukum, Universitas Islam Batik Surakarta, Jl. KH. Agus salim No. 10 Surakarta, Indonesia.*
*email: [a,*] izzatul.umami@undar.ac.id, [b] naim@utem.edu.my, [c] asyrani@utem.edu, [d] arkha@uniba.ac.id,*
** Correspondence*

**ARTICLE INFO**

***Article history:***
Received 3 November 2022
Revised 2 January 2023
Accepted 15 June 2023
Available online 21 June 2023

***Keywords:***
*Micro-entrepreneurs;*
*Mobile-based Learning App;*
*The FBS App;*
*System Usability Scale (SUS);*
*User-Centred System Design;*

***Please cite this article in IEEE style as:***
I. Umami, A. N. B. C. Pee, H. A. B. Sulaiman, and A. Khaerudin, "Designing a Mobile Application to Assist Micro-Entrepreneurs in Understanding the Food Business Legality Process," *Register: Jurnal Ilmiah Teknologi Sistem Informasi*, vol. 9, no. 1, pp. 68-85, 2023.

**ABSTRACT**

Micro-entrepreneurs are considered crucial by the government and stakeholders in economic development. However, the coaching and development opportunities for microenterprises have been limited, leading to a lack of technological advancements and self-competence among business actors. This research aims to address this gap by presenting the design and development of a mobile-based learning application called the Food Business System App (FBS App). The FBS App serves as a valuable resource for micro-entrepreneurs to acquire business knowledge related to government policies and enhance the value of their products. Developed using the Smart Apps Creator app on the Mobile App digital platform, the FBS App includes a collection of papers and videos covering various aspects of business and product legality. The learning content is divided into five parts: licensing, product branding, product manufacturing examples, and feedback. The FBS App is designed to minimize internet data usage, provide user-friendly experience, ensure fast technology access, and offer reliable technology performance for users with limited technological proficiency. The User-Centred System Design (UCSD) approach was employed in the application's design process, and the System Usability Scale (SUS) method was used for testing, resulting in a score of 77.2. It is anticipated that the FBS App will serve as a valuable reference tool for micro-entrepreneurs, enabling them to enhance the quality and competitiveness of their products.



## 1. Introduction

Small business owners are a significant focus for governments worldwide, especially in developing nations [1], [2]. Numerous studies have emphasized the unique needs of microentrepreneurs and microenterprises, providing further support for this concern [3]–[8]. Among these needs, technology adoption plays a crucial role in fostering entrepreneurial development. Micro-enterprises must embrace technology to achieve their entrepreneurial goals, including sustaining the production process and enhancing the quality of their business products [2], [4]. Moreover, promoting entrepreneurial literacy, optimizing business supply chains, addressing liquidity challenges, improving financial access, implementing business process automation, gaining competitive advantage, and combating unemployment are key drivers for the development of micro-businesses [9]–[15].

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Conducting an investigation on the outcomes of technology adoption by micro-enterprises is crucial as it directly impacts the innovative capacity and legal compliance of business actors, leading to the attainment of business and product legality [16]. Understanding the legitimacy of the business and the legality of its products holds significant importance in establishing the quality of the offerings. Business certification and product certification play pivotal roles in the success of business actors, enabling them to achieve sustainability in their operations. Moreover, obtaining such certifications empowers business actors to engage in broad-scope business activities, including international ventures [17].

A system is required to facilitate the processing of product legality, as obtaining the product's legitimacy can be a challenging task [18]. To obtain halal certificates, specific documents must be prepared, including the Business Owner's KTP (Identity Card), Business License, IUMK (Micro and Small Business Permit), Home Industrial Food (P-IRT), and NPWP (Taxpayer Identification Number) [19]. These documents must be fulfilled by business actors to acquire halal product certificates, which hold immense significance for micro-entrepreneurs, particularly in the Business Food Micro Industry. Halal products have a positive impact on micro-entrepreneurs [20].

The success of a system relies on indicators of satisfaction and utilization [21]. Satisfaction plays a crucial role in the acceptance of learning methods across different generations. It is also essential for service processes in organizations and governments, as the success of the system depends on user satisfaction, particularly in government public services [22]. Factors influencing system utilization are influenced by the project creator, the policy determinant, and ultimately, the researcher [23]. The effectiveness of developing an information system is contingent upon user adoption and utilization of the system [24].

One crucial aspect to emphasize is the significance of standardizing the production process, as it offers substantial benefits for business actors in maintaining the sustainability of their operations [25]. Through the standardization process, it is expected that product quality will be consistently maintained, enabling business actors to earn the trust of consumers. Additionally, combatting illegal businesses is vital for industry development and the promotion of legitimate business products [26]. The author emphasizes the crucial role of the government and social institutions in assisting business actors in ensuring the legality of their operations. Clear facilities and procedures should be provided to obtain business legality, as demonstrated by the OSS application in Indonesia https://oss.go.id/, which aids business actors in meeting legal requirements. Moreover, businesses must legalize their food and beverage products through the Si Halal application (https://ptsp.halal.go.id/) in Indonesia. The author adds that the legalization process involves specific stages and requires assistance in auditing and inspecting business production [27]. Ensuring that products comply with established safety and quality standards is of utmost importance.

In this context, it is essential to highlight the active involvement of business actors in monitoring and testing their products. Alongside the role of government and social institutions, business actors must understand their responsibilities in ensuring compliance with applicable standards. This concerted effort can lead to improved product quality, increased consumer confidence, and sustainable industry growth. Additionally, the authors intend to promote the adoption of technology in the processes of product legality and Halal compliance. Although the government has initiated programs to educate business actors on business and Halal legality independently, there is a need to enhance the adoption of technology through semi-intensive assistance. The research is rooted in the necessity for micro-entrepreneurs to harness technology to unlock their potential and enhance the quality of their products. The underlying motivation behind this study is to expedite the learning process for micro-entrepreneurs in obtaining business legality and ensuring product compliance. The project aims to enhance mobile-based learning methods and media by developing micro-entrepreneurial learning applications, ultimately increasing the value of businesses and products.

## 2. Materials and Methods

The research process is divided into four stages, as illustrated in Figure 1. The first stage entails conducting a literature review and developing instruments based on the identified user needs. In the second stage, the specific needs of microenterprises are identified and examined in relation to the existing literature. Moving on to the third stage, software development is carried out, ensuring that it

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

aligns with the identified needs and incorporates feedback from relevant stakeholders involved in the creation of the learning application. Lastly, the fourth stage involves evaluating the usability of the learning system using the System Usability Scale approach.

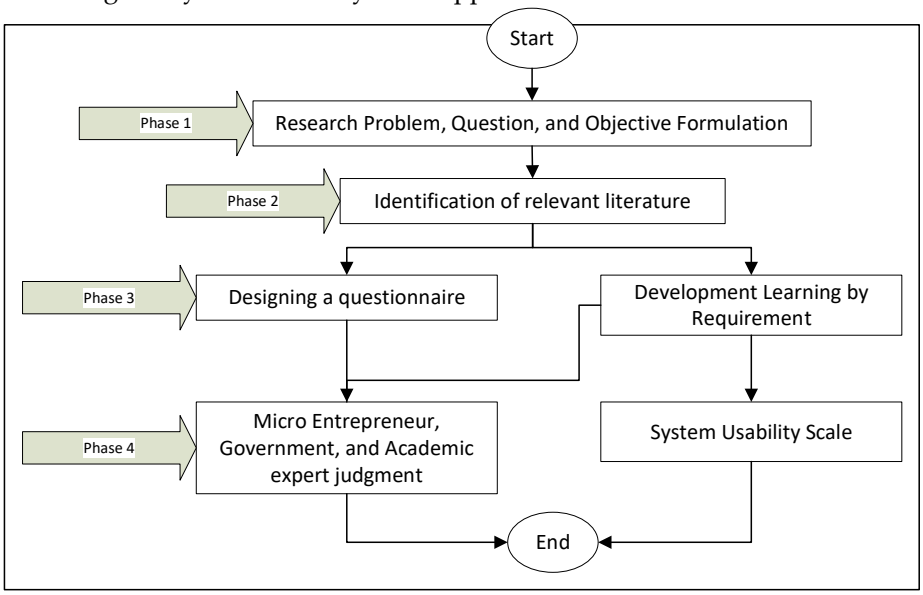


Fig. 1. The Research Stages

The research stages of the UCSD method utilized in this study are presented in Figure 2. UCSD (Understanding, Designing, Implementing, and Analyzing) is an approach or methodology employed in interactive system development and user experience design. This method, also known as " Human-Computer Interaction Process, " is commonly used in the fields of user experience design and human-computer interaction science. In this study, a concise overview of the research steps following the UCSD method is provided understanding, designing, implementing, and analyzing.

The understanding stage involves gaining a deep understanding of the needs, goals, and characteristics of the users who will utilize the interactive Food Business System or product. This includes collecting data and information about the users, the context in which the system will be used, and analyzing the tasks the users will perform. Standard methods employed during this stage include interviews, observations, and analysis of relevant documentation. The research commenced with the recognition of the need for business actors to undergo a learning process when utilizing government facilities for product legality procedures (such as https://ptsp.halal.go.id/) and engaging in business activities (https://ereg.pajak.go.id/login and https://oss.go.id/). However, registering products and ensuring business legality is not as straightforward as one might assume. Business actors require assistance and specialized learning resources to streamline the registration process. To supplement this step, interviews and feedback requests are conducted with business actors who have encountered difficulties while registering Halal products, obtaining NPWP (Tax Identification Numbers), and Business Identification Numbers (NIB).

In the designing stage, designers utilize the insights obtained from the previous step to develop solutions that align with the needs and goals of users utilizing the Food Business System (FBS). FBS design encompasses prototyping, interaction modeling, and the creation of user interfaces. The objective of this stage is to generate a design concept that effectively addresses the identified problems from the previous step.

In the implementing stage, the designed solution is translated into an actual interactive product. This process involves developing, coding, and rigorously testing the system. The technology employed in this implementation phase utilizes the Smart Apps Creator tool, which aids in the creation of the interactive product.

And the analyzing stage focuses on evaluating and testing the implemented interactive system to assess its performance and verify its alignment with user needs. Evaluation is conducted through user testing, gathering feedback, and analyzing data using the SUS method. Our needs analysis was carried out in various locations and sub-districts, including Gudo, Kudu, Ngoro, Morosunggingan

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Village, Kaliwungu Village, Made Village, and numerous other villages supported by the Jombang Government.

During this research stage, four essential steps needed to be accomplished: user needs analysis, functional needs analysis, application use case design, and curriculum design. These steps are integral to the UI/UX design process, ensuring alignment with the requirements of business actors. The outcomes of this analysis are utilized to enhance and optimize the existing product designs. The UCSD method promotes a continuous cycle wherein improved user understanding informs better planning, which is then implemented and reanalyzed to facilitate continuous improvement of the developed product or interactive system.

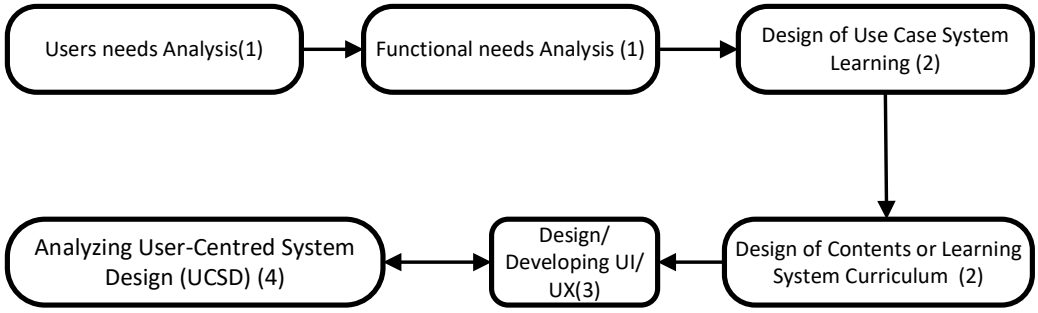


Fig. 2. UCSD Stage Research Method

## 2.1. User Needs Analysis

The target users of the learning system for product legality and business legality are micro-business entrepreneurs with estimated monthly turnovers below 5 million. The FBS learning system caters to the needs of micro-business actors, their assistants, FBS admins, and village institutions interested in fostering the growth of micro-entrepreneurs.

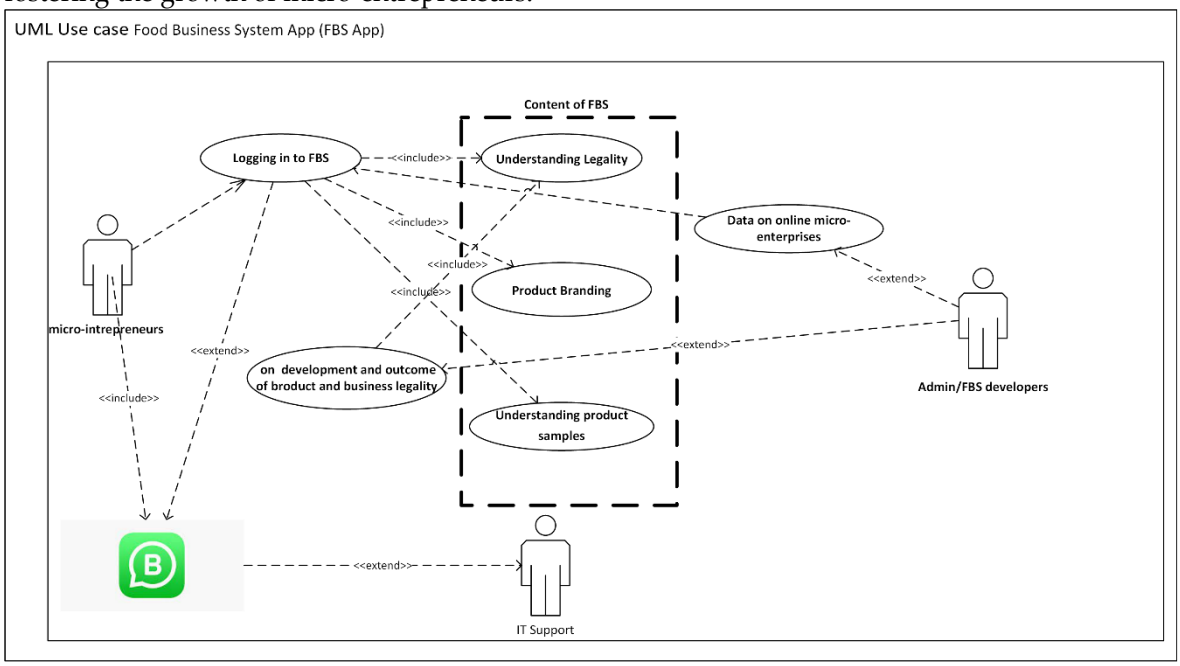


Fig. 3. Use Case Diagrams between users

The selection of users is based on the following criteria is business actors, business actor companions (IT Support), and FBS admin/developers. The business actors are entrepreneurs whose monthly income ranges from 1 to 5 million. Around 90% of them are not familiar with technology and have limited experience with technology adoption. For this study, we gathered data from 27 entrepreneurs in Morosunggingan Village, Peterongan District.

The business actor companions (IT Support) are individuals or institutions who have a good understanding of information technology and are experienced in adopting information system technology. They can provide support and guidance to business actors interested in developing micro-enterprises. And the FBS admin/developers is an internal team responsible for the development of the FBS system. They are interested in promoting the growth of micro-entrepreneurs. Additionally, the FBS

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

admin collaborates with government institutions to support the learning process of business actors in obtaining product legality, NPWP (Tax Identification Number), and NIB (Business Identification Number). Successful data collection from business actors would greatly benefit the government as it would facilitate the organization and management of micro-entrepreneurs in specific areas.

Table 1. User Requirements

| No | Users | Data Requirement/Information |
|---|---|---|
| 1 | IT Support | • Assisting the learning process for micro-enterprises<br>• Helping to log in to FBS and access the FBS learning process |
| 2 | Micro-Entrepreneurs | • Running the system according to the needs of business actors<br>• Carrying out the data input process on the government page with the help of IT Support |
| 3 | Admin/FBS developers | • Synchronizing the needs of business actors<br>• Building a system according to the needs of business actors<br>• Making the right curriculum according to the needs of business actors |
| 4 | Government Support | • Synchronizing the needs of business actors and reporting to the FBS Admin<br>• Supporting the curriculum according to the needs and development of business actors. |

The aforementioned stage involves analyzing user needs for designing the FBS, as presented in Table 1. User identification is divided into three roles, with an additional hidden function that plays a crucial role in supporting the growth of business actors and fostering entrepreneurial development.

### 2.2. Functional Needs Analysis

Developing a learning system requires tailoring it to the specific needs of users. Figure 4 below illustrates our approach to address the needs of business actors, who often have limited knowledge of information technology. These actors are typically focused on production and may lack awareness of the importance of business and product legality. To cater to their needs, we employ two complementary approaches. Firstly, we engage in discussions with business actors on topics related to business development and the improvement of product quality. Secondly, we offer intensive and interactive assistance in obtaining essential certifications such as Halal certificates, NPWP (Tax Identification Number), and NIB (Business Identification Number). This assistance involves stakeholders, including local villages, cooperatives, micro-business services, and the LPPPH (Halal Product Assurance Institute) at Darul Ulum University in Jombang. The FBS App (https://bit.ly/3Zkegpd) serves as a valuable tool for business actors seeking to acquire business certificates and Halal product certificates. To facilitate the learning process and ensure the production of certificates and compliant products, business actors are required to verify their specific needs within the system. This verification process enables them to engage in an independent and streamlined certification procedure.

Fig. 4. Mentoring Process and Functional Needs Analysis for designing the FBS App

### 2.3. *The Design of Use Case Learning System*

The process of application development is inherently complex. One approach to modeling system behavior is through the use of activity diagrams, which are derived from the System Modeling Language (SML) or Unified Modeling Language (UML). These diagrams play a crucial role in the modeling process, specifically in capturing and visualizing system activities. By utilizing UML, a standardized graphical notation for objects, developers can enhance reusability and promote more efficient design practices [28].

The Unified Modeling Language (UML) is widely employed by practitioners to model software architectures from various perspectives [29]. UML serves as a standard modeling language for visualizing system designs, enabling software developers to construct systems more effectively. It aids in the identification, documentation, and development of software by providing a comprehensive modeling language. UML is particularly beneficial for modeling software development concepts, and the reuse of UML diagrams can accelerate the software development process [30]. Among the integrated

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

modeling language models, the activity diagram plays a significant role in depicting the interaction and flow of activities between human users and systems [31].

To ensure efficient and prompt software development, the involvement of business actors is crucial in determining the system requirements. The software should be user-friendly and easy to operate, allowing for a seamless user experience. The M-FBS learning system follows a structured learning process, with 70% of the learning conducted independently. Additionally, the system incorporates a mentorship model or professional support for product and business legality systems, constituting the remaining 30% of the M-FBS system.

Figure 5 illustrates the interaction stages between actors and the M-FBS Learning System. The activity diagram demonstrates the sequential steps involved in obtaining NPWP (Tax Identification Number) legality with the assistance of video learning materials, online learning books, and downloadable PDF files.

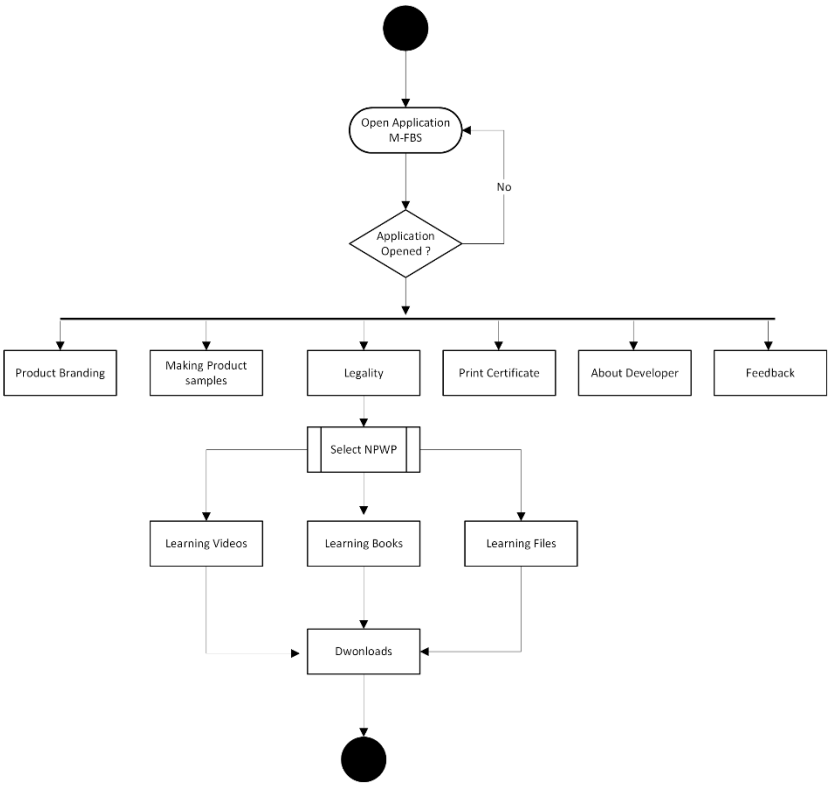


Fig. 5. The Activity Diagram of the process of accessing permissions in M-FBS

### 2.4. *Design of Content or Curriculum for the Learning System*

The flow of the Mobile-based product legality and business legality learning system is designed based on the specific curriculum required by micro-entrepreneurs. The curriculum focuses on the sequential and interconnected processes of business legality and product legality. It begins with obtaining business legality and then proceeds to ensure the legality of the business products. Business actors are required to fulfill at least two legal requirements. This need forms the foundation for developing the curriculum and designing the learning content accordingly.

The Smart Apps Creator was utilized to assist in the learning process of understanding business legitimacy and product legality. Figure 6 presents the central flow diagram of the M-FBS system, which addresses the content requirements identified by micro-entrepreneurs. The following are urgent needs of business actors that require attention, as they cannot independently manage business and product legality are business actors require enhanced learning resources to access and navigate government websites for registering products and ensuring business legality, business actors need to amplify the marketing of their products by adopting online market technologies and utilizing communication channels integrated with business marketing concepts, such as WhatsApp, Instagram, and Facebook, and business actors need intensive guidance to enhance the value of their products and achieve success in obtaining necessary entrepreneurial documents.

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

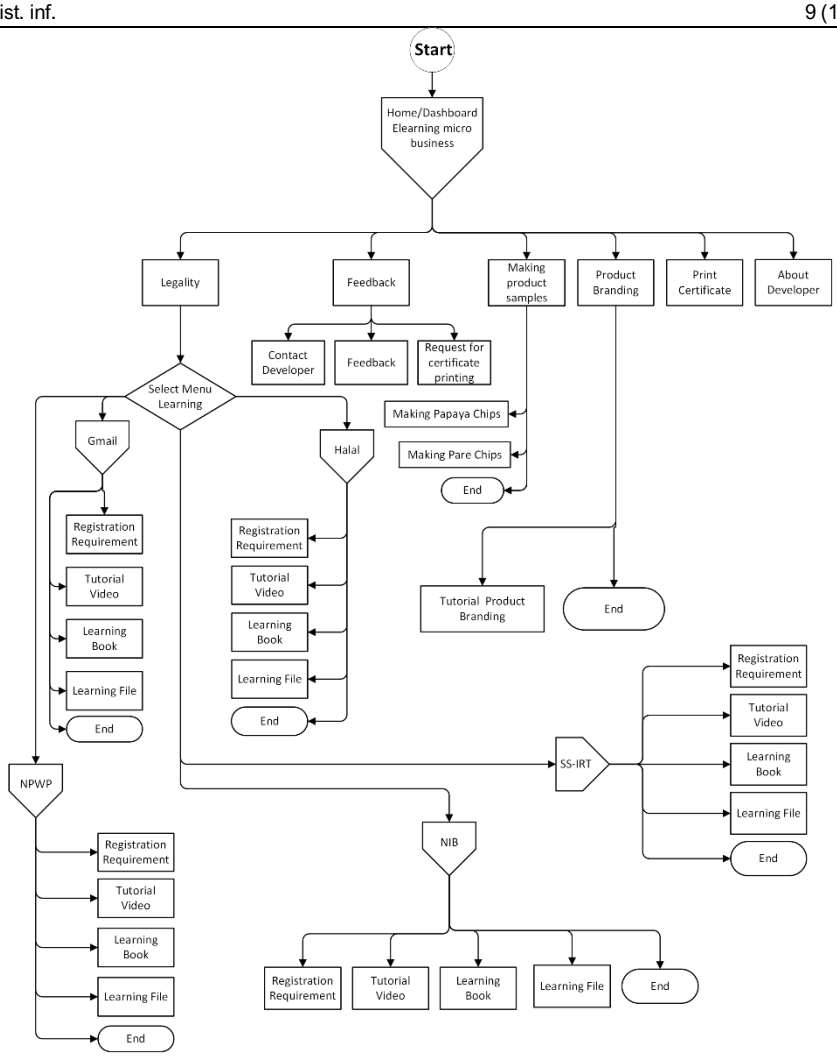


Fig. 6. The Flowchart of the Curriculum of the FBS App used in this study

## 2.5. *Design UI/UX*

FBS (Food Business System) is a mobile-based application designed as a platform for the learning process of obtaining business and product legality. The FBS app was developed using the Smart Apps Creator (SAC). It employs a user-centered system design (UCSD) approach, which prioritizes usability throughout the system's development lifecycle.

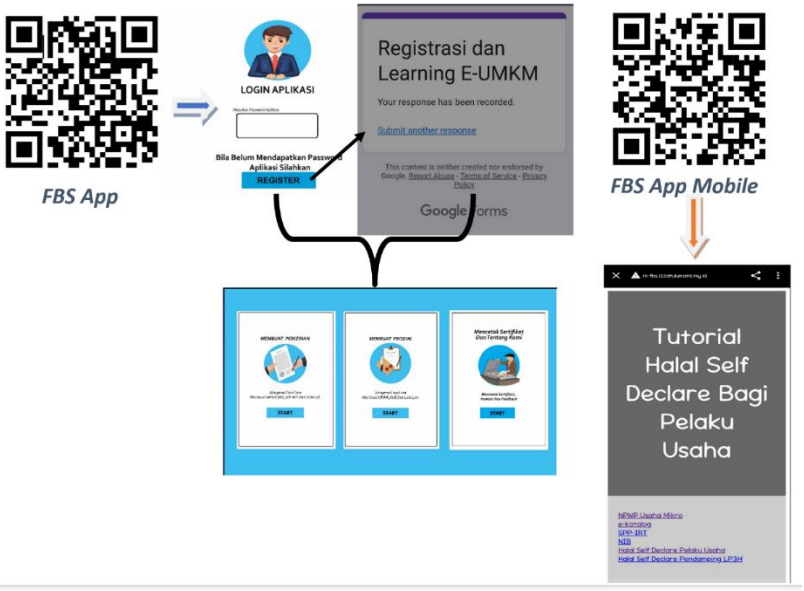


Fig. 7. Barcodes for the FBS App on WhatsApp (Implementation of User Interface)


http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

UCSD is crucial for creating a testing platform that accurately reflects the intended functions and collects relevant user performance data, including scenarios, use cases, prototypes, and user-centric system designs. The system is integrated with the WhatsApp application to facilitate the use of the FBS learning app by business actors. The presence of the FBS system within the application interface (see Figure 7) makes it convenient for business actors, who find WhatsApp to be an intuitive and user-friendly platform.

### 2.6. USCD (User-Centered System Design)

Process customization is crucial for UCSD as it needs to be defined, adapted, localized, and implemented within each organization or system user. The usability function of FBS relies on a user-centered approach, but it's important to note that there is no one-size-fits-all process. The activities of UCSD include understanding the context of use, iterating prototyping to reach a consensus, and addressing the needs of business actors. The development team requires design flexibility and active user collaboration throughout the software development process [32]. While it's essential to involve all users, the level of involvement may vary depending on the phase and their knowledge of the system's needs [33].

In our projects, we utilize an action research approach to introduce changes in technology application for learning purposes. The research focuses on Micro Food Enterprises and Micro Enterprises (UM) as the primary respondents. These micro business respondents are in Morosunggingan and Made Villages, Jombang, East Java, Indonesia. Some of them have already obtained various legal certifications for their business products. To establish connectivity, we share online links through popular platforms like Facebook, WhatsApp, Instagram, and Telegram. For this specific study, we have selected a sample of micro-food entrepreneurs from Jombang district, East Java, Indonesia.

First, user involvement, usability problems, and observation and recording of the results of changes in the learning process were conducted. We used qualitative data collection methods to examine the consequences of activities and actions. And then the development team's work was observed by actively participating in meetings with business actors during the software development process. The current work practices of Administrators, mainly paper-based, involved in national registration, were observed. Semi-structured interviews were conducted with user representatives and software developers using open-ended questions to explore the needs of businesses. Open-ended, semi-structured questions were asked during interviews with users about their work. Ongoing conversations took place with the software development team participants and representatives to understand business practices and potential differences in interpretation of business needs and desired actions. Meanwhile, we continued to work with the principles of the needs of business actors, considering the conditions and actions taken by business actors in processing business legality and product legality. Pilots were conducted, and findings were obtained in a research effort to develop a learning software for food businesses. This system aimed to optimally assist in obtaining business and product legality.

## 3. Results and Discussion

### 3.1. Implementation

M-FBS is a learning application designed to provide knowledge about business legality and product legality. It serves as a digital platform that helps business actors learn and manage the process of obtaining business licenses and ensuring legal compliance for activities such as export trade, import, and distribution permits for their products. The application offers a wide range of informative features, including those illustrated in Figure 8, which cover various aspects of the business field, such as licensing, product branding, manufacturing, and the issuance of learning certificates.

Figure 8 illustrates the learning process that addresses the requirements of business actors for obtaining licenses related to business legality and product legality. This process encompasses four crucial licenses: NPWP (Tax Identification Number), NIB (Business Identification Number), SS-IRT (Home Industry Business Permit Letter), and halal certification. To support this learning process, the system provides guidance on creating emails, as business and product legality registrations necessitate the use of email addresses for business actors.

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Figure 8&9 outlines the learning process for obtaining halal certification for food business products. Business actors are required to prepare various documents that establish their identity as business actors. Additionally, detailed documentation regarding the production process needs to be provided. The necessary documents for business actors include the NIB (Business Identification Number), ID cards of the business actor and the investigator (who serves as a witness during production), signatures of business actors and supervisors, product photos, shopping lists, and comprehensive explanations of the production process. The procedure for submitting these documents for halal certification consists of the following phases. The first phase is business actors (PU) begin by registering on the https://ptsp.halal.go.id page. During registration, they provide their username and PU email. The second phase is the PU uploads the SJPH (Halal Product Registration Certificate) document. Business actors will find a registration page where they can upload data pertaining to the production process. And then, the PU submits the SJPH documents online to the designated companion institution. The LP3H (Institute for Halal Product Assurance) and BPJPH (Halal Product Assurance Agency) have assigned business actor assistants to assist and verify the production process. In the next phase, business actor assistants submit the SJPH documents to the LP3H. These assistants are responsible for verifying the PU's approval. However, this verification process does not end with the companion institution. The confirmation is then forwarded to the LP3H, which serves as the halal product process companion institution. The LP3H submits the SJPH documents of business actors to the BPJPH. The verification process does not stop at the LP3H but continues on the BPJPH page. The Indonesian Ulama Council (MUI) will review the documents and issue fatwas (religious rulings) that grant halal certificates to the producing business actors.


(a) (b) (c)

(d) (e)

Fig. 8. (a) Home Page Views; (b) Requirements for Applying Legality; (c) Learning Video of Halal Licensing; (d) Tax Identification Number and Licensing Learning Files; (e) Product Branding

### 3.2. Testing the FBS App on Micro-Entrepreneurs (MEs)

The testing phase focused on assessing user satisfaction and evaluating the availability of learning features in the FBS App. Various UI/UX testing techniques were utilized, specifically for online-based learning. These techniques include learning readiness testing [24]–[25], UX questionnaire (UEQ) [36]–[39], usability metrics for user experience (UMUX)[40]–[43], and percentile for average user experience ranking questionnaire (SUPR-Q)[44]–[46]. However, in this research, we opted to use the System Usability Scale (SUS) due to its numerous advantages over other testing methodologies [43], [47].

The study participants in this research are small-scale food businesses located in Jombang, East Java, Indonesia. Some of these small-scale business participants have already obtained legal permits for their business products. The respondents were requested to complete an online survey using Google Forms. The survey instrument links were shared online and offline through platforms such as Facebook,

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

WhatsApp, Instagram, and Telegram. The majority of the survey responses were collected from Microbusiness groups on WhatsApp. The data collected focused on micro-enterprises, particularly those in the food industry. A total of 37 small-scale food business practitioners were included as participants in this study.

Testing using the SUS involves the use of a questionnaire with a five-point Likert scale as the testing instrument. SUS assesses the usability of a system from the user's subjective perspective. It is widely used by human-computer interaction (HCI) researchers and is considered a reliable and valid tool that can be applied in various contexts (usually with the Cronbach alpha coefficient exceeding 0.90)[48], [49].

Table 4 The standard SUS [41].

| | | Strongly Disagree | | | | Strongly Agree |
|---|---|---|---|---|---|---|
| 1. | I feel like I'd like to use this system a lot. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 2. | I found the system seemed overly complicated to me. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 3. | I found the system to be simple to use. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 4. | I believe that in order for me to use this system, I would require the assistance of a technical person. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 5. | I found the various function in this system were well integrated. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 6. | I thought there wa too much inconsistency in this system. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 7. | I assume that most people will take this approach quickly. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 8. | The interface was very difficult for me to use. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 9. | I felt very confident using the system. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 10. | I needed to learn a lot of things before I could get going with this system. | | | | | |
| | | 1 | 2 | 3 | 4 | 5 |

The SUS questionnaire consists of ten items, with half of them formulated in a negative tone (odd-numbered items) and the other half in a positive tone (even-numbered items). Participants rate their agreement with each item on a scale of 1 (strongly disagree) to 5 (strongly agree) [47]. The advantage of SUS is its simplicity and readability, with scores ranging from 0 to 100 [41], [47].

The questionnaire presented in Table 4 (The standard SUS [41]) was distributed to 37 participants, including IT support professionals and micro-business actors. The participants were determined based on Roscoe's theory, which suggests that study samples can range from 30 to 500 individuals [50]. The SUS scores range from 0 to 100, with higher scores indicating better usability, and the scale allows for 2.5-point increments. There are several reasons why SUS was chosen for this study. Not only does it serve as a tool to measure the ease of use and adoption of technology, but the system itself is open, enabling anyone to access the FBS platform.

In this study, the SUS scores were interpreted using a Curved Grading Scale (CGS) approach. Each item in the questionnaire is assigned a value grade ranging from 1 to 5. For items 1, 3, 5, 7, and 9, the contribution score is equal to the scale position minus 1. On the other hand, for items 2, 4, 6, 8, and 10, the contribution score is calculated as 5 minus the scale position. The total contribution score is then multiplied by 2.5 to obtain the overall SUS score, following the calculation equation (1):

$$SUS\ Score = ((R1-1)+(5-R2)+(R3-1)+(5-R4)+(R5-1)+(5-R6)+(R7-1)+(5-R8)+(R9-1)+(5-R10)) \times 2{,}5 \quad (1)$$

Here, R1, R3, R5, R7, and R9 represent the results for the odd-numbered questions, while R2, R4, R6, R8, and R10 represent the results for the even-numbered questions. The average of the individual SUS scores is then calculated to determine the overall SUS score.

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Table 2. The lists of the outcomes of the SUS test.

| Participants | Age | Business | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | Average SUS Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 33 | Nastar Cake | 5 | 1 | 4 | 3 | 5 | 2 | 5 | 3 | 3 | 3 | 75 |
| **2** | 35 | Nastar Cake | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 1 | 5 | 1 | 70 |
| **3** | 49 | Coffee Shop | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 2 | 4 | 4 | 65 |
| **4** | 35 | Mini Shop | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 3 | 4 | 5 | 60 |
| **5** | 47 | Lontong Balap | 5 | 1 | 5 | 1 | 4 | 1 | 5 | 1 | 5 | 1 | 97,5 |
| **6** | 36 | Nastar Cake | 5 | 1 | 5 | 1 | 5 | 2 | 5 | 2 | 5 | 3 | 90 |
| **7** | 50 | Boga Cake | 4 | 2 | 4 | 2 | 5 | 1 | 4 | 2 | 5 | 2 | 82,5 |
| **8** | 46 | Crackers shop | 4 | 2 | 4 | 2 | 4 | 1 | 2 | 2 | 4 | 2 | 72,5 |
| **9** | 46 | Honey shop | 4 | 2 | 4 | 1 | 4 | 2 | 4 | 2 | 4 | 2 | 77,5 |
| **10** | 47 | Rice shop | 4 | 2 | 4 | 2 | 4 | 2 | 2 | 2 | 4 | 1 | 72,5 |
| **11** | 40 | Online Shop | 5 | 1 | 4 | 2 | 5 | 4 | 4 | 3 | 4 | 2 | 75 |
| **12** | 38 | Cakes and rice shop | 5 | 2 | 5 | 2 | 5 | 2 | 4 | 5 | 5 | 3 | 75 |
| **13** | 54 | Chicken Breeders | 5 | 1 | 4 | 3 | 5 | 1 | 4 | 4 | 4 | 5 | 70 |
| **14** | 42 | Meatballs and Chicken Noodles | 5 | 1 | 4 | 1 | 5 | 1 | 5 | 1 | 5 | 5 | 87,5 |
| **15** | 46 | Catering | 5 | 2 | 5 | 1 | 5 | 5 | 4 | 3 | 4 | 2 | 75 |
| **16** | 51 | Nugget shop | 5 | 2 | 4 | 2 | 5 | 3 | 2 | 4 | 5 | 2 | 70 |
| **17** | 44 | Frozen Food & Cake shop | 4 | 2 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 1 | 70 |
| **18** | 46 | Batik Clothes | 4 | 2 | 5 | 2 | 5 | 5 | 5 | 2 | 4 | 2 | 75 |
| **19** | 21 | Batik Clothes | 5 | 2 | 5 | 4 | 4 | 2 | 5 | 2 | 5 | 4 | 75 |
| **20** | 41 | Fruit Salad | 5 | 2 | 5 | 4 | 4 | 2 | 5 | 3 | 5 | 5 | 70 |
| **21** | 42 | Salted Nuts & Crackers | 5 | 1 | 5 | 1 | 4 | 1 | 5 | 1 | 5 | 4 | 90 |
| **22** | 44 | Mini Shop | 1 | 2 | 5 | 3 | 5 | 3 | 5 | 1 | 5 | 5 | 67,5 |
| **23** | 35 | Mini Shop | 5 | 2 | 5 | 4 | 4 | 2 | 3 | 2 | 4 | 2 | 72,5 |
| **24** | 48 | Mushroom shop | 5 | 2 | 5 | 2 | 5 | 2 | 1 | 2 | 5 | 2 | 77,5 |
| **25** | 45 | Es Dawet | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 1 | 4 | 4 | 62,5 |
| **26** | 42 | Spicy Chicken Feet | 5 | 5 | 5 | 4 | 4 | 2 | 5 | 1 | 4 | 5 | 65 |
| **27** | 57 | Snacks shop | 5 | 1 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 5 | 62,5 |
| **28** | 18 | IT Support | 1 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 90 |
| **29** | 17 | IT Support | 1 | 1 | 5 | 1 | 5 | 1 | 5 | 2 | 5 | 1 | 87,5 |
| **30** | 18 | IT Support | 1 | 1 | 5 | 1 | 5 | 1 | 5 | 2 | 5 | 1 | 87,5 |
| **31** | 18 | IT Support | 1 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 87,5 |
| **32** | 19 | IT Support | 1 | 2 | 5 | 1 | 5 | 1 | 4 | 2 | 5 | 1 | 82,5 |
| **33** | 18 | IT Support | 1 | 1 | 5 | 1 | 5 | 1 | 4 | 1 | 5 | 1 | 87,5 |
| **34** | 19 | IT Support | 1 | 2 | 4 | 1 | 5 | 1 | 4 | 1 | 4 | 1 | 80 |
| **35** | 18 | IT Support | 1 | 1 | 4 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 87,5 |
| **36** | 18 | IT Support | 1 | 2 | 4 | 1 | 5 | 2 | 4 | 1 | 5 | 1 | 80 |
| **37** | 19 | IT Support | 1 | 2 | 4 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 85 |
| | | | | | | | | | | | | Score SUS Average | 77,2 |

The SUS score serves as an indicator of user acceptance. If the score falls below 68 points, it suggests that users encounter difficulties with the system, and further investigation and resolution are necessary. On the other hand, a score above 68 indicates that minor design improvements may be needed.

Table 3. SUS score categories

| SUS Score | Letter Grade | Adjective Rating |
|---|---|---|
| Above 80.3 | A | Excellent |
| Between 68 and 80.3 | B | Good |
| 68 | C | OK |
| Between 51 and 67 | D | Poor |
| Below 51 | F | Awful |

Table 2 presents the calculated SUS score, which is 77.2 points. This value indicates that users in Jombang, East Java, find the Food Business System learning interface design acceptable and perceive it to have a good UI/UX.

## 4. Discussion

Continuous innovation and improvement are required to meet the technology needs of micro-businesses and promote the development of sophisticated entrepreneurs[2], [4]. The Necessity of Technology Adoption and Product Legality for Micro-Enterprises, particularly in emerging nations.The Necessity of Technology Adoption and Product Legality for Micro-Enterprises, particularly in emerging nations. It highlights the unique needs of micro-entrepreneurs and emphasizes the role of technology in achieving entrepreneurial goals, sustaining production processes, and improving the quality of business products. In addition, identify various drivers for microenterprise development, such as entrepreneurial literacy, business process automation, financial access, and gaining competitive

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

advantage. In India, MOOC media has been used to support micro-entrepreneur learning, but the curriculum mainly focuses on business development, not having customized groups to meet the micro-entrepreneurs needs [51]. However, this approach has limitations as it demands significant effort to study media and restricts access to specific clusters, hindering the potential for broader learning and development among businesses. In addition, existing learning systems mainly focus on individual self-development rather than addressing product quality improvement.

An important aspect to consider is the standardization of production processes through an effective learning system. Although the Indonesian government offers learning support, it often relies on static manuals that all businesses may not easily understand. This research underscores the potential benefits of improved learning systems to help sustain business operations[19]. It is very important to emphasize the role of government and social institutions in providing clear guidelines, facilities, and procedures for business actors to obtain legal status and ensure smooth business operations.

One important aspect discussed is the importance of obtaining business and product certifications to establish the legality and quality of the offering. Business and product certifications play an important role in micro-enterprises success, enabling them to engage in broader business activities, including international ventures. Standardizing production processes and eradicating illegal businesses are important factors in maintaining micro-enterprises sustainability. Standardization is expected to help consistently maintain product quality and gain consumer trust while combating illegal business, promoting industrial development, and promoting legitimate business products. The role of government and social institutions is emphasized in assisting business actors in ensuring safety and quality standards compliance.

The research method used in this study is the UCSD (Understanding, Designing, Implementing, and Analyzing) method, commonly used in interactive system development and user experience design. Four stages of the UCSD method are described, including understanding user needs, designing solutions, implementing systems, and analyzing their performance. User needs analysis is an important step in the research process, and the target users of the learning system for product legality and business legality are identified as micro-business entrepreneurs with an estimated monthly turnover below 5 million. Micro entrepreneurs with minimal capability requirements require Information Technology support, assistance for micro-enterprises, and government support. In addition to emphasizing the need for help, the growth and development of microentrepreneurs should be supported by synchronization of needs, curriculum development, and reporting.

As a follow-up to meet the needs of micro-businesses for an easy learning process and obtaining business certifications and product certifications for business success, businesses can build sustainable potential and expand their reach to international markets [17]**.** The M-FBS V.1 app has been developed as a digital mobile learning platform to assist business owners in obtaining this certification. It provides a convenient medium for business actors to learn about the requirements and processes for obtaining business and product certificates. In case of difficulties, the application offers developer contacts who can provide intensive assistance to answer questions related to the business's legality and online products' legality.

The success of the M-FBS V.1 system depends on the indicators of satisfaction and utilization. User satisfaction is critical to the acceptance of learning methods, and the effectiveness of information systems depends on user adoption and utilization. Positive user reception and ratings, rated 77.2 (B), indicate that the system's design and functionality align with user expectations. Given the limited knowledge and understanding of business actors, the availability of assistance both offline and online is crucial. Micro-enterprises, in particular, benefit from ongoing support and monitoring to maximize their achievements and meet the expectations of all stakeholders.

This research emphasizes the active participation of business actors in monitoring and testing their products as a crucial aspect. Together with the government and social institutions, business actors are responsible for ensuring compliance with relevant standards. Thus, they can improve product quality, increase consumer confidence, and promote sustainable industry growth. The study recognizes the continued potential for technology adoption in the development and process of halal certification to ensure business continuity.

 http://doi.org/10.26594/register.v9i1.3061

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Similar to other developing countries, adopting technology for the learning process in micro-enterprises in Indonesia is still limited, especially in terms of increasing product value and business growth. This research aimed to redesign and develop new user-friendly learning resources for microbusiness owners, eliminating the need for specialized study groups. In addition, this research is based on the current needs of business actors in 2022-2023. To substantiate our findings, we have included data sources and mentoring experiences that validate business requirements regarding business legality and product-related aspects.

This research has significant implications for accelerating the achievement of business legality and product legality of business actors through a learning system that focuses on increasing product value. This system is tailored to answer the specific needs of business actors in the field. Along with government policies that continue to encourage micro-entrepreneurship development, demands from business actors, especially those in the micro sector, are expected to continue to increase. Consequently, this research will continue to evolve and adapt to meet the evolving needs and requirements of business actors in this dynamic environment.

## 5. Conclusions

The study highlights the importance of meeting the technological needs of microenterprises and driving the growth of entrepreneurs forward through continuous innovation. It addresses the limitations of existing learning systems, particularly in Indonesia, which mainly focuses on developing food and beverage micro businesses. This research emphasizes the role of effective learning systems in standardizing production processes and improving product quality. This research aims to improve mobile-based learning methods and media by developing micro-entrepreneurship learning applications, ultimately increasing the value of businesses and products. The study recognizes the potential benefits of improved learning systems to sustain business development operations and increased adoption of technology-based business legality systems and halal certification. In addition, this research's motivation is to accelerate the learning process for micro-entrepreneurs in obtaining business legality and ensuring product compliance. Technology adoption is limited to micro-enterprises in developing countries such as Indonesia, especially in increasing product value and business growth.

This research aimed to develop easy-to-use learning resources for microbusiness owners, eliminating the need for specialized learning groups. This study combines data sources and mentoring experience to validate business actors' requirements regarding business legality and product-related aspects. Implementing business legality requires support from various stakeholders, including families, academics, government, and institutions. Collaboration between government bodies and educational institutions streamlines the legality process for business actors, especially those unfamiliar with the intricacies of business and product legality. Access to learning methods and technical knowledge is beneficial for business actors in obtaining business legality certificates and product legality with confidence. This research has significant implications for accelerating the achievement of business legality and product legality of business actors through a learning system that focuses on increasing product value. It aims to meet the growing needs of business actors, especially in the micro sector, as government policies promote micro-entrepreneurship and create a dynamic economic environment.

## Author Contributions

I. Umami: Conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing – original draft, and writing - review & editing. A. N. B. C. Pee: Conceptualization, formal analysis, methodology, supervision, and validation. H. A. B. Sulaiman: Conceptualization, formal analysis, methodology, and validation. A. Khaerudin: Project administration, software, validation and writing - review & editing.

## Acknowledgment

The author extends their sincere gratitude to the stakeholders who played a crucial role in this research, including the Assisted Villages of Darul Ulum University (Made Village, Badang Village, Jombok Village, Morosunggingan Village), as well as the Jombang Surabaya Indonesia Regency Government Office, specifically the Office of Cooperatives and Micro Enterprises of Jombang Regency. Their valuable support and collaboration greatly contributed to the success of this study.

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

**References**

[1] B. Yáñez-Araque, J. P. Sánchez-Infante Hernández, S. Gutiérrez-Broncano, and P. Jiménez-Estévez, "Corporate social responsibility in micro-, small- and medium-sized enterprises: Multigroup analysis of family vs. nonfamily firms," *J. Bus. Res.*, vol. 124, pp. 581–592, 2021, doi: 10.1016/j.jbusres.2020.10.023.

[2] L. Ariyani, W. Hermawati, R. L. Helmi, I. Rosaira, and A. Budiansyah, "MSME Perceptions towards Internet Use: A Comparison of Before and During the COVID-19 Outbreak in Indonesia," *Asian J. Bus. Account.*, vol. 14, no. 2, pp. 197–230, 2021, doi: 10.22452/ajba.vol14no2.7.

[3] K. Widjajanti, F. N. Prihantini, and R. Wijayanti, "Sustainable Development of Business with Canvas Business Model Approach: Empirical Study on MSMEs Batik Blora, Indonesia," *Int. J. Sustain. Dev. Plan.*, vol. 17, no. 3, pp. 1025–1032, 2022, doi: 10.18280/ijsdp.170334.

[4] A. Behl, N. Jayawardena, A. Ishizaka, M. Gupta, and A. Shankar, "Gamification and gigification: A multidimensional theoretical approach," *J. Bus. Res.*, vol. 139, no. September 2021, pp. 1378–1393, 2022, doi: 10.1016/j.jbusres.2021.09.023.

[5] N. L. Laorden, J. M. P. Sarmiento, G. D. A. Romo, T. R. Acuña, and I. M. A. Acopiado, "Impact of supply chain disruptions during the COVID-19 pandemic to micro, small and medium enterprises in Davao Region, Philippines," *J. Asia Bus. Stud.*, vol. 16, no. 3, pp. 568–586, 2022, doi: 10.1108/JABS-05-2021-0216.

[6] K. Szymczyk, "The level of omnichannel use in Polish msmes," *Oper. Res. Decis.*, vol. 30, no. 3, pp. 113–122, 2021, doi: 10.37190/ord200307.

[7] A. Curatman, A. Suroso, and Suliyanto, "Loyalty program and communication effectiveness as drivers of store loyalty," *Meas. Bus. Excell.*, 2021, doi: 10.1108/MBE-11-2020-0154.

[8] T. Banerjee, A. Trivedi, G. M. Sharma, M. Gharib, and S. S. Hameed, "Analyzing organizational barriers towards building postpandemic supply chain resilience in Indian MSMEs: a grey-DEMATEL approach," *Benchmarking*, 2022, doi: 10.1108/BIJ-11-2021-0677.

[9] M. Acar and H. Temiz, "Empirical analysis on corporate environmental performance and environmental disclosure in an emerging market context: Socio-political theories versus economics disclosure theories," *Int. J. Emerg. Mark.*, vol. 15, no. 6, pp. 1061–1082, 2020, doi: 10.1108/IJOEM-04-2019-0255.

[10] L. J. Cueto, A. F. D. Frisnedi, R. B. Collera, K. I. T. Batac, and C. B. Agaton, "Digital Innovations in MSMEs during Economic Disruptions: Experiences and Challenges of Young Entrepreneurs," *Adm. Sci.*, vol. 12, no. 1, 2022, doi: 10.3390/admsci12010008.

[11] A. Gui *et al.*, "Cloud computing adoption using toe framework for Indonesia's micro small medium enterprises," *Int. J. Informatics Vis.*, vol. 4, no. 4, pp. 237–242, 2020, doi: 10.30630/joiv.4.4.458.

[12] F. Kosadi, W. Ginting, and V. Merliana, "Digital Receipts of Online Transactions in the Reconciliation Process and the Preparation of Financial Reports," *J. Indones. Econ. Bus.*, vol. 36, no. 1, pp. 31–50, 2021, doi: 10.22146/jieb.59884.

[13] K. Mulchandani, S. S. Jasrotia, and K. Mulchandani, "Determining supply chain effectiveness for Indian MSMEs: A structural equation modelling approach," *Asia Pacific Manag. Rev.*, 2022, doi: 10.1016/j.apmrv.2022.04.001.

[14] R. Mitra, A. Goswami, and M. K. Tiwari, "Financial supply chain analysis with borrower identification in smart lending platform," *Expert Syst. Appl.*, vol. 208, 2022, doi: 10.1016/j.eswa.2022.118026.

[15] O. Stephen Taiwo, "MODELING THE IMPACTS OF MSMES' CONTRIBUTIONS TO GDP AND THEIR CONSTRAINTS ON UNEMPLOYMENT: THE," doi: 10.2478/sbe-2022-0011.

[16] G. H. Sagala and T. Effiyanti, "SMEs project: a method to encourage interpersonal skills among pre-service accountant," *J. Appl. Res. High. Educ.*, vol. 12, no. 5, pp. 883–895, 2020, doi: 10.1108/JARHE-04-2019-0097.

[17] A. H. Dharmawan *et al.*, "The agrarian, structural and cultural constraints of smallholders' readiness for sustainability standards implementation: The case of indonesian sustainable palm oil in east Kalimantan," *Sustain.*, vol. 13, no. 5, pp. 1–20, 2021, doi: 10.3390/su13052611.

[18] E. K. Kang'ethe, D. Grace, and T. F. Randolph, "Overview on urban and peri-urban agriculture:

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

Definition, impact on human health, constraints and policy issues," *East Afr. Med. J.*, vol. 84, no. 11 SUPPL., Nov. 2007, doi: 10.4314/eamj.v84i11.9576.

[19] F. Febrimayanti, "Implementation of Halal Certification for Micro, Small, And Medium Enterprises In West Tulang Bawang District," *Adm. Environ. Law Rev.*, vol. 1, no. 2, p. 75, 2020, doi: 10.25041/aelr.v1i2.2148.

[20] A. Ramadhan and E. Y. A. Gunanto, "Decision on Halal Certification of Food and Beverage Products Processed by UMKM Products in Tangerang City - Study of Religiosity, Regulation, and Branding," *J. Ilm. Ekon. Islam*, vol. 7, no. 2, Jun. 2021, doi: 10.29040/jiei.v7i2.2490.

[21] M. Albashrawi and L. Motiwalla, "An Integrative Framework on Mobile Banking Success," *Inf. Syst. Manag.*, vol. 37, no. 1, pp. 16–32, 2020, doi: 10.1080/10580530.2020.1696530.

[22] A. Alawneh, H. Al-Refai, and K. Batiha, "Measuring user satisfaction from e-Government services: Lessons from Jordan," *Gov. Inf. Q.*, vol. 30, no. 3, pp. 277–288, 2013, doi: 10.1016/j.giq.2013.03.001.

[23] M. A. Almaiah, A. Al-Khasawneh, and A. Althunibat, "Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic," *Educ. Inf. Technol.*, vol. 25, no. 6, pp. 5261–5280, Nov. 2020, doi: 10.1007/S10639-020-10219-Y.

[24] W. H. DeLone and E. R. McLean, "The DeLone and McLean model of information systems success: A ten-year update," *J. Manag. Inf. Syst.*, vol. 19, no. 4, pp. 9–30, 2003, doi: 10.1080/07421222.2003.11045748.

[25] P. C. Burnier, D. de S. Guerra, and E. E. Spers, "Measuring consumer perceptions over beef good practices and sustainable production process," *Br. Food J.*, vol. 123, no. 4, pp. 1362–1383, 2021, doi: 10.1108/BFJ-12-2019-0904.

[26] M. De Rosa and F. Trabalzi, "Everybody does it, or how illegality is socially constructed in a southern Italian food network," *J. Rural Stud.*, vol. 45, pp. 303–311, Jun. 2016, doi: 10.1016/j.jrurstud.2016.04.009.

[27] P. Overbosch and M. Freund, "Inspecting hygienic design, hygiene practices and process safety when commissioning a food factory," *Hyg. Des. Food Factories*, pp. 733–742, Jan. 2011, doi: 10.1533/9780857094933.6.733.

[28] E. Huang, L. F. McGinnis, and S. W. Mitchell, "Verifying SysML activity diagrams using formal transformation to Petri nets," *Syst. Eng.*, vol. 23, no. 1, pp. 118–135, 2020, doi: 10.1002/sys.21524.

[29] M. Ozkaya and F. Erata, "A survey on the practical use of UML for different software architecture viewpoints," *Inf. Softw. Technol.*, vol. 121, 2020, doi: 10.1016/j.infsof.2020.106275.

[30] E. Triandini, R. Fauzan, D. O. Siahaan, and S. Rochimah, "Sequence Diagram Similarity Measurement: A Different Approach," in *JCSSE 2019 - 16th International Joint Conference on Computer Science and Software Engineering: Knowledge Evolution Towards Singularity of Man-Machine Intelligence*, 2019, pp. 348–351, doi: 10.1109/JCSSE.2019.8864207.

[31] H. Sastypratiwi and Y. Yulianti, "Web Application Development using MVC-component-based approach," 2019, doi: 10.1109/ICoDSE48700.2019.9092609.

[32] M. Larusdottir, J. Gulliksen, and Å. Cajander, "A license to kill – Improving UCSD in Agile development," *J. Syst. Softw.*, vol. 123, pp. 214–222, 2017, doi: 10.1016/j.jss.2016.01.024.

[33] I. Boivie, C. Åborg, J. Persson, and M. Löfberg, "Why usability gets lost or usability in in-house software development," *Interact. Comput.*, vol. 15, no. 4, pp. 623–639, 2003, doi: 10.1016/S0953-5438(03)00055-9.

[34] K. Adiyarta, D. Napitupulu, R. Rahim, D. Abdullah, and M. I. Setiawan, "Analysis of e-learning implementation readiness based on integrated elr model," in *Journal of Physics: Conference Series*, 2018, vol. 1007, no. 1, doi: 10.1088/1742-6596/1007/1/012041.

[35] Y. Saintika, S. Astiti, D. J. A. Kusuma, and A. W. Muhammad, "Analysis of E-learning readiness level of public and private universities in central Java, Indonesia," *Regist. J. Ilm. Teknol. Sist. Inf.*, vol. 7, no. 1, pp. 15–30, 2021, doi: 10.26594/register.v7i1.2042.

[36] V. Tundjungsari, H. Yugaswara, A. T. D. Putra, and A. S. M. Sofro, "Development of mobile health application for cardiovascular disease prevention," *Int. J. Adv. Comput. Sci. Appl.*, vol. 9, no. 11, pp. 543–550, 2018, doi: 10.14569/ijacsa.2018.091175.

[37] M. Chen, Q. Tang, S. Xu, P. Leng, and Z. Pan, "Design and evaluation of an augmented reality-

ISSN 2502-3357 (online) | ISSN 2503-0477 (print)
9 (1) January 2023 68-83

based exergame system to reduce fall risk in the elderly," *Int. J. Environ. Res. Public Health*, vol. 17, no. 19, pp. 1–10, 2020, doi: 10.3390/ijerph17197208.

[38] A. Hinderks, M. Schrepp, F. J. Domínguez Mayo, M. J. Escalona, and J. Thomaschewski, "Developing a UX KPI based on the user experience questionnaire," *Comput. Stand. Interfaces*, vol. 65, pp. 38–44, 2019, doi: 10.1016/j.csi.2019.01.007.

[39] M. Javanbakht, A. Darvishi Boloorani, M. Kiavarz, N. Neisany Samany, L. Zebardast, and M. Zangiabadi, "Spatial-temporal analysis of urban environmental quality of Tehran, Iran," *Ecol. Indic.*, vol. 120, 2021, doi: 10.1016/j.ecolind.2020.106901.

[40] O. Korableva, T. Durand, O. Kalimullina, and I. Stepanova, "Usability testing of MOOC: Identifying user interface problems," 2019, vol. 2, pp. 468–475, doi: 10.5220/0007800004680475.

[41] J. R. Lewis, "Measuring Perceived Usability: The CSUQ, SUS, and UMUX," *Int. J. Hum. Comput. Interact.*, vol. 34, no. 12, pp. 1148–1156, 2018, doi: 10.1080/10447318.2017.1418805.

[42] S. Borsci *et al.*, "The Chatbot Usability Scale: the Design and Pilot of a Usability Scale for Interaction with AI-Based Conversational Agents," *Pers. Ubiquitous Comput.*, vol. 26, no. 1, pp. 95–119, 2022, doi: 10.1007/s00779-021-01582-9.

[43] K. S. Al-Tahat, "An Arabic Adaptation of the Usability Metric for User Experience (UMUX)," *Int. J. Hum. Comput. Interact.*, vol. 36, no. 11, pp. 1050–1055, 2020, doi: 10.1080/10447318.2019.1709332.

[44] A. Zaman *et al.*, "UVC-PURGE: A Novel Cost-Effective Disinfection Robot for Combating COVID-19 Pandemic," *IEEE Access*, vol. 10, pp. 37613–37634, 2022, doi: 10.1109/ACCESS.2022.3163243.

[45] J. Hodson and B. Traynor, "Design exploration of fake news: A transdisciplinary methodological approach to understanding content sharing and trust on social media," 2018, vol. 2018-July, pp. 1–5, doi: 10.1109/ProComm.2018.00008.

[46] D. Reichenpfader, R. Glauser, M. Dugas, and K. Denecke, "Assessing and improving the usability of the medical data models portal," vol. 271. IOS Press BV, FH Joanneum, Graz, Austria, pp. 199–206, 2020, doi: 10.3233/SHTI200097.

[47] D. Pal and V. Vanijja, "Perceived usability evaluation of Microsoft Teams as an online learning platform during COVID-19 using system usability scale and technology acceptance model in India," *Child. Youth Serv. Rev.*, vol. 119, 2020, doi: 10.1016/j.childyouth.2020.105535.

[48] P. Zaharias and A. Poylymenakou, "Developing a usability evaluation method for e-learning applications: Beyond functional usability," *Int. J. Hum. Comput. Interact.*, vol. 25, no. 1, pp. 75–98, 2009, doi: 10.1080/10447310802546716.

[49] M. S. Featherman and P. A. Pavlou, "Predicting e-services adoption: A perceived risk facets perspective," *Int. J. Hum. Comput. Stud.*, vol. 59, no. 4, pp. 451–474, 2003, doi: 10.1016/S1071-5819(03)00111-3.

[50] L. J. Roscoe, "Wellness: A review of theory and measurement for counselors," *J. Couns. Dev.*, vol. 87, no. 2, pp. 216–226, 2009, doi: 10.1002/j.1556-6678.2009.tb00570.x.

[51] S. Roy, S. Bhattacharya, and P. Das, "Learning clusters, MOOCs, free videos and organization learning: a case study from Indian SMEs," *Dev. Learn. Organ.*, vol. 34, no. 1, pp. 16–20, 2020, doi: 10.1108/DLO-03-2019-0057.