



ORIGINAL

Technological Innovation to Increase the Competitiveness of MSMEs: Implementation of the Integrated Industry Village 4.0 Platform

Innovación tecnológica para aumentar la competitividad de las MIPYMES: Implementación de la plataforma Aldea Integrada de la Industria 4.0

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ABSTRACT

Villages have great potential to support economic development. Excellent products contribute to improving the village economy. MSMEs play an essential role in economic development in the village. However, MSME players have less knowledge and skills in running a business. The MSME actors do not utilize technology properly and find it challenging to use it. This study aims to develop an integrated industry village 4.0 platform and measure the capabilities of MSME actors. The research consists of preparatory, development, and assessment phases. This research involved 25 MSME actors in Srigonco and Bantur Villages, Malang Regency. The instrument consists of validation sheets, user satisfaction assessment questionnaires, pre-test and post-test questionnaires. Data analysis in this study is using qualitative and quantitative analysis techniques. This platform has features such as home page, business incubators, export cloud markets, and MSME Matching Fund. material, media, information, and IT platform validation tests obtained 85,2 %, 89,33 %, and 84,6 %, respectively—the feasibility with excellent categories. MSME actors in the village experienced an increase of 0,40 on the medium criteria. This research is the basis for recommendations for partner villages to make policies related to developing MSME actors. Technology use in several Malang Regency villages can be applied more widely.

Keywords: Innovation; MSME; Integrated Industry; Village; Platform.

RESUMEN

Las aldeas tienen un gran potencial para apoyar el desarrollo económico. Los excelentes productos contribuyen a mejorar la economía del pueblo. Las mipymes juegan un papel esencial en el desarrollo económico de la aldea. Sin embargo, las mipymes tienen menos conocimientos y habilidades para dirigir un negocio. Los actores de las mipymes no utilizan la tecnología de manera adecuada y les resulta difícil usarla. Este estudio tiene como objetivo desarrollar una plataforma integrada de aldea industrial 4,0 y medir las capacidades de los actores de las mipymes. La investigación consta de fases preparatorias, de desarrollo y de evaluación. En esta investigación participaron 25 actores de MIPYMES en las aldeas de Srigonco y Bantur, en la regencia de Malang. El instrumento consta de fichas de validación, cuestionarios de evaluación de la satisfacción de los usuarios, cuestionarios pre-test y post-test. El análisis de los datos en este estudio se realiza mediante técnicas de análisis cualitativas y cuantitativas. Esta plataforma tiene características como la página de inicio,

las incubadoras de empresas, los mercados de exportación en la nube y el Fondo de Contrapartida para Mipymes. Las pruebas de validación de materiales, medios, información y plataformas informáticas obtuvieron 85,2 %, 89,33 % y 84,6 %, respectivamente, la factibilidad con categorías excelentes. Los actores de las mipymes de la aldea experimentaron un aumento de 0,40 en el criterio medio. Esta investigación es la base de recomendaciones para que las aldeas socias elaboren políticas relacionadas con el desarrollo de los actores de las MIPYME. El uso de la tecnología en varias aldeas de la regencia de Malang se puede aplicar más ampliamente.

Palabras clave: Innovación; Mipyme; Industria Integrada; Pueblo; Plataforma.

INTRODUCTION

Villages have great potential in supporting economic development.⁽¹⁾ Rural economic development increases marginal impacts and brings long-term impacts to communities.⁽²⁾ The processing of natural resources, human resources, and village funds supports the village economy.⁽³⁾ The massive potential of the village is also supported by the village fund program and the existence of superior local products in realizing empowered villages.⁽⁴⁾ This village has superior product quality and has great potential for commercial processes. Each village has excellent products to support a sustainable economy.⁽⁵⁾ Village superior products can strengthen village capacity in realizing an independent village economy.⁽⁶⁾ Quality and diverse village products can meet customers' needs in the domestic and foreign sectors.⁽⁷⁾

MSMEs are essential in village economic development.⁽⁸⁾ MSMEs contribute to the village's primary income.⁽⁹⁾ MSMEs provide new space for villages to get new opinions and a better economic culture.⁽¹⁰⁾ The real contribution made by MSMEs encourages job openings and poverty reduction.⁽¹¹⁾ MSME actors are essential drivers and instruments of success.⁽¹²⁾ MSME players have a positive and significant influence that hinders business digitization.⁽¹³⁾ MSME players can improve business performance to achieve business success in the future.⁽¹⁴⁾ The expertise of business people to strategize and see market potential can drive business innovation and accuracy.⁽¹⁵⁾

Knowledge and skills of MSME Actors determine the direction of the business.⁽¹⁶⁾ Rational and business knowledge has implications that lead business people to make wiser decisions.⁽¹⁷⁾ Business knowledge for MSME players correlates with motivation and fighting power to design a more sustainable business strategy.⁽¹⁸⁾ Digital skills are also needed by business actors to stay relevant to current conditions and remain competitive.⁽¹⁹⁾ Learning about MSME-based business management is a weapon to create a sustainable business.⁽²⁰⁾ Entrepreneurial orientation is essential in designing a business performance model.⁽²¹⁾ Learning in the business sector is vital to the income of MSMEs each year and their production activities.⁽²²⁾

Technology helps MSME actors to be able to improve their skills and abilities.⁽²³⁾ Technology adoption for MSMEs provides more excellent market opportunities and potential.⁽²⁴⁾ A good level of technology utilization can help MSME actors overcome the low quality of human resources.⁽²⁵⁾ Technology can foster the enthusiasm of business people to learn business more easily.⁽²⁶⁾ Business actors proficient in using technology can bridge the scientific gap between cities and villages.⁽²⁷⁾

However, the development of the village economy is not significant. The economy of rural communities tends to decline, increasing in underprivileged communities.⁽²⁸⁾ MSME actors' inability to manage businesses conventionally can exacerbate the gap between cities and villages.⁽²⁹⁾ Limited knowledge will reduce motivation for entrepreneurship and innovative behaviour from MSME actors.⁽³⁰⁾ The ability of MSME actors is not optimal. Poor business capabilities influence the process of innovation and impact business continuity in the future.⁽³¹⁾ The ability of business owners to manage their business can affect business failure.⁽³²⁾

MSME players do not make good use of technology. Low adoption of technology by MSME players makes the mindset and introduction of business opportunities more difficult.⁽²⁴⁾ Existing technology is considered difficult and irrelevant for MSME players. MSME actors find it difficult to use technology due to irrelevant learning content and media.⁽³³⁾ Economic and investment cooperation and partnership are still lacking despite a 30 % increase in access to funding for small businesses in several regions.⁽³⁴⁾ Even though the government provides some access to funding sources for small-scale businesses, business actors do not know much.⁽³⁵⁾

Developing the quality of MSME players can provide support for marketing aspects of local products.⁽³⁶⁾ This topic is interesting to raise because it highlights the challenges faced by business actors to support improving the quality of human resources, innovation, and the application of technology.⁽³⁷⁾ The solution is to integrate the learning ecosystem of MSME players by integrating business incubation, markets, and capital through one cloud-based integrated platform to develop potential village export markets. This study aims to develop an integrated industry village 4.0 platform and measure the capabilities of MSME actors in the village after accessing platform services.

METHOD

Research Design

This research uses qualitative and quantitative methods. Quantitative methods provide a relationship between testing pre-test and post-test results that affect the knowledge and capabilities of MSME actors. The qualitative method will explain the interpretation of media feasibility data and the capabilities of MSME actors.

⁽³⁸⁾ The research method used in this development research is the design thinking process. This method uses a flexible approach to large, integrated systems.⁽³⁹⁾

In the empathy stage, identify the problem, define the target user, and analyze the previous basic research.⁽⁴⁰⁾ At the defining stage, elaborating on user needs and the user needs from an analyst's point of view generates creative ideas.⁽⁴¹⁾ Flowcharts help with solution formation, user case design, and user experience. The idea stage design is the design of the platform, and this stage provides an overview of ideas and an evaluation of idea development on the interpretation of existing products.⁽⁴²⁾

At the prototype stage, explore the plan for making products from scratch. The experts will validate the finished product so users can use the existing services. At this stage, validation tests include media, materials, and learning platforms.⁽⁴³⁾ The expert team will provide assessment and input related to existing products. Product evaluation aims to make user input following the needs in measuring the scale of product improvement.

⁽⁴⁴⁾ At the test stage, conduct field scale tests in several villages to develop village potential and the development of incubation programs and assistance for MSME funds using learning platforms.⁽⁴⁵⁾ MSME actors will fill out pre-test and post-test sheets to measure the level of business abilities and skills taught. In addition, MSME actors will fill in the activity evaluation results.⁽⁴⁶⁾

Population and sample

The subjects of this study were conducted to 35 MSME actors in Srigrongo Village and Bantur Village, Malang Regency. Lecturers who are experts in media, materials, and technology carry out the learning platform validation process.

Instrument/Procedure

The instrument consists of validation sheets, user satisfaction assessment questionnaires, and pre-test and post-test questionnaires.

Data Analysis

Data analysis in this study is using qualitative and quantitative analysis techniques. This technique consists of platform feasibility analysis and capability analysis of MSME actors. Data analysis in this study used qualitative and quantitative analysis techniques.⁽⁴⁷⁾ Qualitative data in this study is in the form of input and advice from expert validators. Quantitative data can distribute questionnaires that analyze learning media needs and respond to MSME actors' capabilities.⁽⁴⁸⁾ The data will then be processed to get an overview of the results. These results will be a benchmark for the extent of success and achievement in a study. The results of data analysis are used as guidelines for improving learning platforms.⁽⁴⁹⁾

The feasibility analysis of learning platform media is intended for MSME actors. This learning platform media feasibility questionnaire contains questions with semi-open answers. The writing order is the title, statement from the researcher, respondent identity, instructions for filling out, and question items.⁽⁵⁰⁾ Quantitative questionnaire data can be converted into percentage values using the Likert scale as a measurement scale. Use the Likert scale as a measurement scale to convert to percentage values. The scale has five granular responses.⁽⁵¹⁾ Ratings are given using a scale of one through five, describing very good, good, enough, lacking, and strongly disagree. The level of scale measurement in this study used intervals. Interval data can be analysed by calculating the average of answers based on the score of each answer from respondents.⁽⁵²⁾

Percentage of Respondents' Answers = 100 % x (The number of Scores obtained/The Highest or Ideal Number of Scores).

Table 1. Learning media feasibility scale

Percentage Score (%)	Interpretation
81 - 100	Very Worth it
61 - 80	Worthy
41 - 60	Decent Enough
21 - 40	Less Eligible
0- 20	Very Inadequate

Source: Mahoney JW et al.⁽⁵³⁾

The assessment score results are then averaged from several experimental sample subjects and converted into an assessment statement to determine the quality and usefulness of the resulting product based on user opinions.⁽⁵³⁾ Converting scores into these assessment requirements can be seen in table 1.

After the average value of each score is obtained, the next step is to calculate the increase in knowledge of MSME actors as a representation of business management capabilities.⁽⁵³⁾ The improvement of the capability of MSME actors is analysed through a normalized Standard Gain value with the following equation.

Normalized Gains (G) = (final motivation score - initial motivation score)/(max score - starting score)

The Standard Gain value obtained from the calculation results is then interpreted according to table 2, which is as follows:

Table 2. Modified normalized gain interpretation	
Normalized Gain Value	Interpretation
$-1.00 \leq g < 0.00$	There is a decrease
$g = 0.00$	Remain
$0.00 < g < 0.30$	Low
$0.30 \leq g < 0.70$	Keep
$0.70 \leq g < 1.00$	Tall
Source: Mahoney JW et al. ⁽⁵³⁾	

RESULTS AND DISCUSSION

Results of Learning Media Developer Based on Integrated Industry Village Platform



Figure 1. Concept integrated industry village 4.0

The concept of an integrated industrial village 4.0 aims to optimize local products in the village. This optimization focuses on incubating MSME businesses in villages to be able to market their products to the global market. The concept of an industrial village is poured into an integrated platform. The design of this platform consists of 3 main components: mentoring, access to funding, and finding business collaboration partners. Aspects of mentoring that focus on empowering MSME actors to improve skills and capabilities in managing business. The integrated Village 4.0 platform aims to present an applicative case-based incubation curriculum that

directly applies to the MSME development process. It also serves as a networking platform, connecting potential overseas buyers with suitable product suppliers and fostering collaboration between industry and MSMEs.

Detailed startup introduction learning materials and business model design are designed to assist business actors in explaining how a business can generate profits. Through this component, the business will run smoothly. Because they already know what product he created and the target market to be addressed. The business model describes how the business or venture will be run. The scope of product design to marketing strategy for each business model varies. Understanding the business model often overlaps with understanding the business plan. The two are different things. A business model is the basis or description of a business form.



Business Model Design

- Understanding Business Models
- The Importance of Business Model Design
- History of Business Model Design Development
- Introduction to Business
- Understanding the Business Industry
- Recognizing Consumers and Markets
- Recognizing Business Challenges
- Elements of a Business Model
- Learning the Components of a Business Model
- Determining Value Proposition
- Analyzing Customer Satisfaction
- Determining Market Segments

Figure 2. Learning materials introduction to startup and business model design

Based on the material created, it is then developed into interactive learning videos that MSME actors can use in the independent learning stage. Making interactive learning videos designed to provide an independent learning approach that supports the business development of business actors. MSME players are guided through practical steps in designing effective marketing plans, using social media, and building a strong brand identity. Aspects of financial management are explained in detail, providing guidance on how to create and monitor budgets, manage cash flow, and create simple financial statements. The following is an introduction to startup learning videos and business model design as follows (figure 3).

The integrated village platform 4.0 is a website that aims to disseminate access to technology and information for MSME actors. This platform helps raise the value of local wisdom to support a sustainable learning community. The idea is to utilize digitalization to improve various aspects of business learning and participation for MSME players.



Figure 3. Business model design learning videos

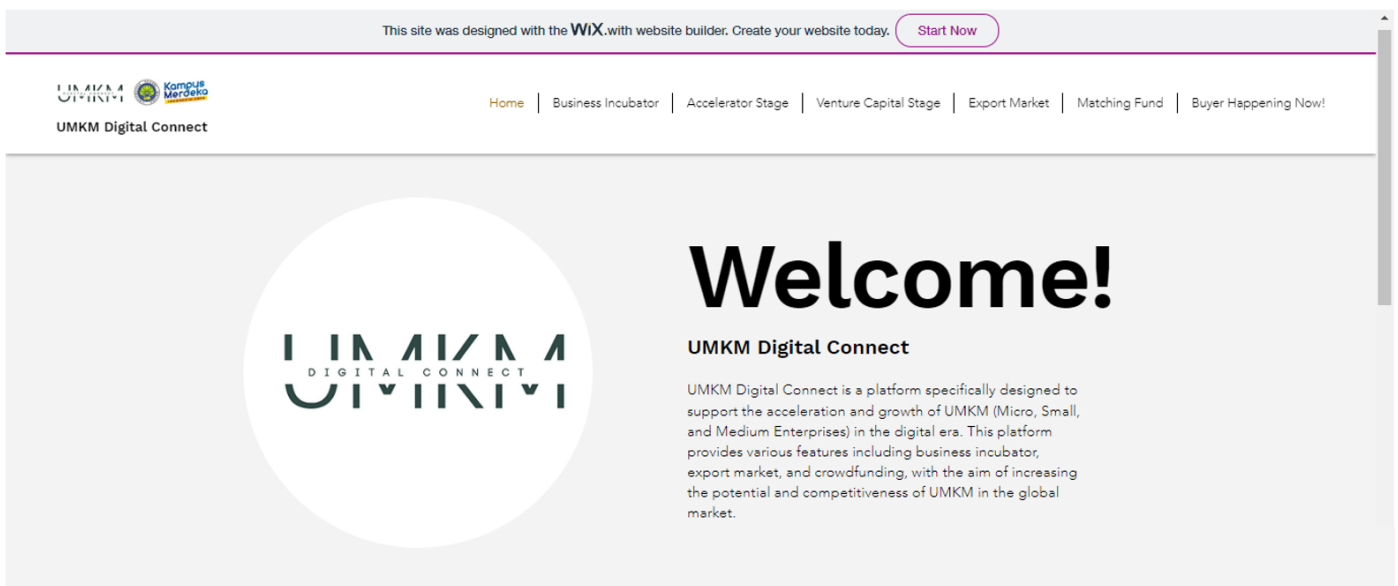


Figure 4. Homepage view

The Homepage view feature in the integrated village 4.0 platform provides more concrete guidance regarding various existing information. This display explains the purpose and function of the platform following the needs of MSME actors. The Homepage feature provides quick links related to learning system management services, access to funding, and various exciting information.

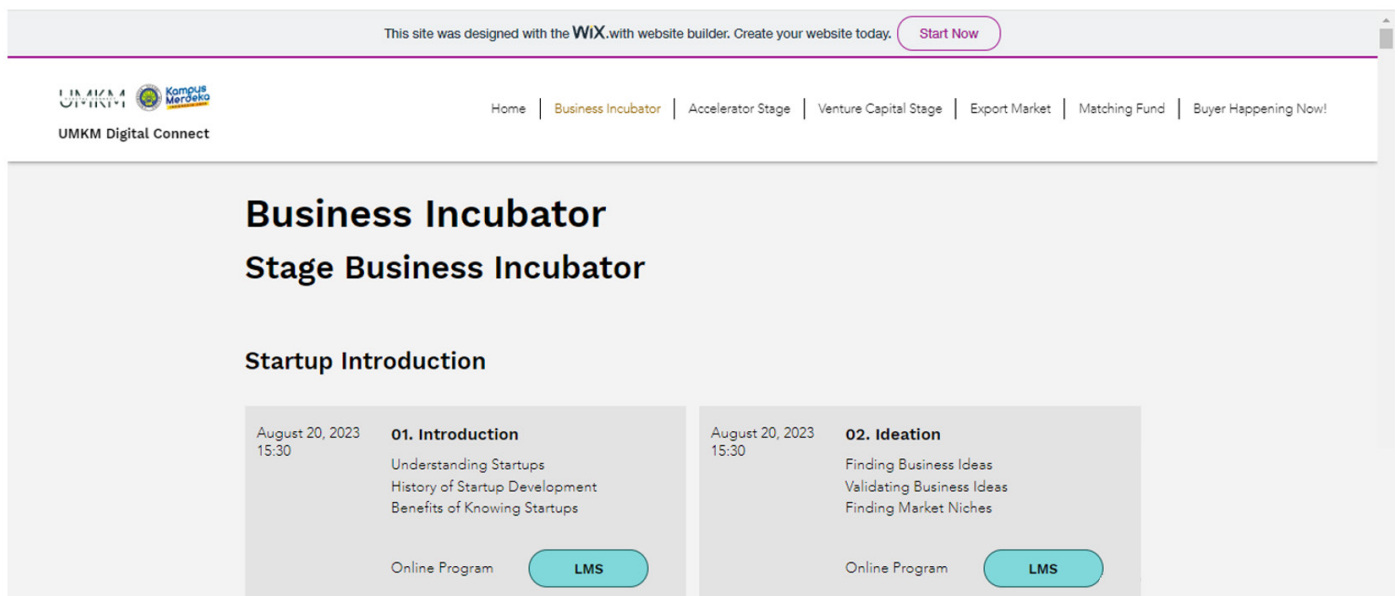


Figure 5. Business incubator view

This feature contains training arranged online so that it can be accessed anywhere. This feature contains a course schedule grouped according to the material you want to study. This feature is expected to increase MSME knowledge.

The next feature contains exported commodities and makes it easier for MSMEs to find clients. This feature also contains order recapitalization from anywhere and anytime, and MSMEs can take these orders. This feature makes it easier for MSMEs to expand their market segmentation to the global market and increase sales.

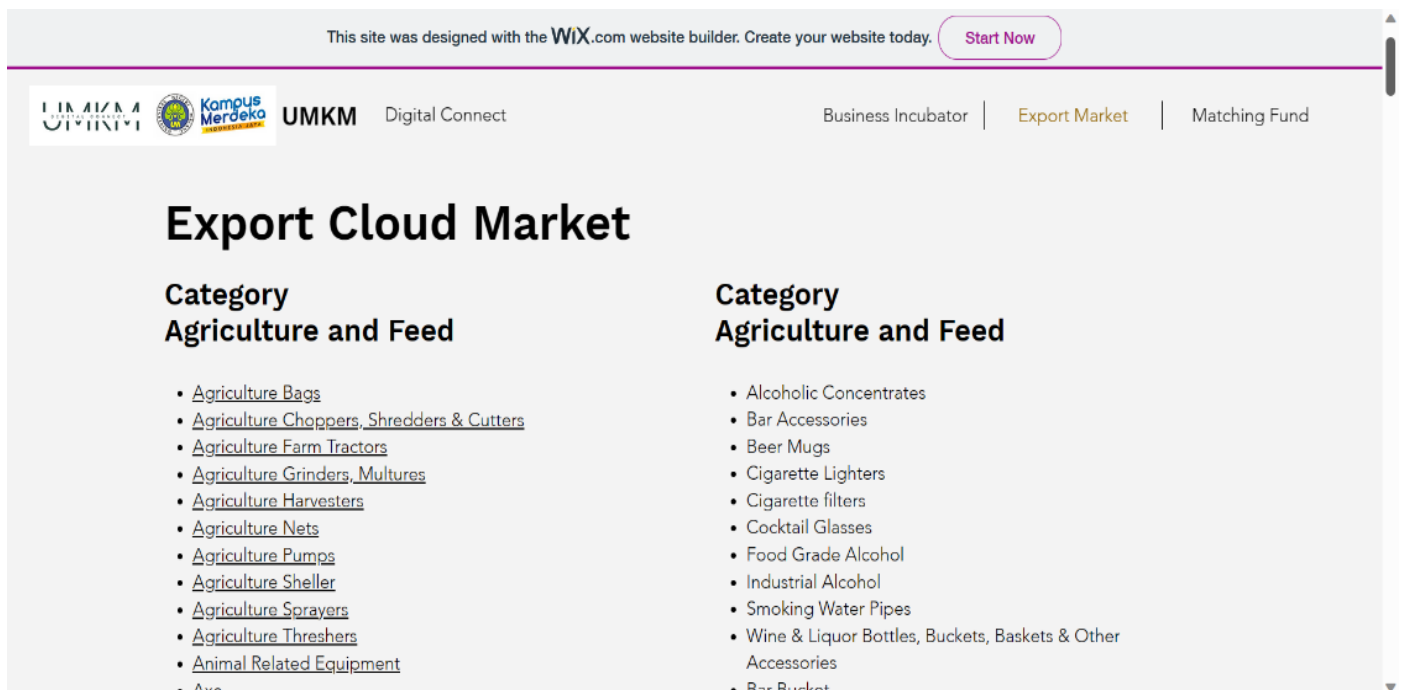


Figure 6. Export cloud market displays

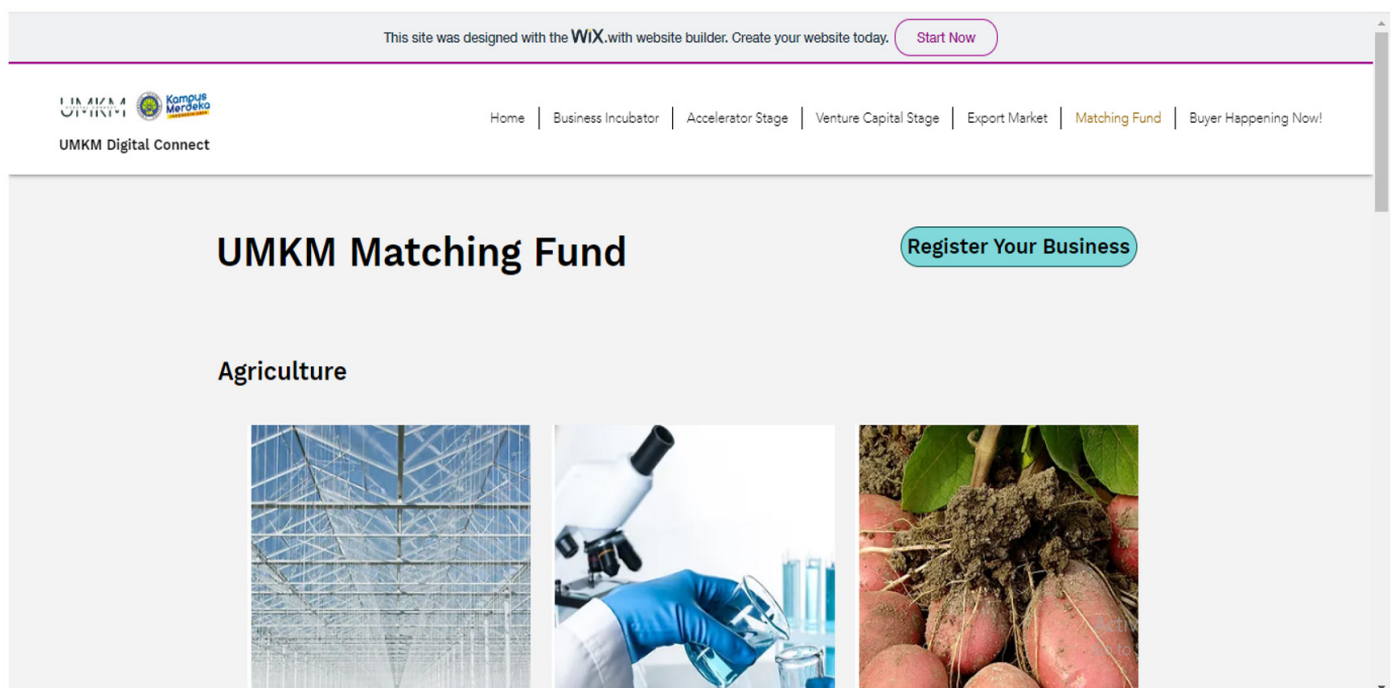


Figure 7. Display of the matching fund feature

The next feature on this website is the MSME Matching Fund. This feature facilitates MSMEs in obtaining financing by fulfilling several requirements. The financing obtained can be used for business development.

The development of MSMEs in the village provides a significant increase. The challenges of MSMEs are

pretty complex, making business actors in the village more difficult. Based on research shows that the business incubation program provided can have a positive effect on business actors. MSME actors will get information about certification and good business impact measurement.⁽⁵⁴⁾ Business incubators must be able to meet the needs of participants in terms of optimizing understanding and creating a better learning ecosystem. Learning patterns can be made systematically and binding to provide a valuable experience. Creating a better learning ecosystem involves integrating elements such as training, mentoring, access to resources, and collaboration between participants. The business incubator should serve as an environment that stimulates growth and mutually reinforcing learning. In this ecosystem, participants can share experiences, build networks, and gain a deep understanding of business dynamics.⁽⁵⁵⁾ The business learning model helps participants identify failures in sustainable business models and manage future business risks. Mentoring activities reduce personal and MSME failure rates based on the experience of mentors and experts. Identification of failures in sustainable business models is a key step in the development of a strong business strategy. The business learning model allows participants to critically evaluate critical elements in their business model, including value proposition, resources, value chain, and marketing strategy. The importance of managing business risk is also an emphasized aspect in the business learning model. Participants are invited to identify various risks that may be faced by business people.⁽⁵⁶⁾ Digital-based business assistance services supported by comprehensive learning designs for the incubation practice sector meet the needs of the MSME sector.⁽⁵⁷⁾

Material Feasibility Validation Test Results

This material expert test is carried out by validators who are experts in their fields to provide advice and assessments of the development of integrated industry village 4.0 learning materials in optimizing the potential of the local economy based on an integrated export cloud market business incubation of village MSMEs so that it can be seen that the learning materials developed have met the eligibility category or not. Material validation test data can be categorized into five aspects, namely aspects of learning objectives, aspects of learning materials, aspects of learning methods, aspects of learning resources, and aspects of learning activities as follows:

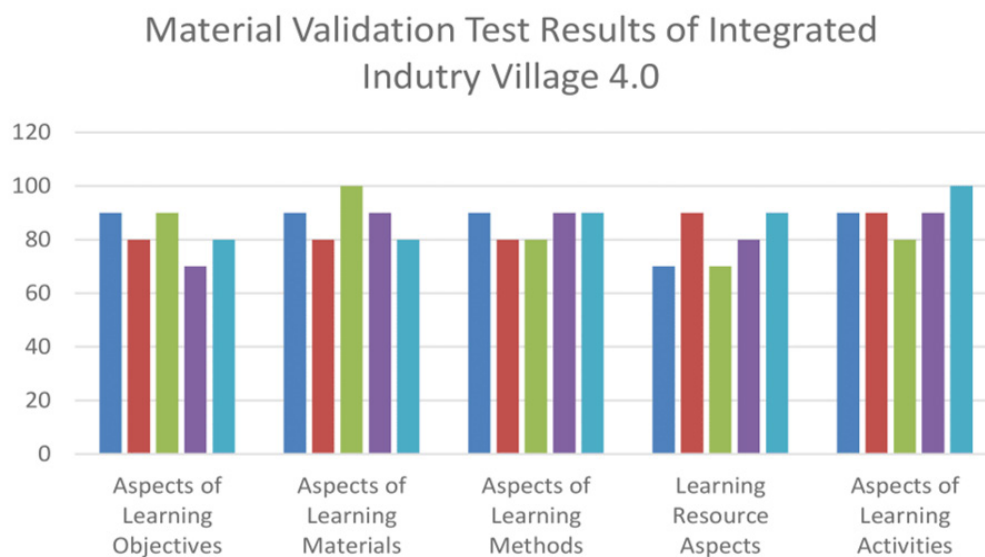


Figure 8. Material validation test results

Based on the figure above, learning objectives aim to test whether the learning material is by the learning objectives; the aspect of learning material tests the relevance of the material presented to form a platform, namely integrated village 4.0. The aspect of learning methods ensures that learning materials have been designed to be easy to understand and valuable for the village. The aspect of learning resources ensures that learning resources are trusted and informative. The last aspect is the aspect of learning activities that test the learning activity system to determine whether it produces a positive response from users. Class material of the expert validation test obtained a total average score of 85,2 % with a maximum score of 100 %. Obtaining this percentage means no revision from experts and is suitable for use. With this value, the validator believes the material follows the learning objectives and considers appropriate learning methods and activities. Material validation is carried out rationally, which means it is based on the rational thinking of experts regarding the material used on the platform.

Good learning content can support a better mentoring process for business actors. The material presented is

able to answer questions or problems that are generally faced in running a business. This ensures that business actors feel connected to the learning material, find it valuable, and can apply it directly in the business context.⁽³³⁾ The existing learning content has fulfilled eight important aspects in facilitating the learning process, ranging from improving quality to inclusiveness of education and mandates for business actors. This learning content provides inclusive support for different professions and experience levels. The material presented has been carefully compiled and involves the selection of relevant and up-to-date information. Understanding of business and finance concepts is enriched with real case illustrations and practical applications, providing business actors with deep and applicable insights.⁽⁵⁸⁾ Digital learning content can revolutionize the way teaching becomes more efficient. The significant difference between conventional and digital business learning opens up more comprehensive information, variety, and communication processes between business actors through digital content.⁽⁵⁹⁾ Good learning content can answer responsible information gaps and mature the process of learning knowledge and skills for MSME actors in villages. This learning content is designed to respond to the special needs of MSME actors in the village. The material is prepared by considering the local context, challenges, and opportunities unique to MSMEs in the village environment. A mature learning process is reflected in the organization and presentation of the material.⁽⁶⁰⁾ Good knowledge will help balance business needs between finance, users, growth, and mindset business actors. Business growth is the main goal, and good knowledge will help business people to plan and manage growth carefully. Knowledge also shapes the mindset of business actors to adopt a progressive and adaptive view.⁽⁶¹⁾

Media Feasibility Validation Test Results

The media expert test aims to assess the media that has been developed. A team of learning media experts carried out this expert test. The assessment of this expert test on the integrated industry village 4.0 video contributes to the manufacture of quality learning products. An assessment instrument is used to provide criticism and suggestions to improve learning videos. The media validation test data is divided into three aspects, namely display aspects, audio-visual aspects, and aspects of media use, which can be contained in figure 9 below:

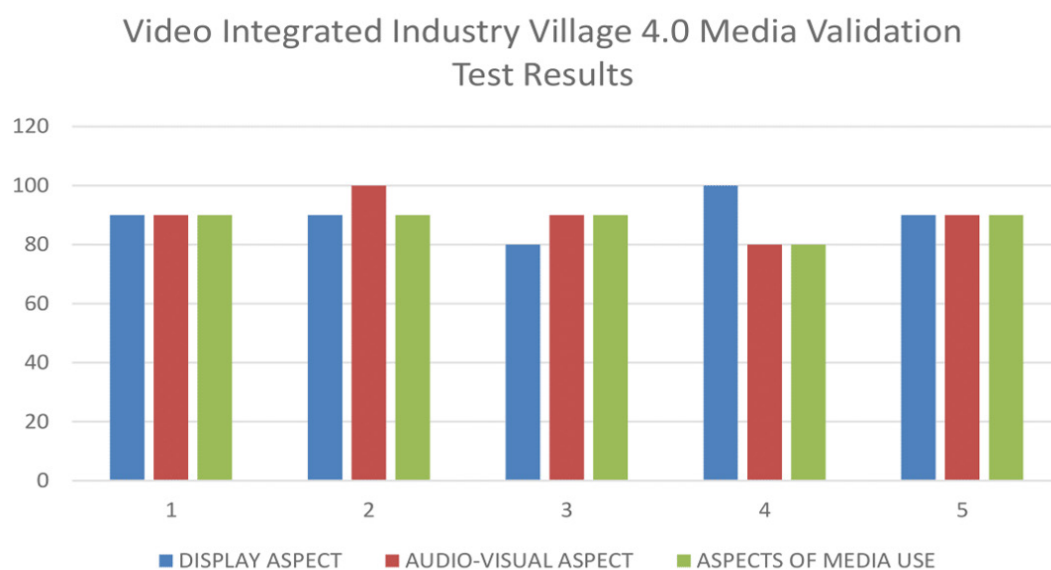


Figure 9. Media video integrated industry village 4.0 validation test results

The display aspect of the media validation test aims to ensure that the learning media has been systematically arranged and has attractive, clear, and easy-to-understand visualizations. The audio-visual aspect is needed to test the audio-visual quality to ensure it is straightforward to understand. In addition, media use aims to ensure that the amount of media is appropriate and helps potential users understand. In the figure above, the media expert validation of the test assessment obtained an average total score of 460 with a maximum score of 500. The average value with a percentage of 89,3 % is included in the “very feasible” category because it is in the range of 81 %-100 %. Obtaining this percentage means no revision from experts and is suitable for use. The media on this platform tends to appear attractive, clear, and easy to understand. In addition, the media used has met the standards for media use. Media validation is carried out rationally, which means it is based on the rational thinking of experts regarding the media used on the platform.

Technology-based learning media can reduce learning challenges and increase user interest. Technology brings solutions to accessibility challenges. Technology helps students to learn at their own pace, improves

understanding of the material, and addresses comprehension gaps. Technology-based learning media not only addresses existing learning challenges but also increases user interest and engagement.⁽⁶²⁾ Learning media innovation as a novelty that correlates with engagement, motivation, and user experience to reduce barriers to learning. Learning media innovation provides space for deeper engagement. Media development creates a more dynamic learning environment, allowing students to better understand and apply concepts.⁽⁶³⁾ Learning media is up-to-date and can improve participants' thinking skills by 81 %, showing practice and effective media. State-of-the-art learning media also offer flexibility in learning approaches. This flexibility not only creates participant satisfaction, but also allows them to develop the ability to think according to individual preferences and needs. Responsive learning systems can provide immediate feedback on participants' performance, allowing them to correct mistakes, understand concepts better, and hone their thinking skills over time.⁽⁶⁴⁾ The learning process that uses learning media has an excellent visual level that can increase learning effectiveness and contribute to business learning in MSMEs. Visual excellence in learning media provides an additional dimension to the learning experience. This helps learning participants, especially MSME actors, to perceive information better and speed up the understanding process. Visualization of business concepts through sophisticated learning media allows for more effective delivery of information.⁽⁶⁵⁾

Learning Platform Validation Test

The learning platform expert test aims to assess the feasibility of the learning website that has been developed. A team of IT experts carries out this expert test. To find out the assessment and input from this expert test on the integrated industry village 4.0 platform in optimizing the potential of the local economy based on an integrated export cloud market integrated business incubation of MSMEs village, an assessment instrument is used as criticism and suggestions so that the learning platform can be improved. The media validation test data is divided into three aspects, namely the user-experience aspect, the data availability aspect, and the security aspect, which is contained in figure 10.

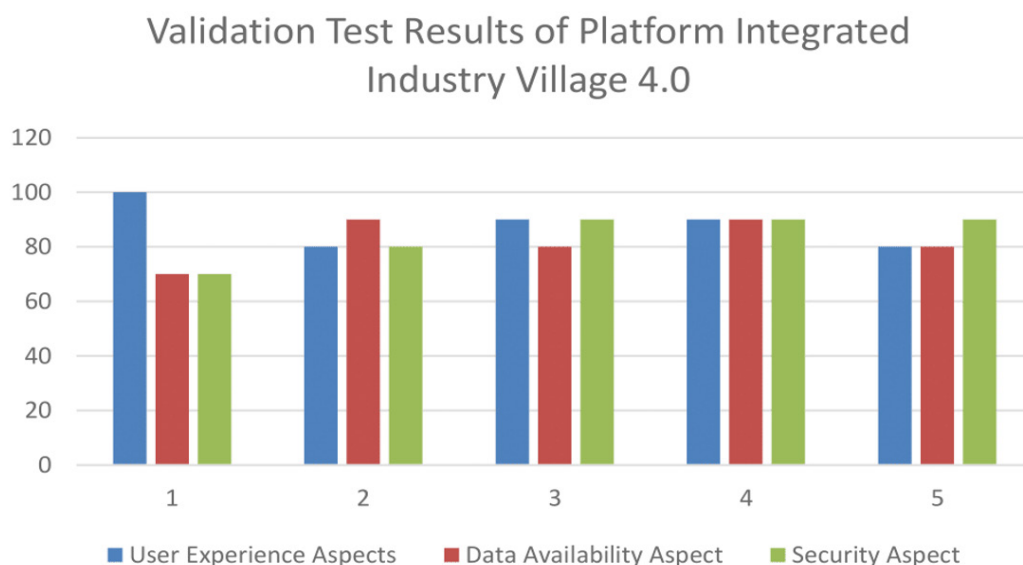


Figure 10. Platform integrated industry village 4.0

The User-Experience aspect of the Platform validation test helps prospective users have a pleasant experience accessing the platform with responsive, attractive, and easy-to-use indicators. The aspect of data availability functions to ensure the platform has complete, informative, and reliable data. The next aspect is security, ensuring that potential users maintain their identity and data security and have a place to report any security problems. In Figure 10, the learning website validation of the assessment test obtained an average score of 460 with a maximum score of 500. The average value with a percentage of 84,6 % is included in the “very feasible” category because it is 81 % -100 %. Obtaining this percentage means no revision from experts and is suitable for use. This percentage value indicates that the platform is easy to use, accompanied by data that is completed as needed, and has strong security so that it will support learning. Platform validation is carried out rationally, which means it is based on the rational thinking of experts regarding the media used on the platform.

Learning platforms provide opportunities and flexibility for users to access materials. Users can access more than 15 hours per week independently, gaining a deeper understanding. This flexibility allows businesses to focus on specific aspects that may require more attention or to explore topics that interest them in depth. Self-paced access creates a personalized learning environment. Users can choose when and where they want to

learn, creating a learning space that suits their individual preferences and learning styles.⁽⁶⁶⁾ Practical learning in entrepreneurship using hybrid mode in helping MSME actors understand the curriculum. In the context of entrepreneurial learning, a hybrid approach allows for a combination of theory and practice. Meanwhile, face-to-face sessions present an opportunity for them to apply those concepts in a real business context, through interactive discussions, case studies, and simulations. The hybrid mode also facilitates collaborative learning and exchange of experiences between MSME actors. A hybrid approach to entrepreneurial learning can create stronger connections between theory and practice.⁽⁶⁷⁾ Learning platforms optimize the environment and have a role in reporting user learning outcomes. The existing database helps policymakers in the decision-making process in program creation. The learning platform optimizes the learning environment by providing easy and intuitive access to a wide range of learning resources. The learning platform collects and analyses user learning data continuously. It includes information about learning progress, exam or assignment results, and participation in various learning activities. This data analysis helps the platform to understand individual needs, preferences, and progress, enabling better personalization in presenting learning content.⁽⁶⁸⁾ The transformation of conventional to digital training implementation supports innovative learning processes and more structured assessments. The innovative learning process results from the ability of digital technology to present learning content in a more dynamic and interactive way. Technology creates a more engaging and engaged experience, stimulating learner engagement better than conventional training which is often passive. Digital training allows the adoption of more adaptive learning methods. Digital platforms can tailor learning content to individual levels of understanding and needs. A more structured aspect of assessment in digital training brings significant benefits. Digital learning platforms enable automated assessments, which reduces instructor workload and provides instant feedback to learners.⁽⁶⁹⁾

Test Measures Knowledge and Capability of MSME Actors

The stages of measuring the knowledge and capabilities of MSME actors are essential. The measurement aims to evaluate the extent to which trainees can use the platform that has been developed. This test is designed to measure the understanding of MSME actors toward basic business concepts, such as financial management, marketing, and operations. Platform development refers to the results of revisions based on comments or suggestions during the validation stage. Field trials were conducted on 35 MSME actors in Srigonco Village and Bantur Village, Malang Regency. These actors comprise various business fields, including food, beverages, services, crafts, and agricultural products. Pre-test and post-test activities aim to determine the impact of using the platform by business actors.

The implementation of this trial obtained data from the results of knowledge and capabilities from MSME actors. The expert team has validated the pre-test and post-test questions to represent the knowledge of MSME actors. The integrated village 4.0 platform has a success indicator if it affects the improvement of results before and after using it. Learning outcome motivation data is qualitative, then converted into quantitative data on the Guttman scale. The qualitative data of each indicator worked by all respondents was averaged to find the average value of each indicator. The average of each indicator was then compared between the knowledge results before and after using the integrated village four platforms. The complete data from knowledge analysis can be seen in table 3.

Table 3. Test Results of Knowledge and Capability of MSME Actors			
Average Number of Test Scores		Standard Gain	Category
Before	After		
66.62	84.24	0.40	Keep

The pre-test results showed an average score of 66,62, including medium criteria. In addition, the post-test results showed an increase in knowledge scores, with an average result of 84,24. Data processing with a standard gain value of 0,40 on medium criteria. The use of the integrated village 4.0 platform can increase the knowledge and capability of MSME actors. MSME players are interested and need to deepen their knowledge about sound business processing.

Research sentences of pre-test and post-test results show gain standards with an increase of 0,40 on moderate criteria. Increasing the knowledge and capability of MSME actors encourages economic and investment cooperation and partnerships that are still lacking. Partnerships are built by efforts to increase positive contributions to customer consumption. MSME players can get views related to service innovation from the partnership process⁽⁷⁰⁾ strategic partnership in establishing MSME forums or associations to facilitate meetings and information exchange. Training on networking will drive business progress. Proper training in this regard can open doors to new opportunities, increase business visibility, and strengthen the foundation of valuable relationships. Networking training can help hone communication and social interaction skills. The

ability to communicate effectively, build strong interpersonal relationships, and manage business meetings are important aspects of networking success. This training not only provides theoretical understanding, but also provides opportunities to practice and develop these skills through role-playing games or simulations.⁽⁷¹⁾ The collaboration process can cover gaps in the knowledge and resources of the value-creation process with various collaboration partners. Value creation for business partnerships has a comprehensive view to face future challenges. Companies can combine the expertise and knowledge of various partners, forming a team that has a comprehensive view to tackle future challenges. Collaboration creates opportunities to share ideas, experiences, and up-to-date knowledge, creating a solid foundation for shared value creation. The opportunity to collaborate with partners also opens the door for companies to access resources that may be limited.⁽⁷²⁾ MSME actors encourage collaboration and knowledge exchange between MSMEs to stimulate innovation. MSME players have not optimized technology optimally to increase efficiency and competitiveness. Collaboration between MSMEs creates opportunities for them to learn from each other and exchange ideas. Opportunities to come together in collaboration allow them to face obstacles that may be difficult to overcome individually. Knowledge exchange among MSMEs brings further benefits in terms of diversification of knowledge and skills. MSMEs have a wide range of backgrounds and experiences, and the exchange of knowledge allows them to draw on different skills.⁽⁷³⁾ Inter-institutional partnerships support social capital and passion to grow the business long-term. Partnerships between institutions provide significant benefits in terms of social capital. Social capital includes a network of relationships and cooperation that builds trust, social norms, and positive interactions among various parties. In a business context, partnerships like these create an environment that supports information exchange, engagement, and mutual assistance. This social capital is invaluable in overcoming obstacles and challenges that may be faced in long-term business development. Partnerships between institutions can create synergies involving different skills and perspectives.⁽⁷⁴⁾

CONCLUSIONS

Platform Integrated Industry Village 4.0 has feasibility in terms of material, media, and technology with excellent categories. This platform has features such as business incubators, export cloud markets, and MSME Matching Fund. The Village 4.0 integrated industry has undergone material, media, and platform validation tests by obtaining “very feasible” results. Material, media, and IT platform validation tests obtained 85,2 %, 89,33 %, and 84,6 %, respectively. MSME actors in the village experienced an increase of 0,40 on the medium criteria. Knowledge and skills can be provisions for MSME actors to carry out their business activities. Access to technology opens opportunities for MSMEs to market local products to foreign countries. This research is the basis for recommendations for partner villages to make policies related to developing MSME actors. Technology use in several Malang Regency villages can be applied more widely. This research is limited to being implemented in 2 villages so it can be disseminated. The number of responses is not much and is dominated by food businesses, so it is necessary to diversify the type of business.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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