



Implementation Of Management Information Systems And Internet Of Things In Improving The Economy And Developing Human Resources To Expand Export Market Penetration Of Tenun Ikat Troso Jepara

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DOI: <https://doi.org/10.56457/jabdimas.v2i2.155>

Diterima: 20 November 2024; Direvisi: 1 Desember 2024; Dipublikasikan: 20 Desember 2024

Abstract

Research for the International Community Service (PKM-I) was carried out to formulate strategies and programs for the development of Jepara's Troso Naviza Ikat Woven Small and Medium Enterprises (MSMEs). Strategies need to be implemented to develop MSMEs, including by increasing the capabilities of related human resources. There is then a need to create various innovative products and carry out digital promotional strategies, so that MSME products can go global. The Magister Management Study Program (MM Program) together with the Syah Alam Polytechnic (PSA) Selangor Malaysia on 24-27 September 2024 conducted PKM-I with these MSMEs. The initial study stated that these MSMEs had problems regarding the lack of quantity of sales of ikat weaving exports abroad. Apart from that, these MSMEs need to improve their human resources capabilities to increase their ability to export products abroad and there is still a lack of understanding of digital promotion using IoT (Internet of Things) and MIS (Management Information System). In addition, human resource development is needed to expand product export penetration abroad. During PKM-I, a directing method was carried out using IoT and MIS for digital product promotion and human resource development as well as evaluating the results of PKM-I that had been implemented. It is hoped that all Troso Jepara Ikat Weaving MSME business players will master the strategic matters of exporting ikat weaving abroad based on MIS and IoT. This is also specifically related to digital marketing as well as human resource development. Indeed, these MSMEs will be able to expand product export penetration abroad in the near future.

Keywords: Development, Economy, HRD, Penetration Export, Tenun Ikat Troso

INTRODUCTION

Development of Tenun Ikat Troso Jepara

Jepara is a district in Central Java Province and this district is located along the coastline of the north coast of Java, so it has several famous beach tourist attractions. Apart from that, Jepara is also known as an industrial area for furniture and wood carving reliefs and holds the title of The World Carving Center. Jepara is also the birthplace of a national hero who is famous for women's emancipation, namely R.A. Kartini. Apart from having natural tourist attractions, Jepara also has cultural riches in the form of Troso ikat weaving. The weaving is made with traditional tools made from bamboo or wood which are moved by humans. Troso itself is taken from the name of a village in Pecangaan subdistrict, Jepara Regency [1] and the Village is one of the 12 villages in the Pecangaan District area, to be precise 15 km south of the capital city of Jepara Regency. Initially, the weaving craft business in Troso Village was still a side activity aimed at meeting his own needs. Currently, the ikat weaving craft business is being developed into a small industrial center to meet market demand. The initial idea to make Troso Village a tourist village came from the concerns of

ikat weaving entrepreneurs who often took part in exhibitions outside the area because ikat weaving from Troso is recognized by other parties as a regional weaving product. This sparked the enthusiasm of the craftsmen and the community to develop Troso ikat weaving into a tourist attraction by making Troso village a tourist village.

As time and technology develop, the manufacture of Troso Jepara weaving has experienced several developments, especially in the motifs used. Among the areas producing woven crafts in Indonesia, ikat cloth from the Troso Jepara weaving center is known for its cheaper prices. Because of this, woven cloth from Jepara troso spread throughout various regions in Indonesia. Even better known than the original weaving of the area. The causes include cheaper raw materials on the island of Java, effectiveness of workmanship, and innovation in the use of looms instead of machines [2]. A complete research has been carried out to develop the Troso area into a complete tourist area apart from its completely natural environment and the main result is Troso Jepara ikat weaving [3]. The strategy that has been carried out by [4-12], and in general, is that Troso Jepara Ikat Weaving MSMEs need to do the following things to develop their potential, so that they can compete in national, regional and even global businesses, including, a) need to maintain manufacturing techniques, woven fabric as a tourist attraction, in collaboration with third parties to develop the Troso Village icon. Disseminating information to the entire community requires developing the concept of sociopreneurship and requires innovation in motifs and colors of woven fabrics and actively participating in exhibition activities, b) to require participation in the desires of the Indonesian people in ikat weaving and the world tends to be more stable when compared to furniture. It is necessary to establish partnerships with areas that have different tourist attractions and c) it is necessary to maintain the brand of Troso Village as a weaving center and it is necessary to create annual activities such as the existing Troso Fair. Creating attractive tour packages in Troso Village as well as word of mouth marketing, through print and digital media.

In the current digital system, it seems that management information system (MIS) and internet of things (IoT) applications are very necessary both for marketing development and expanding penetration of product exports abroad. MIS is a planning system that is part of the control of a business which includes the use of people, documents, technology and procedures by management accounting to solve business problems, such as, the costs of products, services or a business strategy [4]. MIS are distinguished from ordinary information systems because MIS is used to analyze other information systems applied to the organization's operational activities. Academically, this term is generally used to refer to a group of information management methods that are related to automation or support for human decision making, for example, decision support systems, expert systems, and executive information systems. The aim of MIS is to solve various problems in business including services, product costs and business strategy. The entire system is used in order to analyze other information systems in the implementation of operational activities in the organization [4]. Meanwhile, IoT is the Internet for Everything, a concept that aims to expand the benefits of continuously connected internet connectivity. Capabilities, such as, data sharing, remote control, and so on, also apply to objects in the real world. For example, food, electronics, collections, any equipment, including living objects, all of which are connected to local and global networks via embedded and always active sensors [5]. The Internet of Things is closely related to Machine-to-Machine (M2M) or better known as smart devices [6] and basically, IoT refers to objects that can be uniquely identified as virtual representations in an Internet-based structure.

Partner Problems

From the description that has been presented previously and based on fact tracking and previous research results, it can be concluded that there are at least two problems with Troso Ikat Weaving MSMEs, Jepara, especially related to marketing management and the need to increase knowledge related to MIS and IoT applications in order to develop the quality of implementing human resources and operations of Troso Jepara Ikat Weaving MSMEs. Community Service Research Participants (PKM-I) which was carried out by Magister Management Lecturers of Pamulang University (Prodi MM UNPAM) in collaboration with Lecturers of the Syah Alam Polytechnic (PSA Polytechnic) Selangor Malaysia and hereinafter this PKM activity is called PKM International (PKM-I). The PKM-I Team concluded that matters relating to the implementation of the Troso Naviza Jepara Ikat Weaving business so far are the following things, a) there is still a lack of sales of ikat woven exports abroad, b) there is still a need to increase the HR capability of the Jepara ikat weaving company in order to increase the ability to export products abroad and c) lack of understanding of marketing using IoT and MIS as well as developing human resources and expanding penetration of product exports abroad. With the matters described in the previous section, the MM UNPAM Study Program Lecturers and PSA Selangor Malaysia Polytechnic jointly implemented the PKM-I for Small Medium and Micro Enterprises (MSMEs) for Naviza Ikat Weaving with the title "Implementation of Management Information Systems and the Internet of Things in Improving the Economy and Development of Human Resources (HR) to Expand Penetration of the Troso Jepara Ikat Woven Export Market."

Objectives and Benefits of PKM-I Magister Management UNPAM Study Program and Polytechnic PSA Selangor Malaysia

The objectives of PKM International (PKM-I) are **a)** to provide direction and guidance on strategic matters needed to increase woven export products abroad and based on MIS, **b)** to increase knowledge of IoT applications in various fields, especially related to increasing the quality of MSME workers, and **c)** increasing knowledge about marketing by using IoT and MIS as well as developing human resources and expanding penetration of product exports abroad. After the implementation of PKM-I between the MM Study Program and PSA Polytechnic Selangor Malaysia, all Troso Naviza Jepara Ikat Weaving MSME workers are expected to **a)** gain knowledge about the strategic matters needed to increase woven export products overseas and based on MIS, **b)** obtain knowledge of IoT applications in various fields, especially related to increasing marketing of Troso Naviza Jepara ikat products and **c)** gaining knowledge about marketing using IoT and MIS as well as developing human resources and expanding penetration of product exports abroad.

METHOD

In this International PKM-I of Lecturers of Magister Management of UNPAM and PSA Polytechnic Malaysia, the stage 1 preparations were made for everything related to materials and tools in accordance with the theme properly. The results of these preparations are intended to make the application of materials and benefits of AI presented easy to understand. This should also be understood by all participants or young employees of UMKM Tenun Ikat Naviza. To implement this International PKM-I program, it is necessary to go through several stages of work procedures starting from the preparation stage as shown in Figure 1.

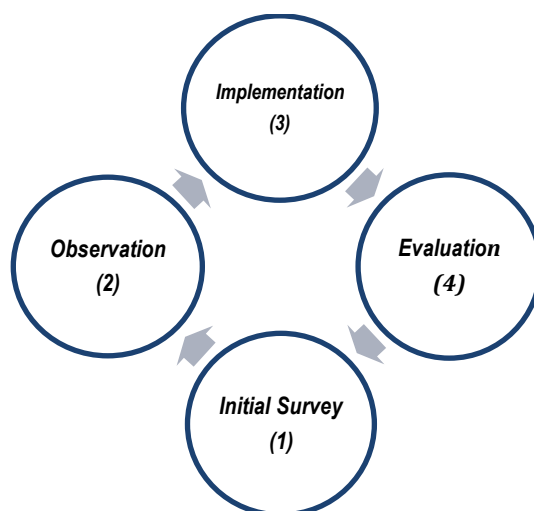


Figure 1. Flow Chart of PKM-I Implementation

In stage 1, an initial survey and location survey of UMKM Tenun Ikat Naviza was carried out at Desa Troso, Kecamatan Pecangaan, Kota Jepara and the initial survey was conducted directly to the site by chairman of Prodi MM UNPAM. In stage 2, observations are then carried out after determining the implementation time and target participants for the activity. In stage 3, a team coordination meeting is held, and at this stage tasks are distributed, including creating an implementation schedule, starting from preparation, implementation, to evaluation and report preparation. Stage 4 is the implementation of evaluation activities carried out after counseling, training and mentoring, especially for all employee members of UMKM Tenun Ikat Troso Naviza Jepara.

Evaluation of the implementation of PKM-I was carried out by filling in related instruments or questions as well as responses which are all prepared by the PKM-I Team. This was regarding how the participants respond to the PKM-I activities carried out by the Pamulang University MM Study Program Lecturer Team. It is hoped that partner participation in implementing the International PKM-I program will run smoothly by giving permission to the team to carry out PKM-I activities for young employees of UMKM Tenun Ikat Troso Naviza Jepara. The international PKM-I implementation event in Jepara was held in:

Place : Multipurpose Building, Desa Troso, Kecamatan Pecangaan, UMKM Tenun Ikat Troso, Jepara

Activity Target : All Employee Members of UMKM Tenun Ikat Troso Naviza, Jepara

Date and Time : September 27, 2024, 14.00-16.00 WIB.

All UMKM employees, around 27 lecturers of the Magister Management and Information Engineering (MTI) as well as PSA Malaysia lecturers study programs were present as participants of PKM-I. The resource persons, the Chancellor of UNPAM, Dr. H.E. Nurzaman, AMM, MM, M.Si. as well as the head of Desa Troso promised to continue to share their knowledge with all participants, staff and lecturers of PSA Selangor Malaysia. PKM-I implementation provided materials, training and question and answer sessions. The structural agenda of PKM-I activities was as follows:

**Table 1. Agenda of PKM-I at UMKM Tenun Ikat Troso Jepara
Thursday, 27 September, 2024**

No	Time	Agenda
1	14.00-14.15	Welcome Speech from Head of Desa Troso Jepara
3	14.15-15.00	Keynote and Opening Speech from Rector UNPAM, Dr. H. E. Nurzaman, AMM, M.Si, M.M.
4	15.00-15.15	Signing Agreement between Prodi MM and UMKM Tenun Ikat Naviza Jepara
5	15.15-15.30	Presentation from Dr. Yayan Sudaryana Prodi MM UNPAM with the title of Product International Promotion to Foreign Countries
6	15.30-15.45	Presentation from Dr. Natasya PSA Malaysia with the title of To Use AI for Product Digital Promotion
7	15.45-15.55	Group Photo for All Participants of PKM-I from UNPAM, PSA Malaysia and UMKM Tenun Ikat Naviza Jepara
8	15.55-End	Corteous Party

RESULTS

A. International Marketing Extension and Promotional Digital Applications with Artificial Intelligence)

In this digital era, technological developments are the main catalyst in the transformation of various sectors, including the marketing sector. The PKM-I Team of the Magister Management Study Program and PSA Selangor Malaysia Polytechnic provided counseling related to International Marketing to all employees of Troso Naviza Jepara Ikat Weaving MSMEs and the counseling was delivered by Dr. Yayan Sudaryana, M.M. It was conveyed that one of the tips that can be done is to look for partners abroad and collaborate by signing an MoU (Memorandum of Understanding). The MoU can also be done with a local company that specifically handles product sales abroad. In its activities, it can be ensured that when planning to sell its products abroad, it will interact a lot with the Ministry of Trade and even interact with the Ministry of Law and Human Rights in processing passports, immigration and so on.

Artificial Intelligence (AI) is a field of computer science devoted to solving cognitive problems generally associated with human intelligence, such as, learning, creating, and recognizing images. Modern organizations collect large amounts of data from a variety of sources, such as, smart sensors, human-generated content, monitoring tools, and system logs. AI can then apply this knowledge to solve new problems in a way that humans do. For example, AI can respond meaningfully to human conversations, create original images and text, and make decisions based on real-time data input. Unlike humans, AI can work 24/7 without reducing performance levels. In other words, AI can perform manual tasks without

errors. It can be applied AI to focus on repetitive and tedious tasks so human resources can be utilized in other areas of the business. AI can reduce employee workload while MISplifying all business-related tasks. AI can use machine learning to analyze large amounts of data faster than humans can. AI platforms can spot trends, analyze data, and provide guidance. With data forecasts, AI can help suggest the best course of action for the future. Humans can also train AI to perform tasks precisely and quickly. This can increase operational efficiency by automating parts of the business that employees find difficult or find tedious. The use of AI in marketing includes various effective and innovative applications. Its applications can also be said to be very diverse, here are some of them, including content personalization, chatbots and customer service, sentiment analysis and predictions, programmatic advertising and content creation.

B. Collaborating with MISilar Companies Both At Home and Abroad

An increase in exports of a product from a country is a reflection of the economic progress it has achieved. To achieve sustainable international trade growth, a comprehensive and planned strategy is needed. Based on in-depth analysis, here are some effective strategies that can help countries expand their trade reach in the global market, namely, product diversification. In facing an increasingly complex market, the country must encourage diversification of export products. Identify superior products that have competitive advantages in international markets, and encourage manufacturers to develop innovative products that meet global needs. Strengthen education and training for workers and makers of torso tie woven products and, where possible, improve the skills of product makers. It is necessary to encourage research and development (R&D) for product innovation and production processes, so as to maintain competitiveness in a wide market reach. The need to take advantage of opportunities in free trade agreements and profitable economic partnerships is a smart step. Apply for membership in international trade organizations, such as, the WTO to expand global trade networks. Then expand the promotion of export products through trade fairs, conferences and trade missions. Additionally, leverage digital presence through global e-commerce platforms to reach consumers worldwide. Next, ensure the product meets international standards to increase the confidence of international buyers. Build a certification system that is recognized globally, so that local products can compete with MISilar products from other countries. Equally important, pay attention to sustainable and ethical trading practices.

Furthermore, understanding the demands of a global market that is increasingly concerned about the environment and society is an important key. By adopting responsible practices, local products will be more in demand in international markets. To strengthen trade expansion, research new markets in developing countries that have increasing demand for goods and services. Identifying global market trends and responding to them quickly will provide a significant competitive advantage. It is also necessary to involve the private sector in planning trade strategies and product development. Partnerships with local companies will increase production and distribution capacity, resulting in a win-win for all parties. Furthermore, educate local consumers about the benefits of export products in supporting the country's economy. Encourage consumer awareness of local products to increase the competitiveness of domestic products in international markets. It is necessary to continue to evaluate the strategies implemented and adjust them to changes in markets and global trade policies. Adaptive flexibility will maintain competitiveness and relevance in an ever-changing market. Implementation of all these strategies requires close collaboration between government, the private sector and educational institutions. Consistent policy support and

creating a conducive business environment are the keys to success. With these steps, a country can move forward on the international trade stage, create sustainable economic opportunities and improve the welfare of its people.

DISCUSSIONS

As previously stated that the target of this community service activity is to introduce IoT and MIS applications to improve HR capabilities to carry out digital marketing, so that “Tenun Ikat Troso Jepara” products will increase in the future. It is hoped that this community service activity will be especially beneficial for Troso Naviza Jepara Ikat Weaving MSMEs. Interaction between PKM-I participants and the PKM-I Team needs to continue after PKM-I is implemented. At the end of the event, if there is not enough time to discuss the material, PKM-I participants can contact the speaker for further discussion. Finally, it is hoped that PKM-I can help the MSMEs of Tenun Ikat Troso Jepara to carry out digital promotions so that they can increase products exported abroad and develop HR capabilities in using IoT and MIS not only for digital promotion purposes, but also for the development of these MSMEs in the near future.

EVALUATION

One of the targets of PKM-I activities is to provide outreach on IoT and MIS applications for digital promotion and at the same time to develop the quality of human resources to expand penetration of the Jepara Troso Naviza Ikat Woven MSME export market. It is hoped that PKM-I activities will be especially beneficial for these MSMEs and other targets. The material presented in the counseling needs to be discussed together so that knowledge can be shared between participants. At the end of the event, if there is insufficient time to discuss the material, PKM-I participants can contact the presenter to accommodate their needs. Based on the main problem explained in the previous chapter, namely the lack of understanding of the importance of IoT applications and MIS to use them in the digital promotion of MSMEs. In solving digital promotion problems, the solution offered to them is a) increasing participants' abilities and knowledge of IoT and MIS applications and b) using IoT and MIS applications to improve the quality of MSME HR for various things, so that in general the quality of MSME HR increases. They also felt satisfied with PKM-I which was carried out by paying attention to the occupational safety and health (K3) standards of PKM-I partners. Partners are also very satisfied with the implementation of PKM-I regarding the principles of the scientific method. Furthermore, partners are also satisfied with the results of PKM-I which are in accordance with the service planning and the solutions expected by partners. The PKM-I results can be utilized optimally by partners, and are deemed adequate when compared with the expected results. The results of the survey for partners of PKM-I, Troso Naviza Jepara Ikat Weaving UMKM, provided the results as shown in Table 2.

Table 2. PKM-I Questionnaire for Partner UMKM Tenun Ikat Troso Naviza Jepara

No	Statement	Selected Choice				
		VNS	NS	N	S	VS
1.	Community Service Planning (PKM-I) carried out by Pamulang University lecturers is in accordance with the needs of service partners				S	
2.	Community Service Planning (PKM-I) has been carried out in accordance with Occupational Safety and Health (K3) standards for Community Service (PKM-I) partners				S	

3.	Implementation of community service is carried out according to the rules of the scientific method					VS
4.	Implementation of Community Service (PKM-I) is carried out by paying attention to Occupational Safety and Health (K3) standards					VS
5.	The results of Community Service (PKM-I) are in accordance with the service planning				S	
6.	The results of Community Service (PKM-I) are in accordance with the solutions expected by partners				S	
7.	The results of Community Service (PKM-I) can be utilized optimally by partners				S	
8.	Community Service (PKM-I) funding has been felt to be quite adequate when compared to the expected results.				S	
Write down the things needed for sustainability in the future *		Your comments: <i>It is expected that the collaboration needs to be continued</i>				
Write your suggestions for our progress *		Your Comments: <i>The collaboration is good and needs to be continued</i>				

Note: **VNS**-very not satisfied; **NS**-not satisfied; **N**-normal; **S**-satisfied; **VS**-very satisfied





Figure 2. Photos of PKM-I from MM UNPAM, PSA Polytechnic Malaysia and UMKM Tenun Ikat Troso Naviza Jepara

CONCLUSION

The international community service (PKM-I) in UMKM Tenun Ikat Naviza Jepara was held based on the collaboration among UMKM Tenun Ikat Naviza Jepara, Sultan Salahudin Syah Alam (PSA) Polytechnic, Selangor, Malaysia and The University of Pamulang-UNPAM, Indonesia. PKM-I was carried out to formulate strategies and programs for the development of Troso Naviza Jepara Ikat Weaving Enterprises (MSMEs). The Magister Management Study Program (MM Program) together with the Syah Alam Polytechnic (PSA) Selangor Malaysia conducted PKM-I on 24-27 September 2024 with these MSMEs. The previous study stated that these MSMEs had problems regarding the lack of quantity of sales of ikat weaving exports abroad. Apart from that, MSMEs need to improve their human resources capabilities to increase their ability to export products abroad and there is still a lack of understanding of digital promotion using IoT and MIS (Management Information System). In addition, human resource development is needed to expand product export penetration abroad. During PKM-I, a directing method was carried out using IoT and MIS for digital product promotion and human resource development as well as evaluating the results of PKM-I that had been implemented. It is hoped that all Troso Jepara Ikat Weaving MSME business players will master the strategic matters of exporting ikat weaving abroad based on MIS and IoT, especially related to digital marketing as well as human resource development. Finally, these MSMEs will be able to expand product export penetration overseas in the near future.

ACKNOWLEDGEMENTS

The authors fully express sincere gratitude to the University of Pamulang-UNPAM, Tangerang Selatan, Banten, which has given us the opportunity to do the international community service (PKM-I) in UMKM (MSMEs) Tenun Ikat Troso Naviza Jepara with the title of *Implementation of Management Information Systems and Internet of Things in Improving The Economy and Developing Human Resources to Expand Export Market Penetration of Tenun Ikat Troso Jepara*. The authors finally expected this PKM-I research will be worthwhile for the related lecturer's community in Indonesia.

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