

PAPER • OPEN ACCESS

Empowering in Coastal Communities Using Ergonomics and Technopreneurship Methods

To cite this article: Eko Nurmianto 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1198** 012014

View the [article online](#) for updates and enhancements.

You may also like

- [Improving coastal and marine resources management through a co-management approach: a case study of Pakistan](#)

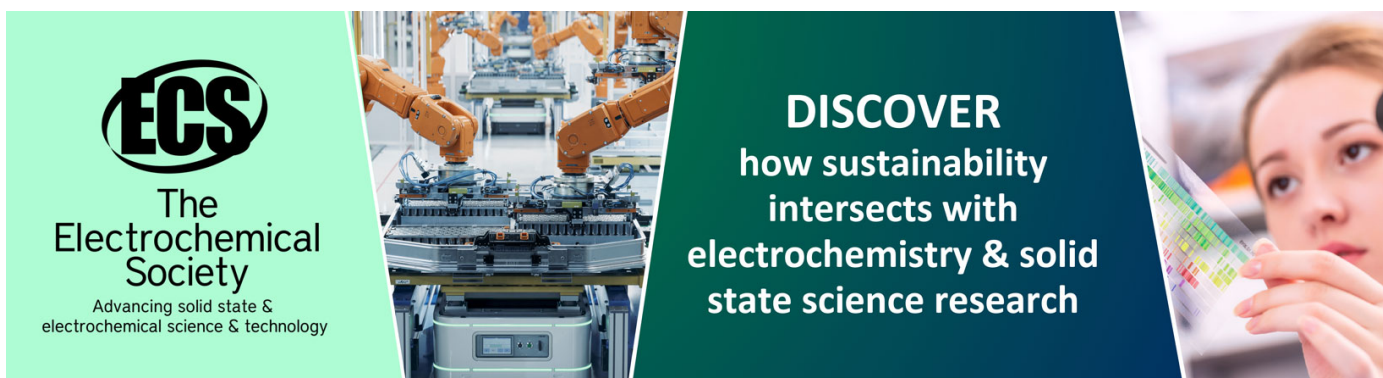
Zafar Ullah, Wen Wu, Xiao Hua Wang et al.

- [Prevention and control measures for coastal erosion in northern high-latitude communities: a systematic review based on Alaskan case studies](#)

Min Liew, Ming Xiao, Benjamin M Jones et al.

- [Socio-economic studies of coastal communities at the Fishing Port of Kutaraja, Banda Aceh, Indonesia](#)

R Thaib, I Ilda, A Rahmah et al.



ECS
The
Electrochemical
Society
Advancing solid state &
electrochemical science & technology

DISCOVER
how sustainability
intersects with
electrochemistry & solid
state science research

Empowering in Coastal Communities Using Ergonomics and Technopreneurship Methods

Eko Nurmianto*

Department of Industrial and Systems Engineering, Institut Teknologi Sepuluh Nopember (ITS), Surabaya 60111, Indonesia

*Corresponding Author: ekonurmianto1@gmail.com

Abstract. Every community wants their business to be successful and able to last a long time. Problems of coastal community are lack of skill and income Empowerment objectives 1) Determining the level of needs of coastal communities, 2) Determining the type of skills required, 3) Determining appropriate training packages to improve skills. Based on this goal, the result of empowerment is how to improve the skills and income of coastal communities. As people's income increases, it is expected that the volume of activities and commodity trading will also increase. This empowerment provides a plan to improve the standard of living for coastal communities and their families. This activity is in accordance with SDG 8 (Decent Work and Economic Growth).

1. Introduction

Indonesia has great sand and shellfish producing potential. So far, the sand and shellfish produced by fishing communities are still sold in the form of raw materials and have not been processed into finished products. In fact, sand and shells have various benefits, for example, they can be made into crafts such as Tissue Boxes, Photo Frames, Wall clocks, Pencil Cases, etc. It can increase prosperity for the local people. It is a pity, if very abundant sand and shells are sold only in the form of raw materials that are of little value-added compared to the above mentioned finished products that are of greater value-added.

The handicrafts manufacturing industry, which is located in Paiton, East Java, has been around since a few years ago, but until now it is still not well developed. The lack of capital makes them unable to increase production capacity as well as limited marketing. They still use traditional technology. Seeing such a situation, there is still an opportunity to increase efficiency and effectiveness through the program that is in accordance with the situation and conditions of the industry. The design of management, human resources, production, finance, and design will in turn increase the competitiveness of such small industries.

One way to improve production efficiency and effectiveness is to conduct *sustainable training*. During this time, they use scissors, cutters, or razors to cut handicrafts raw materials. Besides taking a long time, the use of such equipment also reduces the quality it produces. In addition, it is also less comfortable and healthy, because workers get tired quickly, so there are often mistakes that result in a lot of wasted materials.

The workforce in *SME CRAFT*, gained handicrafts making skills from years of work experience and was transmitted informally. *SME CRAFT* has 5 people and still has family ties. The



average number of workers per SME is only 5 people, so job specialization does not yet exist. The administrative system has not been in order. There are still many who concurrently work without looking at *job specification* and *job description*, so that management functions such as planning, organizing, directing and controlling are unclear and overlap each other.

The implementation of production at *SME CRAFT* is still *a job* order or just waiting for an order so that it is less developed. This is certainly not able to support efforts to increase his income. Types of production are made based on orders from customers without any initiative to develop products that will meet the needs and desires of consumers in the future. For this reason, it is felt that there is a need for stimulation to cultivate courage and confidence to move forward.

The implementation of production has not advanced because it does not have a marketing fleet and is waiting for orders so that it is less developed, besides that legalization / business licenses are also not owned by partners.

In Indonesia since antiquity there has been a lot of sand and shells which is the second largest area in the world where there is sand and shellfish [1] Dahuri, *et al.*, [2] Sorensen and McCreary, [3] Nurmianto. Sand and shells are found in almost all stretches of beaches in Indonesia. The use of sand and shells has been limited to complementing children's toys. So that the price of sand and shellfish becomes very cheap, because the Indonesian people have not been optimal in utilizing sand and shellfish.

The process of making products from sand and shells has been researched by Eko Nurmianto (2006), [4] Zulaikha *et al.*, [5] Nurmianto and is actually an activity of making crafts that are labor-intensive so that they can absorb a large workforce. If the handicrafts industry can grow and develop, it will reduce unemployment by a large amount. To process sand and shellfish raw materials into products such as Tissue Boxes, Photo Frames, Wall clocks, Pencil Cases, and so on only requires simple skills [6,7]. Training in making sand and shellfish crafts for the community is an important thing to increase income and free residents from the snares of poverty. Even if developed it can become a sand and shellfish handicrafts industry oriented towards creating jobs and reducing the number of unemployed.

Problem that exists with partners besides the above problems is that the partner only has a single buyer, this single buyer will buy in large quantities and then will sell it at a high price elsewhere. This is very detrimental to the partner because the partner sells at a low price but the buyer actually sells at a high price. Another thing, if such a buyer does not place an order for a long period of time, then the partner will go bankrupt. The most classic problem faced by partners is selling goods carelessly, in this is associated with partners often not providing *packaging* on the product they want to sell, this makes buyers who want to buy the product get the impression that the product has no aesthetics and this is a loss for the partner. In addition to not providing wrapping on products, partner service to consumers is less friendly, because partners are job-order-based SMEs, partners often do not serve *orders* from customers if they feel that partners are lazy to do work. Partners also often sell with products that have not much variety, then buyers will see that the creativity of the partners is very small, buyers will choose other manufacturers. This loss is fatal, with the creation of little competition of partners with competitors.

The purpose of empowerment is to apply science and technology in the form of skills training on how to make sand and shellfish crafts, increase the added value of sand and shellfish raw materials that have been around the target area and have never been used, reduce unemployment rate and poverty rate, increase community independence and provide community income through entrepreneurial activities. The benefits of empowerment are being skilled in making sand and shellfish crafts, serving as a means of doing business for the community, providing employment opportunities for the community, understanding about increasing the added value of sand and shellfish raw materials.

2. Literature Review

Previous research on clam sand-based handicrafts products, Eko Nurmianto [3,5], Zulaikha *et al* [4] and Wuryani [6,7] has examined the Utilization of Clam Sand Waste for Handicrafts Products. Such products can be sold in the concept of entrepreneurship.

Practical Technical Making of Clam Sand-Based Boxes, namely first measure the shape you want / according to the mall, after finishing just cut using a crossbar and knife, the cardboard that has been cut is newly formed using paper insulation, try the results of the cut earlier, close the box with the box body closed, if it is too wide to tighten it by pressing, after the box is finished, prepare the sand powder that has dried, the box body and box lid are smeared with white glue, in a wet state, sand then sprinkled / pasted on the surface of the box, dry with the heat of the sun or hairdryer, carefully if something is uneven. The part is smeared again with glue and then sprinkle sand again, after drying then painted / given ornaments Decoration of shells.

The provision of materials in making boxes includes cardboard, eagle white glue, beach sand, gun glue, shells. For the equipment, namely a knife, ruler, pen / ballpoint, brush, glue holder (Aqua glass).

3. Methods in the application of science and technology Assessment Method

Methods in the application of science, ergonomics, technopreneurship and technology about the manufacture of shell sand handicrafts products include:

a. Counseling and discussion on the manufacture of sand shell craft products. At this stage, the target audience is jointly given counseling about the knowledge of processing sand and shellfish raw materials, especially for the manufacture of handicrafts products. The materials presented at this stage are cardboard cutting of various shapes of boxes, frames and clocks with mall guides, the formation of cartons according to the mall pattern, gluing of cardboard pieces into whole boxes according to the shape of box tissue, photo frames and table clocks, gluing sand on tissue boxes, photo frames and table clocks, drying tissue boxes, photo frames and table clocks under the sun, making ornaments on tissue boxes, photo frames and table clocks, variations of ornamental knick-knacks, installation of clams on tissue boxes, photo frames and table clocks, variations of clam knick-knacks, evaluation of the work of each participant, life skills of clam sand crafts, determining the cost of goods of box tissue products, photo frames and table clocks, In addition, counseling on entrepreneurship was given as well as ergonomics aspects, i.e: hand grip diameter and how to hold a drill.

b. Direct practice with training on how to make sand shell craft products. At this stage target audience is divided into groups and each group of hands-on practice how to make products with a wide variety of qualities.

c. Counseling and follow-up discussions on the manufacture of sand shell craft products. At this stage, the target audience is given advanced material on business development and the application of creative ideas to the products produced. All materials presented at the time of the second visit the materials presented at this stage are financial management and management, creative design of sand handicrafts products, shells, pearls, manufacture handicrafts product packaging design, process and production technology (cleaning, cutting, polishing, boring) to improve the quality of handicrafts products, internet technology training and web design to improve product marketing crafts, market intelligence in anticipation of competing craft products.

4. Results and Discussion

This service program provides the results of service in the form of a gradual training process to develop a sand shellfish craft business. The development process depicted in several pictures as follows.



Figure 1 The results of the participants' work from the sand clam handcrafts product making training and all products are in hand size ergonomically



Figure 2 Results of cleaning shellfish raw materials using H₂O₂



Figure 3 Results of training on making handcrafts products made from resin based



Figure 4 Web www.klucil.com results of training in internet technology and web design

How to make a resin mold from silicone, that is, prepare a matric or model to be printed and propagated, the matric is smeared with vaseline its function is to make the matric not sticky if it is greased with silicone, the matric is placed on the glass and the edges are coated with a square night or side function is for silicone poured in the mold not spilled, after being coated at night we take enough silicone, into an aqua glass and given 3 drops of silicone catalyst then we stir until it is completely flat and then we pour it on the matric surface that we have prepared earlier if the silicone overflows we turn and so on until it dries, if it feels that the silicone is not thick enough then it can be poured once again the mixture until thick after finishing the silicone has become rubber. The silicone that has become rubber is smeared again with vaseline until smooth. Then we pour enough resin plus the dryer the principle works the same as silicone, after finishing and ring approximately 4-5 hours.

How to make products from resin, namely Prepare the silicone mold that we have made earlier, take aqua plastic cups we pour enough resin liquid according to the size of the model. Give the resin dryer liquid 2 or 3 drops to mix thoroughly and then we pour it into the mold round and round until it freezes and then let it sit for 15 minutes to dry, the mold can be taken and then practiced.

Appropriate Technology in the form of Web www.klucil.com the results of Internet Technology Training and Web Design is the right tool to market handcrafts products from sand shells. By using Web www.klucil.com, the Development of the Sand Clam Handcrafts Business Group in Paiton can run more optimally. From the web can be seen various types of products and their prices. And can help

people to get to know internet technology as a marketing medium. This program namely Technopreneurship Methods as mentioned by Nurmianto [8] as depicted in the following figures. Limitation of this program that the posture of the trainer and trainee awkward and not ergonomic [9,10]



Figure 5 Instructor delivering material in ergonomics and technopreneur (product design, financial management and marketing management)



Figure 6 The technology used in this process is how to use drill, grinding machine and gun glue as well as how to hold equipment ergonomically.



Figure 7 Assembling tissue box products



Figure 8 Product drawing and painting. The watch size is same as the wrist size.



Figure 9 Pasting sand color onto carton. The photo frame size is same of hand grip ergonomically.



Figure 10 The final products of the work of the fostered partners.

5. Conclusions

From the results of the community service program, it is concluded that:

1. The application of science, ergonomics, technopreneurship and technology for the community has been carried out in the form of skills training on how to make sand and shell crafts with the following materials:
 - Development of entrepreneurial spirit
 - Financial Management
 - Creative Design
 - Processing of raw materials for shellfish sand found on the coast
 - Assembly of handicrafts products manually and with the use of mechanical technology
 - Development of sand shell craft products using resin
 - Internet Technology and Web Design as a marketing medium for craft products
 - Market Intelligence as a competitor analysis of handicrafts products
2. Increase community independence and provide community income through entrepreneurial activities.
3. Skilled in making sand and shell crafts using ergonomics methods
4. Serves as a means of doing business for society.

6. References

- [1] Dahuri R, J Rais, Sapta 2004 *Pengelolaan Sumber Daya Wilayah Pesisir* (Jakarta: Pradnya Paramita)
- [2] Sorensen J C dan McCreary 1990 *Coast: Institutional Arrangement for Management of Coastal Resources* (Berkeley: University of California of Berkeley)
- [3] Nurmianto E 2006 *Pemanfaatan Limbah Pasir Kerang untuk Produk Kerajinan Untuk Meningkatkan Wirausaha Masyarakat di Wilayah Pesisir Pantai Kecamatan Paiton* (Paiton: Laporan Penelitian Kerjasama LPPM-ITS dan PT Power Gen Jawa Timur)
- [4] Zulaikha E, Waluyohadi dan Isrofah 2008 Pemanfaatan Limbah Kantong Plastik Untuk Produk Kerajinan. *J. Desain IDEA*. **9** 11 61-75
- [5] Nurmianto E 2008 Ergonomic Intervention in Handicraft Producing Operation. *Proc. 9th Asia Pacific Industrial Engineering & Management System (APIEMS)* Bali Indonesia
- [6] Wuryani S 2004 *Kreasi Cangkang Kerang Untuk Dekorasi Rumah* (Surabaya: Trubus Agrisarana)
- [7] Wuryani S 2005 *Kreasi Cangkang Kerang 2* (Surabaya: Trubus Agrisarana)
- [8] Nurmianto E 2009 *Technopreneurship* (Jogyakarta: Materi Kuliah Tamu Univ Islam Indonesia)
- [9] Nurmianto E 2004 *Ergonomi: Konsep Dasar dan Aplikasinya*, 2nd ed. (Surabaya: Guna Widya)
- [10] Nurmianto E 2018 Ergonomics smoke machine for indigenous people in Indonesia *Proc. MATEC Web of Conferences* **154**, 01103 (2018) <https://doi.org/10.1051/mateconf/201815401103> ICET4SD 2017