The Pripree Model of Bantumsue Community to Nawatwithi (Local Innovative) for Industries Handicrafts Design with Enhancing Participation Action Approach

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Abstract

The objectives of this research were 1) to synthesize the design development of industrial handicraft prototype of Bantumsue community; and 2) to evaluate the product design of industrial handicraft to produce the product manuals for community. An agricultural leftover's experiment was established where design A is a product from banana cladding materials, design B is bamboo leaf and design C is pineapple. Data were collected using questionnaire and in-dept interview form and analyzed using the formula of Trixie Blend Diagram, percentage and mean. The 175 samples for the research consisted of experts, tourists and designers to evaluate the design, the environmental impact and graphic design of the prototype of handicraft.

The research revealed that 1) Selecting materials with the least environmental impact showed the highest level of satisfaction with the average value of 4.46 (SD = 0.67); 2) The average of material consumption was 4.38 (SD = 0.63); which is similar to 3) The appropriated manufacturing processes, which was 4.38 (SD = 0.63); 4) The average value of reducing environmental impact was 4.37 (SD = 0.68); 5) Suitable service life showed the average value as 4.12 (SD = 0.72); 6) The prototype of industrial handicrafts design showed a high level of satisfaction with the average value of 4.44 (SD = 0.61); and 7) Proper end-of-life management system was at moderate level with the average value of 4.37 (SD = 0.73). According to the 123 participants or 26.15% agreed that the processing of waste from fiber paper could create the most appropriate handicraft. In addition, 1) The product design B (from bamboo leaf) showed the most satisfied creative handicraft with the average value of 4.58 (SD = 0.56); 2) The graphic design of handicraft prototype no. 11 and 09 highlighted the most satisfied with the mean of 4.33 (SD = 0.73); and 3) The logo design of layout no. 6 was the highest level of satisfaction with the mean of 4.20 (SD = 0.90).

Keywords: Bantumsue Community, Industries Handicrafts Design, Community Participation

Introduction

The changing conceptions of knowledge in 21st century led people to experience the learning society that required the new knowledge for the highly competition to serve the community and be in the greater quality of life. The development plays an important role to response to the national tourism strategy of the country; developing Thai products and tourism services, raises the awareness of being a good host (National Tourism Policy Committee, 2017). The state agencies are required to generate the income and develop the tourism within their areas by attempting to conserve and restore the tourist attractions. Regarding the promoting of creative economy which refers to the sum of the knowledge, called "Intellectual capital", it is required the creative thinking skill (new knowledge base)" to maximize its utilities. The new idea will create a difference, add product value and finally lead to innovation and the successful utilization of news ideas.

DCMS (Department Culture Media and Sport) of the United Kingdom briefly defines the "Creative Economy" is the beginning of using personal creativity, skills, and talents to increase the potential for the stability of the implementation of intellectual property advantage (Howkins, 2010). Thailand has specified into 4 main industrial groups (and 15 sub-industrial groups) which are related to cultural heritage included handicrafts and arts as a

framework for setting guidelines of sustainable national development. A quality improvement will be focused on the level of basic resources to enhance "quality" and "value" to "added value". Furthermore, product development in community that associated with products and tourism services in the line of Thai identities also responses to the national development of Thailand 4.0 policy. The objective is to help Thais upgrade from having a medium-income to be better life. (Pholphirul, 2013)

In this research, the researcher aimed to study the agricultural leftover at the Bantumsue community, Kaeng Krachan District, Phetchaburi province to create new products and enhance the existed products of the community in every household. The researcher hopes to encourage people to create the handicrafts as product on demand (POD) to meet the customer's requirement. Therefore, people can create a household industry, called "Industrial handicraft" and hopefully leads to the "Creative industry" which defined as the cycle of production, distribution, and services from the creativities. Moreover, "Intellectual capital" refers to the intangible value of people in a community, significantly became a fundamental for sustainable development, quality improvement and added value. It possibly enhances the competitive advantage and the competency of the people to support the skill for career in a community. The creative work can be a bridge between problems and eco-industrial handicrafts by studying the correlation between living things and the environment. The ecosystem concept was applied the sufficiency economy philosophy to create a design work by using culture, folk wisdom combined in the agricultural leftover to represents the identity of the community. The researcher can be a part of the creative community development, business center, and innovation. The industrial handicrafts at Bantumsue community, Phetchaburi province, can be considered as a new knowledge that applied from available resources in the community to achieve the greater utilities. The idea of reusing agricultural leftovers came from the community at Bantumsue, Kaeng Krachan district. According to the primary data and in-depth interviews with a community leader, it showed that the most important agricultural crops are 1) pineapples; 2) banana plants, which were largely cultivated (Phetchaburi Provincial Office, 2017, p. 20); and 3) bamboo leaf which is a fast-growing economic plant according to the list of the economic development plan to increase more green areas (Faculty of Forestry, Kasetsart University, 2018). The materials have been manufactured as "plant fiber paper" according to the characteristics of the properties from different tests. The selection of the best results for developing a new product can create handicraft works (Wongsuwan, Khiaomang, & Seo, 2020) mixed with the raw material and leather industrial residue under and the circular economy principle which concerned about the waste management from production, consumption, or harvest of economic crops in the community. The waste consumption has been re-material or reused to add the product's value. It may be possible to upgrade the products to the industrial level and develop the handicraft works for community which represented the community participation, creativity and community's potential. The research study was a Participations Action Research (PAR). The community plays an important role to brainstorm and create the business model, not only in their areas but their neighbors. The objectives of the research were 1) to synthesize the craft prototype design of handicraft industry at Bantumsue community, Kaeng Krachan district, Phetchaburi Province; and 2) to summarize and evaluate the product design of industrial handicraft to produce the product manuals for community.

Research Methodology

1. This was an Experimental Research and Participations Action Research (PAR) (Sutthinarakorn, 2017): Data were analyzed using open-ended questionnaires, observations, and in-depth interviews.

2. Data Collection:

- The study of agricultural leftover (plant fiber) and the industrial handicrafts concept.
- The result from community and student's experiment under the design of industrial handicrafts concept.

3. Data Analysis:

- The 175 samples consisted of the residents, tourists who visited Bantumsue homestay, and the experts.

4. Summary of Design Development: The objectives framework was used as a guideline for design development.

- The study of relationship between the industrial handicrafts concept within communities, ways of living, wisdom, culture, religion, traditions, environment at Bantumsue community and agricultural leftovers characteristic and production process (Department of Cultural Promotion, Ministry of Culture, 2016).
- The study of physical properties from agricultural leftovers by using semi-chemical methods for trial framework and the mold from industrial handicrafts production (Hopper, 2009).
- The study of creativity of the industrial handicrafts' design by applying the creative handicrafts concept and the sufficiency economy philosophy as a practice (Naksorn, 2015).
- The study of fundamentals of design in terms of color, material, and post-design process (CMF) (Becerra, 2016).

The research concept can be shown by the following diagram.

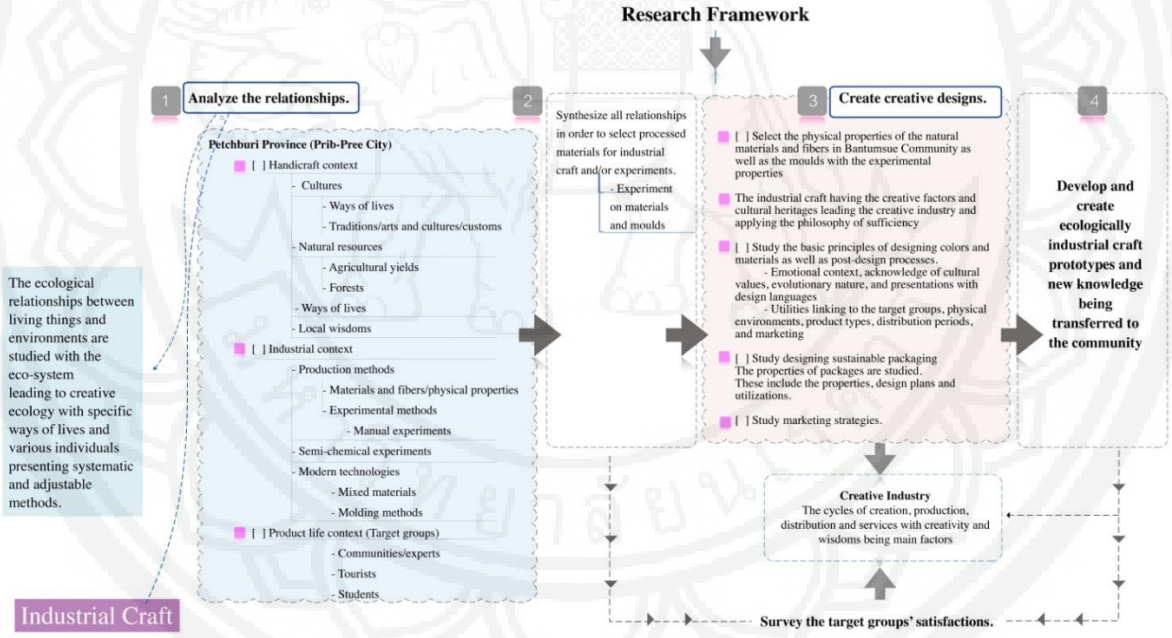

Figure 1 Conceptual Framework.

Results

The analysis of the relationship between the local wisdom of agricultural and career path to strengthen the family and community's potential. The industrial handicraft at Bantumsue area is considered as a new concept of the knowledge base, which leads to generate the income for the community. Data were collected from the science experiment by boiling the leftovers and extract the appropriate quality of pulp to create the industrial handicrafts products. A is for products made from banana cladding, B is for products made from bamboo leaf and C is for

products made from pineapple. The data were analyzed by Triaxial Blend Diagram (Hopper, 2009). The results were summarized from the seven formulas to determine the thickness (a) the experimental standard has referred from the community product standard of plant fiber paper (Thai Industrial Standards Institute, Ministry of Industry, 2017, p. 1) following to the community product standard of plant fiber paper sized 45 x 85 cm from the experiment as follows: 1) The average standard weight of all formulas was 220 g/square meter; 2) The highest score of the tear strength was formula 3 (10a) of 1962 mN, followed by formula 1 (8a) with the value of 1907 mN and the last one was formula 6 (13a) with the value of 1467 mN; and 3) The moisture of the paper was in a normal level at ± 10 percentage, which could be further developed as products or packaging; 4) The appropriate physical property of pulp has the difference color and suitable for screen printing, rubber stamp or heat press machine (140 Celsius degree) for 70 seconds (Wongsuwan et al., 2020).

The development of the knowledge based on plant fiber paper has been transferred to Bantumsue community and were able to produce for commercial purpose. Utilizing a creative cycle process which tried to solve the environmental problems such as climate change and circular economy is seen as appropriate fundamental principle of resources used. The circular economy principles are required the study of material cycles and the development of products extension to encourage households to create the "Industrial Handicraft". The outcome products will lead to the "Creative Industry" which is the cycle of product creation, product distribution, and services using creativity, including intellectual capital (Howkins, 2010). Those are fundamental to sustainable development by focusing on improving the quality of life of the community and create industrial handicraft.

The research finding of the community's basic knowledge indicates that 1) There were 171 participants or 97.70% who interested in the recycled agricultural leftovers; 2) 36 participants chose the agricultural leftovers from pineapples and banana cladding to process into plant fibered paper; 3) There were 150 participants (86.60%) understood the industrial handicrafts concept and 25 participants (13.40%) have no idea about the concept; 4) 103 participants (58.50%) believed that agricultural leftovers could create a packaging and any type of products (41.5%); 5) Household items, decorations and souvenirs (26.15%) have been selected to use with the agricultural leftovers' products, followed by clothing (19.81%) and food (15.69%); 6) The cushion packaging has been selected by 87 participants (50.30%) to be the most interesting products from agricultural leftovers' samples, followed by installation arts (43.40%) and stationaries (19.81%). The researcher also created the guidelines for industrial handicrafts. There were two groups of samples used in the evaluation and two parts of the evaluation.

Part 1 Model of Industrial Handicrafts: eco evaluation model and environmental impact analysis in the designing procedure.

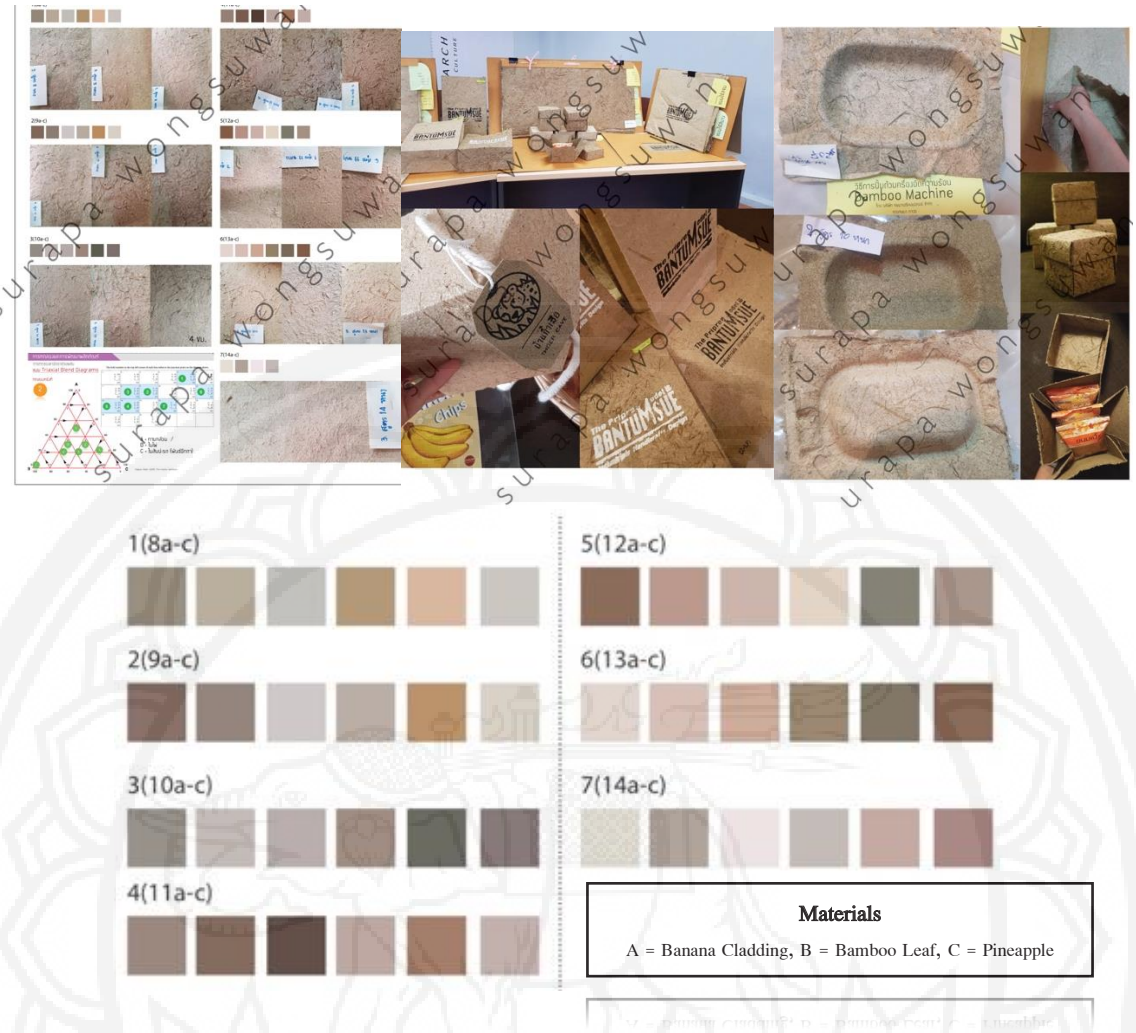

Figure 2 Physical Properties of Plant Fiber Paper.

Product Design
Set A

Figure 3 Prototypes of Industrial Crafts Design A.

Product Design
Set B

Product Design
Set C

Figure 4 Prototypes of Industrial Crafts Design B and Design C.

Table 1 Prototype of Industrial Handicraft Evaluation form Experts and Designers Participants

Assessment List	$\bar{x}$	SD	Satisfaction Level
1. Selecting Materials with the Least Environment Impact			
1.1 Non-toxic, non-contaminated material.	4.46	0.57	Very
1.2 Use renewable materials.	4.63	0.49	The Most
1.3 Use recycled materials.	4.48	0.68	Very
1.4 Easy to recycled raw material.	4.43	0.72	Very
1.5 Materials with low energy production.	4.36	0.71	Very
1.6 Raw materials with easy production.	4.40	0.85	Very
Total	**4.46**	**0.67**	**Very**
2. Material Consumption			
2.1 Weight of industrial handicrafts.	4.30	0.70	Very
2.2 Dimension and size for transportation.	4.40	0.56	Very
2.3 Material type.	4.33	0.66	Very
2.4 Recycled or Renewable material.	4.50	0.62	The Most
Total	**4.38**	**0.63**	**Very**
3. Appropriated Manufacturing Processes Used			
3.1 Production technology at the least environment impact.	4.33	0.75	Very
3.2 Reducing the number of production processes.	4.37	0.62	Very
3.3 Waste reduction in the production process.	4.40	0.67	Very
Total	**4.37**	**0.68**	**Very**
4. Reducing the Environmental Impact			
4.1 Design to reduce energy consumption in the production process.	4.33	0.80	Very
4.2 Reducing the use of unnecessary items.	4.40	0.67	Very
4.3 Reducing emissions from the production process to the environment.	4.53	0.57	The Most
4.4 Reducing fuel residue.	4.46	0.63	Very
Total	**4.43**	**0.69**	**Very**

Table 1 (Cont.)

Assessment List	$\bar{x}$	SD	Satisfaction Level
5. Suitable Service Life			
5.1 Increase reliability.	4.30	0.70	Very
5.2 Durability.	3.39	0.78	Very
5.3 Protection during use.	4.13	0.68	Very
Total	**4.12**	**0.72**	**Very**
6. Prototype of Industrial Handicraft Design			
6.1 Using the prototype industrial handicraft model that is suitable for the community context.	4.46	0.57	Very
6.2 Using mixed materials for prototype of industrial handicrafts.	4.60	0.49	The Most
6.3 Use of illustrations and patterns.	4.36	0.66	Very
6.4 Use of color tones in prototype production of industrial handicrafts.	4.46	0.62	Very
6.5 Relationship and psychological importance for customers.	4.46	0.68	Very
6.6 Product has a symbol indicated the chemical substance and the method for disposal.	4.33	0.66	Very
6.7 Suitability in selection with main material and mixed material of plant fiber paper.	4.63	0.61	The Most
6.8 Materials has the suitability for utilization.	4.53	0.57	The Most
6.9 Protection during use.	4.10	0.66	Very
Total	**4.44**	**0.61**	**Very**
7. Proper End-of-Life Management System			
7.1 Materials of industrial handicrafts can be recycled.	4.43	0.62	Very
7.2 Materials at the end of life have the least environment impact.	4.36	0.71	Very
7.3 Materials of industrial handicrafts are easy to sort before disposal.	4.26	0.82	Very
7.4 The residue of Industrial handicrafts can be landfilled and safe.	4.43	0.77	Very
Total	**4.37**	**0.73**	**Very**

The results from Table 1, the eco evaluation model, and the environmental impact analysis at the design stage were indicated that 1) The selecting materials with the least environment impact was the highest rate of satisfaction by the mean of 4.46; 2) Material consumption was as high as; 3) The rate of appropriated manufacturing processes used by the mean of 4.38; 4) Reducing environmental impact was at a high rate by the mean of 4.37; 5) Suitable service life was at a high rate by the mean of 4.12; 6) The prototype of industrial handicraft design was at a high level by the mean of 4.44 and proper end-of-life management system was at a high rate by the mean of 4.37.

Table 2 Evaluation of the Satisfaction of Industrial Handcraft Design form Experts and Designers Participants

Assessment List	$\bar{x}$	SD	Degree Satisfaction
1. Product Design Set A	4.00	0. 77	High
2. Product Design Set B	4.58	0. 56	Very High
3. Product Design Set C	3.83	0.77	High
Total	**4.13**	**0.70**	**High**

Based on the results from Table 2, it was concluded that product design set B was the most satisfaction rate by the mean of 4.58, followed by product design set A (by the mean of 4.00) and product design set C (by the mean of 3.83).

Part 2 Graphics Design on Industrial Handicrafts: "Pripree Model" is a graphic design prototype of industrial handicrafts product of Bantumsue community, Keang Krachan district, Phetchaburi province. The researcher has further developed from the design from the 100 Thai-inspired projectt: Public Art Project layout 01-03 to create happiness (Phetchaburi province) with the support of the Contemporary Art Promotion Fund for the year 2020, Office of Contemporary Art and Culture, Ministry of Culture (100RBDT, 2020). And another part is the local flower of Phetchaburi province that the researcher designed in according to the research's characteristic.

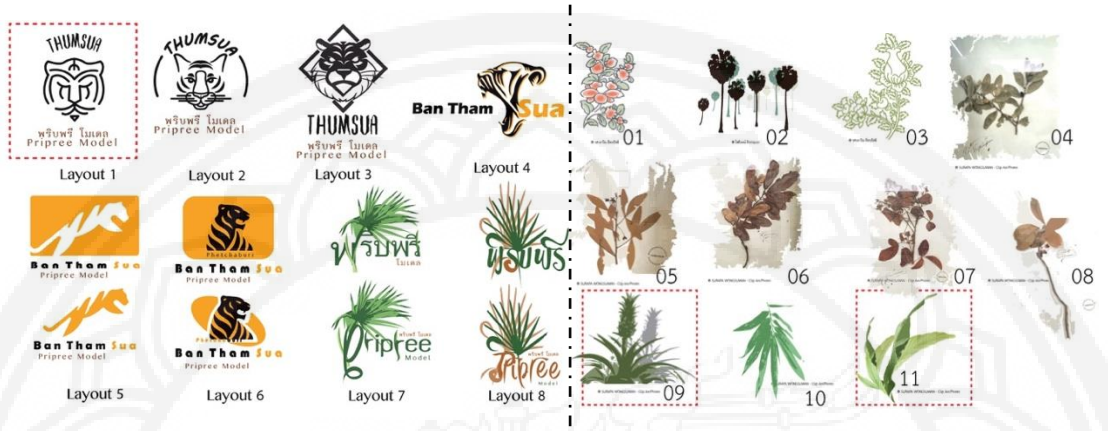

Figure 5 Graphic Design for Prototype of Industrial Handicraft.

The assessment of the industrial handicraft's graphic design revealed that the prototype of industrial handicraft no. 11 and 09 was the most satisfaction rate by the mean of 4.31, the prototype of industrial handicraft no. 01, 02 and 06 was at the significant level of 4.31 and the prototype of industrial handicraft no. 03 was at moderate level by the mean of 4.33 respectively. The assessment of the graphic design for logo product showed that the Lay out no. 6 was the most satisfied with the mean of 4.20, followed by Lay out no. 3 with the mean of 4.00 and the Lay Out no.7 with the mean of 3.96, respectively.

Conclusion and Discussion

Industrial handicrafts of Bantumsue community, Phetchaburi province is a new knowledge base derived from studying the available resources in the community for the greater utilities. The agricultural leftovers in the area are used as an experiment material to find physical properties, and bring them to the process of industrial handicrafts under the local culture, agricultural wisdom and economic crops' concept.

Sukontachart, Pinthapataya, & Simachokedee (2021) summarized the industrial wastes including hazardous and non-hazardous entirely affects the environment and ecology. The research has briefly defined the industrial wastes as non-hazardous waste produced from the manufacturing process, deteriorated raw materials, disqualified products, or expired products. Those could be reuse and added value to the new industrial handicrafts without endanger the environment under the 3R concept. Moreover, the method of leather sewing by hand which is different from the sewing machine, was applied to create the contemporary industrial handicrafts from leftovers. The idea of choosing the best plant fiber paper from agricultural leftovers mixed with waste leathers to create the new products.

In addition, it maintained biodiversity, preserved cultures and communities, unharmful, sentimental value and the community's adaption for survival. The community natural resources were used to create the valued new

materials via a good design, creative technology, the hand-made method such as sewing. (sewing of leather goods), binding or tying (same as the fishery style in Phetchaburi community).

Figure 6 Integration of the Research into the Classroom.

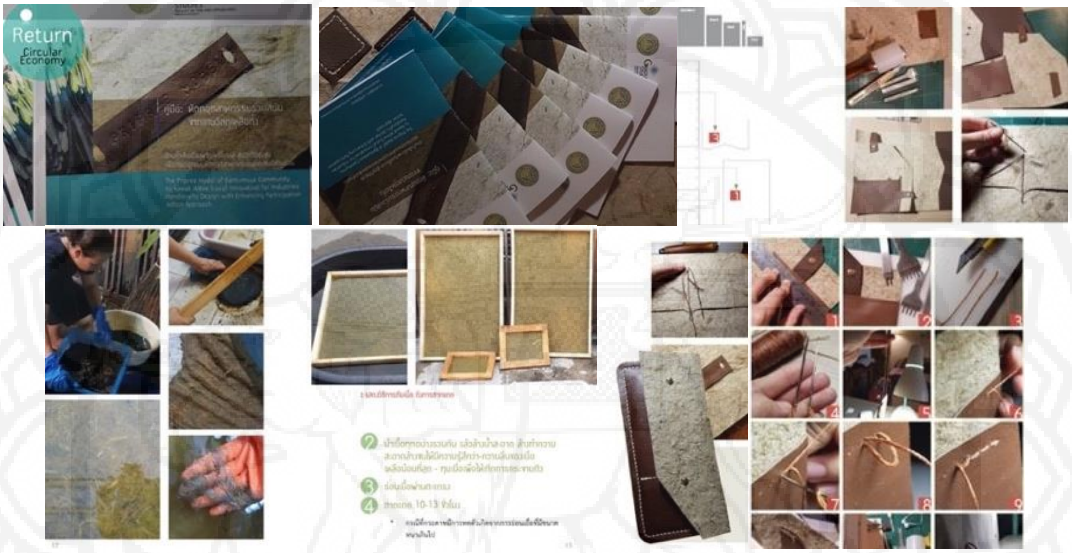

Figure 7 Summary of Contemporary Industrial Handicraft Handbook from Residues.

Figure 8 Integration of the Research and Knowledge Transferred to Bantumsue Community, Phetchaburi.

This research are learning development, creating knowledge base from the cooperation between educational institutions and communities. It aims to exchange knowledge, build a cooperation, use the available resources for greater benefit. The research's objective responds to the government policy and strengthens community's intelligence. In 2004, According to Chulalongkorn University & Rajamangala University of Technology Thanyaburi, "students have participated in the framework called "Conceive Design Implement Operate (CDIO) (2004)" and students gained experience from real world example case studies. They can analyze and criticize the scenario". Finally, the project allowed students to shape the skills and experience before graduation. They can apply the knowledge base to the actual work of art creation. The principle of art creation for eco-industrial handicrafts is the integration between theoretical and practical by applying the various sciences to create the

handicrafts. The result is an overview of a new creative knowledge base as the guideline for community development, generates career and income for the household. The principle of marketing and technology become a significant part to add value of the products for creative, culture and high value service. In conclusion, the creative industry will be the ultimate goal of industrial handicrafts, which is related to creativity, distribution and service as well as the intellectual capital become the crucial fundamental factor for sustainable development.

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