

**GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES**  
**THE INCREASING PRODUCTIVITY AND VALUE ADDED FOR CRAFTSMEN**  
**GEM STONE IN SANGIRAN SRAGEN THROUGH ACCESS TECHNOLOGY,**  
**MANAGEMENT, AND UTILIZATION OF RESOURCES POWER**  
**BASED LOCAL WISDOM**

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**ABSTRACT**

Small and Medium Enterprises (SMEs) could get great opportunities of ACFTA implementation. Formulation of the problem in this research are:

1. How to design the industrial models of gemstones and fossils souvenirs align with the market taste?
2. How to improve the utilization of the technology used in the low skills and business management of gemstones and fossils souvenirs industry?
3. How to optimize the role of support institutions which are research, education, and banking in the gemstones and fossils souvenirs industry?
4. How to enhance the social capital to achieve a good business climate in the gemstones and fossils souvenirs industry?

Type of this research was a research and development. Conducted by cross sectional study both the subject and object of the research within certain period of time.

The results obtained in the first year are the Training Need Analysis for gemstones and fossils Creative Industries in Sangiran; the establishment of a prototype model of an appropriate technology with the equipment application used to break and polish gemstones and fossils into value-added products; the development of souvenirs design from gemstones and fossils; the realization of a prototype implementation and evaluation of alternative testing.

**Keywords:-** *Productivity, Value-added, Gemstones Artisans, Sangiran, dan Local Wisdom*

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**I. INTRODUCTION**

Sangiran Museum has changed its location 3 times, firstly in Dayu Gondang Rejo Karanganyar, secondly moving to Krikilan (now used as Village Office [balai desa]). Because of inadequate location, it has been moving to the current location since 1986. At that time the sellers occupied the parking area. The sellers' initiative to apply for space was eventually approved by the Local Government in the form of land. The building was constructed on the sellers' mutual cooperation, but it was collapsed due to the labile land. A cooperative was established on September 29 1999, initiating to apply for the grant of construction material to the Local Government. This application was urged due to the structuring conducted by BPSMP (Balai Pelestarian Situs Manusia Purba = Prehistoric Man Site Preservation House) of Sangiran becoming the representative until today. The cooperative contained 35 sellers as its members since 1986 to now.

Precious stone is a mineral, the one created as a result of geological process, the element of which consists of one or more chemical components with high sale price and preferred by the collectors. Precious stone should be polished before made as jewelry. Not all areas contain precious stones throughout world. In Indonesia only some areas contain precious stones including Banten province with its Kalimaya, Lampung with its nice grape and champaca types, and Kalimantan island with its kecubung (amethyst) and diamond (polished diamond). Precious stone is named from a through z, classified by its hardness with Mohs scale from 1 to 10 points. The most preferred precious stone in the world is the crystallized one other than Diamond, Emerald, Ruby, and Sapphire. The grape type of agates like Biru Langit, bungur or kecubung originating from Tanjung Bintang, Lampung are currently hunted widely by the collectors because of its crystal quality. In Sangiran Village of Sragen, there are some precious stones as well, but the people have not been able to empower it based on local wisdom not harmful to the nature.

The research attempts taken by colleges in synergy with the related parties to support the improvement of productivity and product's ad value expand the marketing of Indonesian SMSE's products, not only in domestic but also in global markets. The research's findings and innovative applied technology resulting from research centers and colleges are applied to the production and marketing process for the SMSEs' products. Local and Central Governments are expected to implement an integrated policy, and to support the development of Indonesian SMSEs.

Traditional market structuring, business localization supported by adequate access and infrastructure availability partial to the SMSEs can provide add-value and improve the SMSEs' competitiveness in dealing with the incoming foreign products without removing the marketing vehicles of local products mostly originating from SMSEs.

#### **Problem statement**

1. Considering the background of problem above, the problems of research is stated as follows:
2. How is the design of precious stone and fossil souvenir industry corresponding to the market taste?
3. How to improve the technology, skill and business management used in precious stone and fossil souvenir industry?
4. How to optimize the role of supporting institutions such as research center, education and banking in precious stone and fossil souvenir industry?
5. How to increase the social capital in industry and good business climate in precious stone and fossil souvenir industry?

#### **The objectives in the first year are**

1. To hold Training Need Analysis for the creative industry of precious stone and fossil souvenirs in Sragen Regency.
2. To develop model and module of Creative Industry Entrepreneurship training for precious stone and fossil souvenirs in the attempt of improving the community economy and local wisdom.
3. To develop the expeditious technology prototype, souvenir reengineering and design.
4. To implement the alternative prototype and to evaluate the test
5. To deal with the administration process for Intellectual Property/Patent Right.

The urgency of research is to provide solution to the problems above aiming to improve the understanding of values of local wisdom-based creative industrial work, to model the behavior encouraging the establishment of creative industry and the contribution of entrepreneurship spirit to developing the creative industry. Research efforts have been taken by colleges and related parties in applying the innovative applied technology in production and marketing processes in SMSEs' products. The creative industry of precious stone and fossil souvenirs is selected because it is the superior sector in Sangiran area of Sragen Regency, the small-scale industry absorbing many local laborers.

#### **Benefit**

##### **1. Benefit to Science and Technology Development**

- a) Entrepreneurship Science Developing Entrepreneurship Science theory as a discipline studying an individual's ability of dealing with life challenge through applying creativity and innovation to meet the market need and demand.
- b) Development of precious stone and fossil souvenir design Improving technically the add-value for creative industry's products so that the precious stone and fossil souvenir's competitiveness improves in the market.

##### **2. Benefit to Development**

- a) Poverty Handling. Improving the business performance and social-economic life of craftsperson community through improving their potencies in long term will encourage the acceleration of Indonesian economic recovery.
- b) Job opportunity providing. Expanding the job opportunity to the wide society through growing the new entrepreneurs in precious stone and fossil souvenirs.

3. **Benefit to Institution**

- a) Encouraging the existence of Sebelas Maret University of Surakarta in predicting and helping give an alternative solution to the local and global problems in order to support the community's high competitiveness and science and technology-based social economic activity.
- b) Creating the sustainable synergy of potency empowerment between community, government and Surakarta Sebelas Maret University based on link and math and giving input to the adjustment of education curriculum material.
- c) Research attempts taken by colleges and the related parties support the improvement of export and expand the marketing of Indonesian SMSEs' products, either in domestic or in global market.
- d) In addition, this study identifies the strength, weakness, opportunity and threat occurring in each industry as the foundation on which the development of policy, strategy, and action plan is based on for the development of precious stone and fossil souvenir industry in the attempt of improving the competitiveness.
- e) The goal of research is the widespread policy and strategy of developing industrial area for precious stone and fossil souvenir in the attempt of supporting the acceleration of improvement of local competitiveness over the related parties.
- f) Central and Local Government are expected to implement an integrated policy supporting the development of Indonesian SMSEs.
- g) Traditional market structuring, business localization supported by adequate access and infrastructure availability partial to the SMSEs can provide add-value and improve the SMSEs' competitiveness in dealing with the incoming foreign products
- h) The attempt of not removing the marketing vehicles of local products mostly originating from SMSEs.

**II. LITREATURE REVIEW & CONCEPTUAL FRAMEWORK**

**Entrepreneurship education and creative industry**

Entrepreneurship education has been taught as a distinctive independent discipline with theory, concept, and scientific method complete with learning media in the form of training given by both external parties and experience, according to Yohanes (in Trimurti and Nurlaela, 2009). Entrepreneurship education aims to create an entrepreneur with entrepreneurship competency, namely, having knowledge, skill, and entrepreneur mental attitude.

Entrepreneurship, according to Meng and Liang (in Rahmawati and Nurlaela, 2009), is one of keys to economic growth and is development engine. The corporate life sustainability is highly dependent on the entrepreneurs' tenacity in attaining superiority through their creatively thinking and innovatively behaving abilities (Zimmerer and Scarborough 1996).

Entrepreneurship spirit, according to Pinillos and Reyes (2011), can be said as related to someone's individualism by achieving his/her personal objective. Innovation in entrepreneurship process, according to Lyer (2004) in Kaur (2014), is as follows:

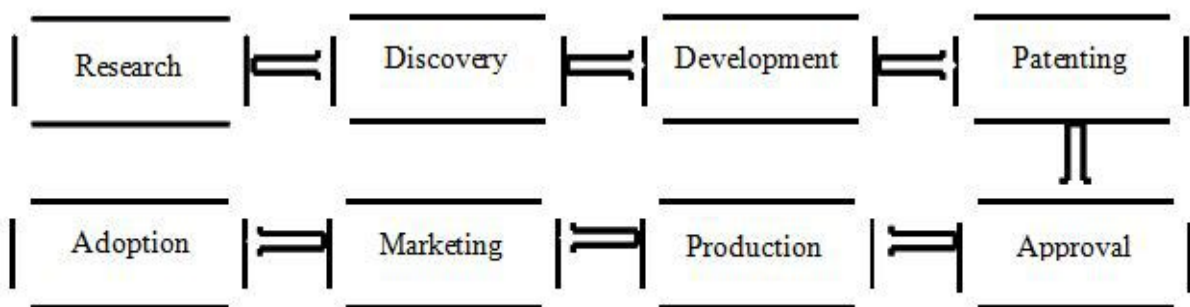


Figure 1 Entrepreneurship Process (Lyer, 2004 in Kaur, 2014)

Kaur (2014) also said that in making innovation in business, the main activities to be conducted are as follows:

- a) Improving the existing product design
- b) Inventing new product
- c) Outsourcing R & D and innovating
- d) Innovating based on the process need
- e) Changing industrial and market structure.

The conceptual framework of research can be illustrated as follows.

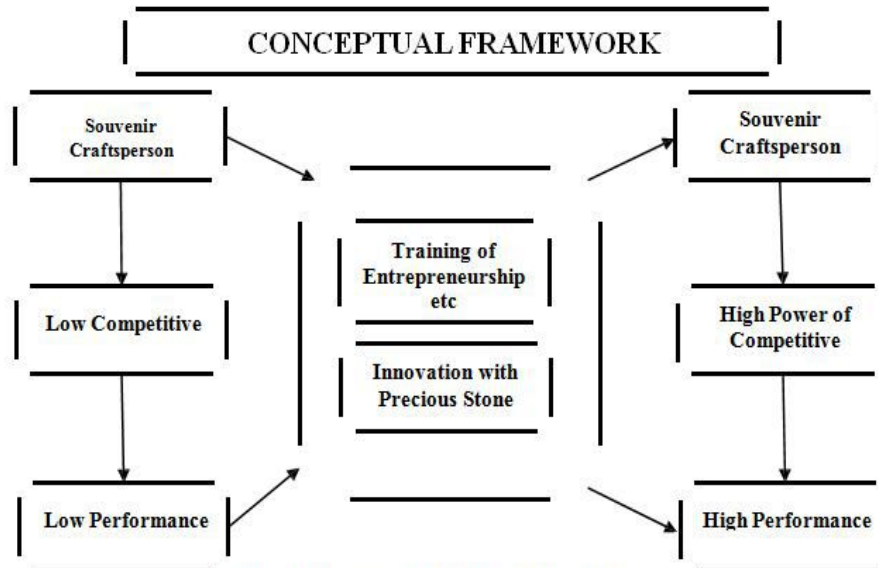


Figure II.2: conceptual framework of research

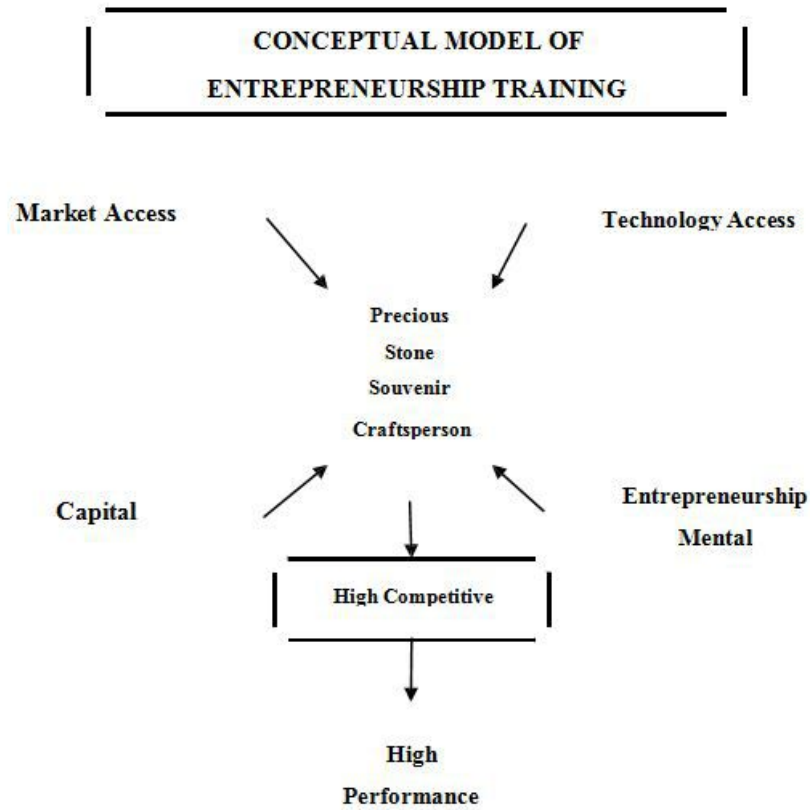


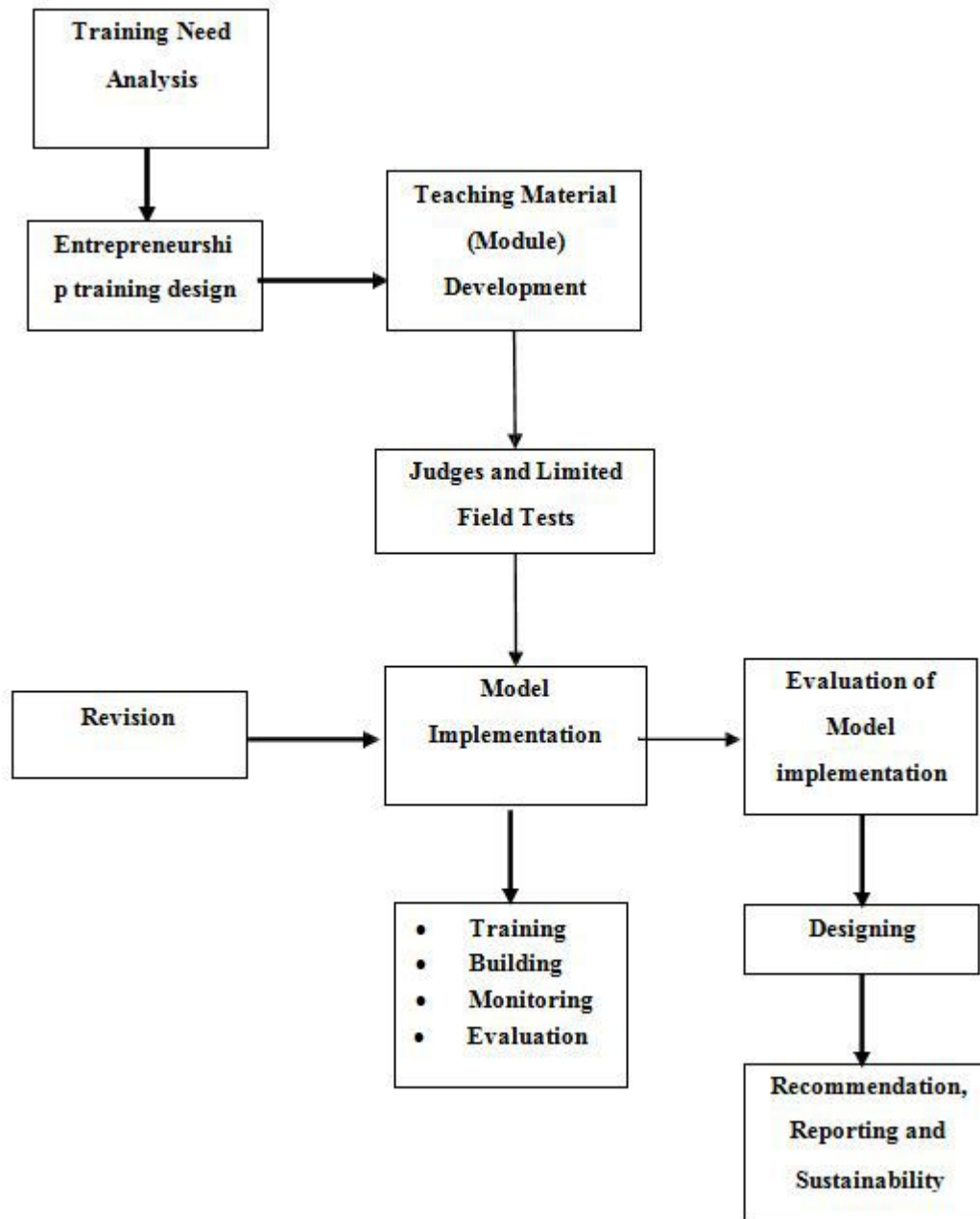
Figure 3: conceptual framework of Entrepreneurship Training

### III. METHOD RESEARCH

This research was conducted using cross-sectional method by studying the subject and object of research in certain period of time. This study was taken place in Sragen Regency of Central Java Province.

#### Research Diagram

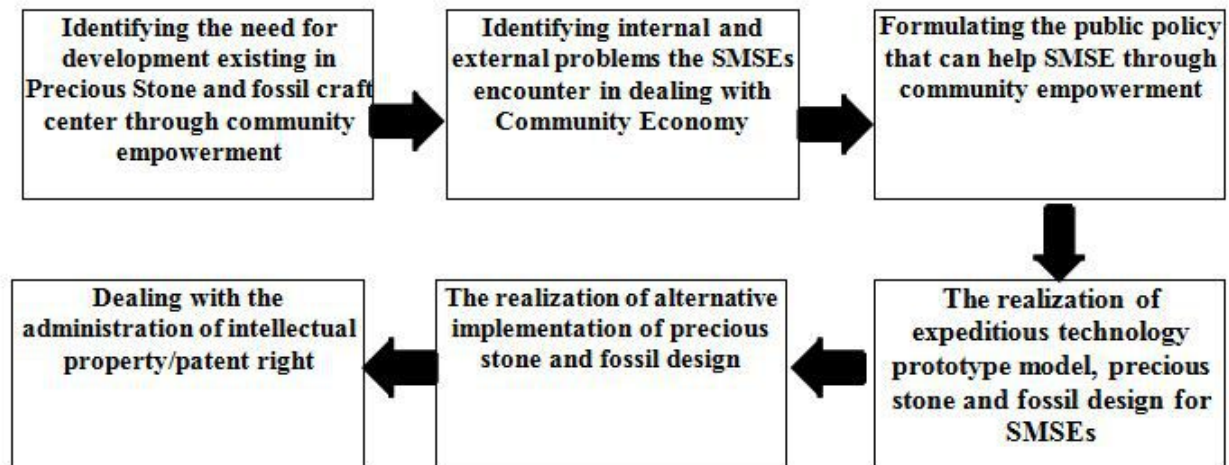
The diagram of research and research procedure is as follow:



*Figure 4 Research Procedure*

How far the change occurs is illustrated as follows: First Year





#### IV. RESULT & DISCUSSION

This research and development ran smoothly and institutionally (with independent and sustainable prospect) through creating Business Learning Group (Kelompok Belajar Usaha = KBU) and continuously facilitated by Mekar Niaga BDS (Business Development Service). About 30 crafts-persons would have four types of life competency: 1) Personal competency, the ability of self-identification, thinking rationally and of appearing with well-established self-confidence. 2) Social competency is the ability of communicating, cooperating, tolerating, and having social care and responsibility in living within the society. 3) Academic competency is the ability of formulating and solving problems encountered by means of critically, analytically and systematically thinking process, and of conducting research, exploring, innovating, and creating through scientific approach. 4) Vocation competency is the one related to weaving craft skill that can be used to work as laborer or in independent business. The craftsperson would have entrepreneurship ability including: the one of managing and organizing business plan, of developing business through creatively and innovatively thinking ability, and of developing business professionally and independently.

Some partners involved intensively in planning, implementing, and supervising this research and development include: a) Village Government Institution/Sub District Head for recruiting the craftsperson, b) Cooperatives and SMSE industrial Service for capitalization, c) Sragen Regency's Tourism Service, d) Surakarta Sebelas Maret University and Yogyakarta State University as research team, and e) Precious Stone SMSE Cooperative in Sangiran Sragen.

The improvement of industrial partnership performance after the application of technology is intended: to improve profit volume, employee number and investment, and expanded marketing area, to improve the skills of craftsperson in planning and managing weaving craft business so that the feasible income is obtained to meet their life need, to grow entrepreneurship insight among the crafts-persons in order to have high working ethos and to produce superior works to be competitive in global market, to improve the craftsperson's ability in managing natural, social, cultural, and environmental resources and to utilize a variety of technologies in craft business area, to have ability of self-conceptualization, understanding others and environment and working in team either formally or informally.

This study was intended to accomplish the applied technology. The method of selecting the science and technology used in the implementation of activity was observation intended to observe the precious stone product and its production process and stone polishing engine in Sangiran Sub District. The research team along with the crafts-persons determined the appropriate concept in designing in order to find out the most preferred design to the consumer, to determine the diversification of new product to be produced. The research team also conducted an observation to find weakness and strength in the application of stone

splitting engine and sitting drill, to see the strength and weakness and to reform the financial management, workshop and business operation. Individual facilitation was intended to find out each individual craftsperson's potency to be developed optimally.

From the problems state above, the alternative solution offered to the precious stone craftsperson in Sangiran village was to make them have independent attitude and capable of initiating their own business by having adequate skill. The trainings needed included:

1. Training of export-import, accounting, taxing, cooperative, and marketing management.
2. Training of entrepreneurship mental attitude development,
3. Training of financial management for the participants
4. Training of business management
5. Success Story by presenting the related business practitioners and conducting comparative study in Wonogiri.

### **Setting**

The settings of Service to Society activity were Sangiran Village and Faculty of Economy of UNS (Export-Import laboratory)

Technique of collecting data used for finding out the analysis on the craftsperson's need was to use questionnaire. The instrument used was questionnaire sheet containing a number of written questions the respondents should respond to.

Training Need Analysis was conducted to adjust the content of training and the need of training participants (small employer of precious stone craftsperson). The organization of training need analysis was conducted with small business enterprising concept approach. Small enterprising is the small business managed with small scale enterprise business by applying the functions of management in its business management. The functions of management included planning, organizing, implementation, and control.

The activities of small enterprise basically involve the ones pertaining to production/technology, marketing, financial/capitalization management and business management. From the description of craftsperson's business in the research site, it can be concluded that the constraints inherent to the craftsperson's business were poor access to technology, limited access to marketing, and limited capitalization/finance, and inadequate managerial skill.

In the presence of several weaknesses inherent, the aspect of training need analysis would be related to production, marketing, financial, and business management aspects of craftsperson. The research on Harvard University showed that the key to entrepreneurship success is mostly (85%) affected by entrepreneurship mental and only 15% is affected by technical skill. Referring to the result of study, entrepreneurship mental aspect is the one taken into account in conducting training need analysis.

## **V. CONCLUSION & RECOMMENDATION**

### **Conclusion**

The result of the first year (2015) includes: a) Conducting Training Need Analysis for the precious stone crafts-persons, b) developing model and module of precious stone design innovation and product diversification training, c) applying the stone splitting instrument and sitting drill, d) training of export-import, accounting, taxing, cooperative, online marketing management, and entrepreneurship.

The qualitative indicators achieved in the first year (2015) are: a) developing local potency and building the area through a productive people economic sector, b) transforming the people economic sector building professionally, improving the quality of human resource and its critical, dynamic, and constructive humanity, c) developing learning, working, and endeavoring culture with entrepreneurship insight for the members of society, d) developing education program and life competency in the attempt of developing small-scale, micro-scale enterprises, and informal sector, and e) holding training of production, entrepreneurship, marketing management, accounting, export-import procedure, tax, cooperative for weaving crafts-persons.

The result of study on training need analysis to identify the appropriate training model in order to improve the business performance through small-scale enterprising concept found the following:



1. There is a need among the precious stone crafts-person for getting training of entrepreneurship with potential need due to 80% standard enterprising not achieved meaning that  $\pm$  80% small-scale employers have not had entrepreneurship spirit and have not applied yet the right and good business management principles.
2. The specification of need can be seen from each aspect and order of problems:
  - a) 100% small enterprises need training to develop entrepreneurship attitude and personality including the ability of leading, self-motivating to be a learner human oriented to the achievement of performance.
  - b) 100% small enterprises need training of marketing management giving knowledge to organize the marketing plan and selling skill.
  - c) 100% small enterprises need training of business financial management particularly related to profit planning and control, healthy practice to separate the personal from business wealth and practical bookkeeping for the small enterprise.
  - d) 100% small enterprises need training of precious stone production management
  - e) particularly in holding production administration, controlling the quality of production, and understanding the occupational safety and health.
  - f) 100% small enterprises need training of management to improve organizational skill, knowledge on business licensing and business plan organizing skill.
3. From the data of observation conducted on the respondents regarding cultural aspect and social condition of community, it can be identified that an appropriate training model is the one consistent with the participants' requirement that is prescriptive and participative in nature, using facilitator approach.
4. Considering the background of participants' education level in addition to teaching material adjusted with the participants' requirement as suggested in the need analysis study, the participants' intellectuality should be adjusted as well. There are six models developed in this study:
  - a) Module of precious stone production
  - b) Accounting module
  - c) Entrepreneurship module
  - d) Online marketing management module
  - e) Module of export-import procedure and document
  - f. Cooperative taxing module.

### Limitations

1. Validating the training model and module does not through judge test (related expert) and restricted test (several potential users).
2. This study do not evaluating and revising the training model and module that has undertaken feasibility test by the relevant judge and potential user.
3. This research do not evaluative on the extent to which the precious stone-based entrepreneurship training will provide highly economic product and improved performance of crafts-person business.
4. This study do not Give feedback and outcome of training to the stakeholders as the initial measure in disseminating the training model into a broader scope.

### Recommendation

As the follow up of product produced in this study, training module and model, in the future, the following measures should be taken

1. Validating the training model and module through judge test (related expert) and restricted test (several potential users). The training model test will examine whether or not the training format design enables the learning process and transfer of knowledge and skill to crafts-person working realm. The feasibility test on training model will examine whether or not the training module is consistent with the training participants' need and intellectuality, and enables the participants to participate actively.
2. Evaluating and revising the training model and module that has undertaken feasibility test by the relevant judge and potential user.

3. Applying training model and module that has been evaluated and revised to the entrepreneurship training with the expectation that the affective domain will improve, the entrepreneurship spirit starts to develop, psychomotor domain will improve in the form of precious stone skill and cognitive domain will also improve in the form of improved knowledge on business management.
4. Conducting evaluative research on the extent to which the precious stone-based entrepreneurship training will provide highly economic product and improved performance of craftsperson business.
5. Giving feedback and outcome of training to the stakeholders as the initial measure in disseminating the training model into a broader scope.

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### Documentation

