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Pencipta		
Nama	:	**Dr. Susminingsih, M.Ag.**
Alamat	:	Griya Tirto Indah Gg II No.62 RT 01/RW VI Kel.Tirto Kec. Pekalongan Barat , Pekalongan, JAWA TENGAH, 51119
Kewarganegaraan	:	Indonesia
Pemegang Hak Cipta		
Nama	:	**Dr. Susminingsih, M.Ag.**
Alamat	:	Griya Tirto Indah Gg II No.62 RT 01/RW VI Kel.Tirto Kec. Pekalongan Barat , Pekalongan , JAWA TENGAH, 51119
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Dr. Freddy Harris, S.H., LL.M., ACCS.
NIP. 196611181994031001

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Eco-friendly Innovation for Sustainability of Batik Industry

Susminingsih
susminingsih62@gmail.com

Abstract

This article aims to explore a product innovation for industrial sustainability in an environmentally friendly framework. Entrepreneurs should take the competitiveness with the best management through innovations. Meanwhile, the interdependence of both industry and the environment elaborates human resources, natural safety, and consumer attention to be greatly regarded in the sustainability industry. Awareness and concern about products often conflict with environmental quality. This study was conducted by employing a qualitative method in 2017. Interviews, observation, and documentation were carried out to small and medium-sized enterprises of the Batik industry in Pekalongan City, Central Java, Indonesia.

The findings reveal that first, the Batik industry run by the entrepreneurs and home workers closely harmed the environment. Second, the wastewater treatment was managed bythe local government to minimize the environmental damage through either individual or collective treatment. Third, an innovation of the eco-friendly product was promoted by the Batik entrepreneurs. This innovation was made by replacing chemical dyes with natural ones. Likewise, the consumer trend demanding for products with softer natural colors also contribute to the development of innovations. Fourth, the environmental management established by the Batik entrepreneurs faced several challenges, namely: 1) a limited entrepreneurship knowledge of waste management, 2) environmental awareness, particularly for waste waterdisposal, (c) high cost of a home-scale wastewater treatment plant, and 4) complicated processes of Batik production with natural dyes. Finally, the innovation was promoted by the entrepreneurs' learning processes in terms of organizational learning and inter-organizational processes.

Keywords: eco-friendly innovation, entrepreneurs, sustainability, Batik, industry.

1. Introduction

Global climate changes happening in many countries have seized great attention from the government, academicians, researchers, and entrepreneurs (Kuo, 2016). Conserving the environment or saving the earth through reusing, recycling, reducing,

planting, and analyzing environmental damage is fully attempted in many countries. Government regulations are established to take control of companies, civil societies, illegal logging, office waste such as paper, water, waste of electricity, air pollution, ozone depletion, and so on. Therefore, to deal with this issue, eco-friendly innovations go viral in many ways.

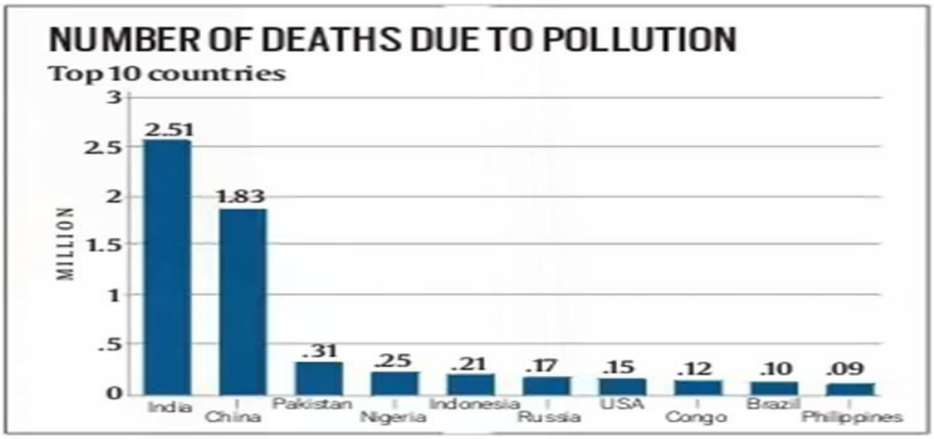
It is very necessary for the companies to apply well-established environmental management so as to change their business mindset. The companies' tendency to stimulate to take advantage of the eco-friendly or green environmental innovations should be implemented within the corporate management (Chang &Chen, 2013). Additionally, the company sustainability forces the entrepreneurs to make a good decision as their responsibilities in order to encounter the turbulence of environmental changes (Simpson, Taylor, & Barker, 2004; Friedman& Miles, 2001). In many cases, the victims of the environmental damage, consumer demand, disease on children, and social safety need a serious attention from the entrepreneurs and government because they have perceived the importance of environmental issues (Chang &Chen, 2013).

Meanwhile, the boycott to environmentally unfriendly products disrupts the business continuity. An eco-friendly innovation is the best alternative and the appropriate strategy for the company that becomes a new market approach (Robertson& Yu., 2001). Brand image, furthermore, needs a distinctive orientation, and consumer demand declines when environmental rescue propaganda is demonstrated at many places. For this reason, good innovations serve to help entrepreneurs solve their business problems.

Innovations, nonetheless, are not a reliant and homogeneous process. It indicates that entrepreneurs should make an essential attribute to identify their business and put added value for the consumer satisfaction. Organizationally, the corporate environmental management would affect their strategies and managerial interpretation while making a new product and process protection through innovations (Chang &Chen, 2013; Green, Morton, & New, 2000). That is the reason why the identification of corporate management from environmental damage attracts a wide array of research to explore the impact for corporate performance, including inhibiting and supporting factors (Chang & Chen, 2013; Rani, Chelliah, & Halim, 2014; Perez-Sanchez, Barton, & Bower, 2000). It implies that innovation processes happen at all levels of business. In other words, the environmental damage caused by offensive behavior such as indiscriminate waste disposal may contribute

to water pollution, land contamination, and low air quality, and industry is one of actors performing this kind of behavior. The evidence of the entrepreneur behavior is discussed in the light of theoretical issues in the development of research analysis. The fact that an unhealthy environment influencing the mortality rank in some countries is presented as follows.

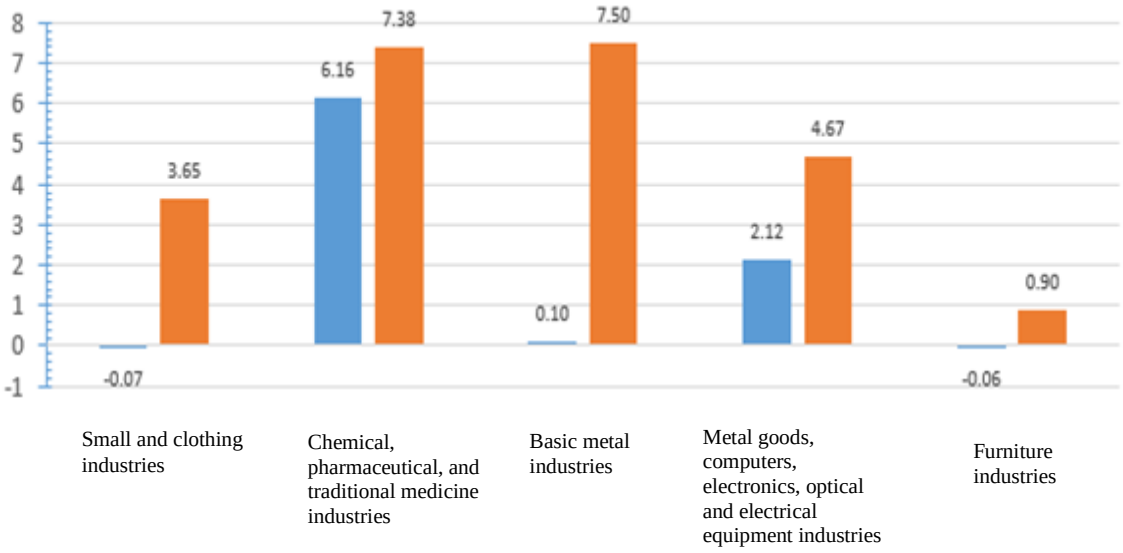
Figure 1.
Number of Deaths Due to Pollution



Source: WahanaLingkunganHidupIndonesia, 2012

Figure 1 shows us that pollution becomes one of the causes of the high mortality rates in those countries. The highest level is India, whereas the lowest is the Philippines. Meanwhile, Indonesia's number of death due to pollution stayed at the fifth level in 2012. Further, high income is inversely proportional to the low life expectancy because of the pollution contributed by industry. This paper highlights the relationship between industry and the environment. It illustrates that industry and the environment complement each other in order to ensure their sustainability since industry is built for long-term goals. Industry, likewise, gives the contribution to nation development through innovations. Not to mention, market trend, consumer purchase, and the environment make the entrepreneurs adapt to rapidly changing business. Country development processes possess both good and bad effects for human life, including the improvement of absorption of labor growth and the level of per capita income exposed in the following figure.

Figure 2.
Growth of Industrial Cluster in the 2nd Quarter of 2017



Source: Central Bureau of Statistics, 2017

Figure 2 depicts that the Indonesia's economy development in 2017 increased significantly in many sectors. Small industries, including Batik cloth, developed from -0.07 to 3.65. This fact illustrates a good condition to attract investors and generate people's income. It can be pointed out that small and clothing industries also contribute the positive value. In Indonesia, small and medium-sized enterprises (SMEs) passed down from generation to generation. They have an essential role to enhance social welfare, company's revenue, worker's income, consumer purchase, consumer needs, and labor absorption noticeably. It is apparent to deem that the sustainability of industry takes priority over entrepreneurs. Unfortunately, the abundant production of encouragement frequently sacrifices the environment as the pollution becomes uncontrollable. In short, the negative environmental impact from industry is higher than household, hospital, transportation, or office. Table 1 below draws this condition.

Table 1.
Environmental Polluters in Indonesia, 2012

	Polluter	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Company	91	31.4	39.4	39.4
	Government	26	9.0	11.3	50.6
	Society	6	2.1	2.6	53.2

Company and Government Combination	66	22.8	28.6	81.8
	42	14.5	18.2	100.0
Total				
Missing System	231	79.7	100.0	
Total	59	20.3		
	290	100.0		

Source: Wahana Lingkungan Hidup Indonesia, 2012

2. Literature Review

This paper shed the light to the literature on the importance of sustainability of SMEs in the nation's growth and its mutual dependence with the environment. The literature acknowledges various advantages to the adoption of an eco-friendly concept and practices. Meanwhile, the entrepreneur traits are creativity and innovation. In addition, entrepreneurship is best studied through the understanding of its key elements such as innovation and sustainability.

2.1 Eco-friendly Concept

An eco-friendly or green concept as a new innovation framework encourages special productivity of industrial goods and services (Lee, Wahid, & Goh, 2013). Similarly, eco-friendly entrepreneurship orientation occurs in all parts of the world (Wang, Hermens, Huang, & Chelliah, 2015) as well as SMEs can gain competitive benefits and build sustainable business by adopting good environmental practices (Simpson, Taylor, & Barker, 2004). Wong (2012) claims that green product and process innovations are positively associated with green product competitive advantages.

The eco-friendly drive has close relation to innovation. On the one hand, the entrepreneurs set the value of ecology or environment on their products, and on the other hand, they put the new idea into practice. Eco-friendly innovation is distinguished from a conventional one since the entrepreneurs initiate to put the eco-friendly identity which results from the entrepreneurs' learning on the climate or environmental change as a business challenge (Renning, 2000).

The entrepreneurs promote eco-friendly products as well as their strategies to increase or expand by introducing the new products tremendously. This eco-friendly or green innovation represents a new identity for business (Chen, 2011). They make this innovation to break the market behavior as a response to the business challenge. The other

objective is to enforce the local government regulations in relation to the environment in three steps, namely: designing, fabricating, and packaging (Unruh and Ettenson, 2010). Previous research exposed that innovations on products contribute to company's competitive profit (Chiou, Chan, Lettice, & Chung, 2011; Porter & van der Linde, 1995).

2.2 Innovation Concept

The value of innovation is promoted to develop and create a new specification or qualification for entrepreneurs' products (Fernandes, 2012). Knowledge and experience-based innovation is a good way for entrepreneurs to push the productivity and reach success (Chen, Lai, & Wen, 2006). It is interesting to note that interaction between industry and the environment drives the entrepreneurs to make a lot of changes. Industrial dynamic strategies forced by motivation aimto make business more sustainable so as to win a competition or business advantage (Maheshwari, 2012; Kuo, 2016; Chen, Lai, & Wen, 2006).

Apparently, innovations of family firms constitute absolute necessities. Bocken, Farracho, Bosworth, & Kemp (2014) claim that innovation relates the development of value, culture, politics and technology. Value-based business innovations are yielded by knowledge and entrepreneur experience while product, design, function are important to reach the business sustainability. The competency of entrepreneurs tend to be well-built when they successfully adapt to environmental changes. These processes involve the learning process, starting from individual learning, organizational, and inter-organizational levels (Sanz-Valle, Naranjo-Valencia, Jime'nez-Jime'nez, &Perez-Caballero, 2011). Technology and creativity have a strong role in enhancing new innovations and the industry sustainability (Sanz-Valle, Naranjo-Valencia, Jime'nez-Jime'nez, & Perez-Caballero, 2011). Accordingly, de Sousa, Pellissier, & Monteiro (2012) assert that collaboration may increase due to the company's creativity and innovation. It denotes that innovation becomes a business identity to create a distinction from other companies.

2.3 Sustainability Concept

The notions of sustainability have been proposed by some studies. Shaharir (2012) defines that knowledge sustainability is one of important components in any sustainability issue. Further, Klemes, Friedler, Bulatov, &Varbanov (2010) highlight that sustainability

desire encourages the industry to emphasize integration and optimization. Moreover, sustainability deals with ecological issues (pollution, eco-friendly production, climate change, low quality of water, and wastewater treatment). It reveals that learning an issue of sustainability is a relatively strategic key to understand the change of entrepreneur orientation in relation to business.

Likewise, Maritz & Donovan (2013) point out that sustainability relies on a new discovery, improvement, reimbursement, and combination of them, whereas the commercialization of idea into a new design of commodity is considered an added value for the business sustainability. This situation stimulates companies to conduct a market survey, explore a new consumer trend, develop production technology, and organize marketing evaluation. The sustainability heavily depends on the capability of the enterprise's manager in adapting to the changing environment that tends to be uncertain (Lee, 2009).

2.4 Organizational Learning on Small and Medium-Sized Enterprises

The discussion of organizational learning has increased for few recent years, especially in dealing with business challenges (Hooper, Jukes, & Stubbs, 2000; Hansen, Sondergard, Holm, &Kerndrup, 2005; Roome&Wijen, 2005). Besides, organizations would be more effective if they constitute learning organizations (LO) (Senge, 1990). Atkinson, Smith, &Hilgards (1987) note that learning can be defined as a relatively permanent change in behavior as a result of experience. According to Senge, Kleiner, Roberts, Ross, & Smith (1994), the LO should also learn and change as a result of adaptation to the environment and apply five rules/disciplines. The first is to build a shared vision through empowering individuals to draw a single image of the future. The second is to engage in a whole learning team and the dissemination of new knowledge. Third, the mental model of how the world needs to change to allow the growth of a new common view on what is allowed and what can be done. Fourth, individuals require to be continuously assessing the gaps in their knowledge and learning. The fifth is to manage a thinking system. It means viewing the whole context of the organization; how pieces interact well with each other and the environment.

Principally, cognition or an understanding aspect indicates a contact of a businessman with a faced challenge. This makes the behavior aspect to be a response form

toward business issues. Sometimes, both of them do not happen sequentially, and even on the contrary. There is the time when business responses occur reflexively and when it becomes the continuation of learning outcomes (Fiol& Lyles, 1985). Huber (1991) suggests that there are four constructs linked to organizational learning, namely: knowledge acquisition, information distribution, information interpretation, and organizational memory.

SMEs, additionally, are managed by a small team, and sometimes the owner also serves as a manager. Consequently, he/she takes responsibilities for materials, finance, marketing, employees, and business challenges. The owner/manager leadership plays a pivotal role in developing his/her business. As a founder, he/she may present an eco-friendly innovation as a new idea as well as their product identity.

3. Research Methodology

This present study aims to explore the entrepreneurs' mindset in terms of an eco-friendly innovation for the sake of conserving the environment while producing Batik in Pekalongan City, Indonesia. The research conducted at SMEs would contribute to determine the value of entrepreneurship based on family, knowledge, and spiritual contexts regarding the innovation so as to encounter the environmental change. The organizational learning processes in this study were employed to discuss the innovation and sustainability of Batik industry more comprehensively.

Organizational learning and inter-organizational processes successfully emphasize the innovation created. It strengthens the role of the entrepreneurs in moving on the environmental change, consumer behavior, and productivity. Further, innovation can be seen as the result of the entrepreneurs' learning processes from the inefficiency and ineffectiveness of products. Meanwhile, organizational learning is a dynamic process which enables the Batik entrepreneurs to adopt and adapt the business challenges. Based on several studies concerning eco-friendly innovations and the business sustainability, it is suggested that qualitative methods are more reliable (i.e. Shams and Bjornberg, 2006). For this reason, this research carried out observation to several entrepreneurs who promoted to save the environment in their Batik production.

During this study, the Batik entrepreneurs were well-participated to share their determined behavior in terms of innovation-making. The researchers needed longer time to

collect the data through observation comprehensively in investigating the phenomena occurred in the Batik industry and exploring the sociological process in relation to the context of values, family, culture, and spirituality. The interview conducted in this study covered these two research questions (RQs).

RQ 1. How do the Batik entrepreneurs react to the environment condition that may affect the sustainability of their industries?

RQ 2. How do the Batik entrepreneurs learn about business changes and eco-friendly innovations?

There were five Batik entrepreneurs who became the research participants.Each of them spent2 to 2.5 hours for the interview. The main idea to innovate their products was relevant to the concepts presented in the previous section. It was demonstrated by the owners who made the eco-friendly innovation for their products. During the interview, the environmental damage was regarded by the entrepreneurs while taking their decision to change their business identity so as to create the sustainability of their Batik industry. This information contributed the researchers to analyze the Batik entrepreneurs' mindset resulting from their organizational learning. Once the interview was done, the result was transcribed and coded, tabulated, and analyzed to present comprehensive elaboration.

4. Results and Discussion

In Pekalongan City, Batik industry is often managed by family, and most of them are Muslims. Erdem & Baser (2010) suggest that values, family, and religiosity of entrepreneurs become a special position in small business. Batik, additionally, has grownas humans' culture since hundreds of years ago. Batik never cracks time by time, and is always dynamic (Astuty, 2014). The cultural and spirituality values are important elements underlying that Batik industry in Pekalongan City shapes a unique typology as long as Islamic values are powerful drivers of the Batik entrepreneurs' calling. Optimism, mutual responsibility, justice, and balance tend to enhance the entrepreneurs' eco-friendly innovation in decision-making. As Muslims, it is highly adhered that working is equal to worship. They spend their time to implement their spirituality into goodness, even in industrial matters. In the Shaharir's (2012) viewpoint, for Muslims, sustainability is a state of achieving a balanced condition, without exploitation of natural and human resources. Both consumers and entrepreneurs clearly assert that innovations are very necessary to make. It means that Batik industry as an existing business entity and the environment

influence each other. The availability of raw materials, finance, technology, and consumer is included into all components of the environment that is very pivotal for the sustainability of this industry. It is supported by several studies exposing that eco-friendly innovations contribute to a business competitive benefits (Simpson, Taylor, & Barker, 2004; Chen, Lai, and Wen, 2006; Kuo, Y., Chen, M., 2016).

Batik industry has a multidimensional view of family influence. De Massis, Frattini, & Lichtenthaler (2013) declare that innovations in family business are different from non-family one. The experience from older and future generations should be important consideration when they face business dilemmas over family management involvement, generation-ownership dispersion, and family member reciprocity (Kellermanns, Eddleston, Sarathy, & Murphy, 2010). There are several factors affecting the Batik industry condition, namely: human resource, material, consumer purchase, marketing, government regulation, and promotion through exhibitions on national and international scales. At the same time, religious values take part in the sustainability development of the Batik industry as well. Not to mention, ethics and morality in religion may affect sustainability.

Table 2.
Number of Business Units and Workers of Batik
in Pekalongan City from 2011 to 2013

No.	Sub-district	2011		2012		2013	
		Business Units	**Workers**	**Business Units**	**Workers**	**Business Units**	**Workers**
1.	West Pekalongan	262	4.261	264	4.335	346	5033
2.	South Pekalongan	188	2.074	188	2.074	263	2575
3.	East Pekalongan	110	2.536	111	2.510	114	2483
4.	North Pekalongan	71	1.073	71	1.073	80	1030
Total		**632**	**9.944**	**634**	**9.992**	**803**	**11.121**

Source**:** Industrial Offices, Cooperatives,and SMEs of Pekalongan City.

Table 2 reveals that Pekalongan City becomes a tremendous potential over the result of Batik cloth. Many workersearn a living in this creativecity. It is indicated by the spread of Batik industry, and the majority of Pekalongan people have their incomes from this business. Producing and selling the Batik cloth have become the people's livelihoods since they were children. This condition proposes that human resources are the main element in every single activity (Astuty, 2014).

Most entrepreneurs in Indonesia are on the small-medium scale so it is important to conduct an explanatory study in order to uncover the situation and innovation that impact on the sustainability of their business. Fernandes (2012) clarifies that design, utility, and process are made of the creativity of learning. Likewise, the collaboration among entrepreneurs, consumers, raw material suppliers, workers, and the government shows productive and integrative relations. Therefore, the Indonesian government encourages innovations in Batik industry. This research was conducted on products, natural dyes, and alternative media of Batik innovated by the entrepreneurs. Since 2014, Pekalongan City has been officially declared as a part of Creative Cities Network by UNESCO, in which crafts and folk art are an essential element of Pekalongan City's identity. It indicates that this city has identified creativity as a strategic pillar for the sustainable urban development that suits eco-friendly innovations promoted by the Batik entrepreneurs.

The imbalance between industry and the environment becomes a priority for both big companies and SMEs. The unhealthy environment due to water contamination on both color and odor stimulates the society, government, and businessmen to conduct experiments to switch to natural dyes. The environment pollution level caused by Batik waste is quite unsettling because of the used chemical dyes. The lack of a reliance on rules, standards, or regulations may affect the treatment of the environment. Safeguarding the environment needs to be carried out massively in various countries by considering the government regulation, research, and enhancement of SMEs innovation. Table 3 presents that the Indonesian government pay serious attention concerning this issue.

Table 3.
Indonesian Government Regulations of the Environment

No.	Law/Regulation	Issue
1.	Law No. 32/2009	Environmental Protection and Management
2.	Minister of Environment Regulation No. 14/2010	Environmental Documents for Industry and/or Activities Having Permit and/or Activities Having No Environmental Documents
3.	Minister of Environment Regulation No. 05/2012	Type of Activities Requiring Environmental Impact Assessment (Amdal)
4.	Minister of Environment Regulation No. 16/2012	Guidelines for Preparation of Environmental Documents
5.	Minister of Environment Regulation No. 17/2012	Guidelines for Public Participation in Environmental Impact Assessment and Environmental Permit
6.	Minister of Environment	Procedures of Assessment and Examination of

	Regulation No. 08/2013	Environmental Documents and Environmental Permit Issued Process
7.	Government Regulation No. 27/2012	Environmental Permit
8.	Minister of Environment Regulation No. 14/2012	Guidelines for Economic Valuation of *Gambut* Ecosystem
9.	Minister of Environment Regulation No. 15/2012	Guidelines for Economic Valuation of Forest Ecosystem
10.	Circular Letter No. B-14134/MENLH/KP/12/2013	Guideline for the Implementation of the Article 121 of Law No. 32/2009 on Environmental Protection and Management (Environmental Management Documents and Environmental Evaluation Documents)
11.	Minister of Environment Regulation No. P.28/MENLHK/SETJEN/KUM.1/2/2016	Geospatial Information Network of the Indonesian Ministry of Environment

Table 3 illustrates that the Indonesian government enforces those regulations since the industry run activities/projects and it is under the control of the government. In order to avoid the violation of entrepreneurs, the Indonesian government manages other program sheld by the Ministry of Environment and Forestry, the Ministry of Trade, and the Ministry of Cooperatives and SMEs by mentoring training in natural dyes used in Batik production.

The academic study or organizational learning has been done under industrial producing with environmental management in many countries (Elkin & Cone, 2009; Robinson, 2013; Millard, 2010). The entrepreneurship mindset to serve the consumer need is also determined by material benefits and social responsibility. Both entrepreneurs and consumers are moving on from economic exchange that is no longer short-term oriented needs into economic activities conserving the environment. The entrepreneurs' concern drives their decisions to yield the eco-friendly products, which manage the industrial relation supported by organizational learning. Technology and research on innovations are embodied in new products, processes, and strategies. It suggests that not only does Batik entrepreneurs' innovation give benefits, but it also promotes an ecology dimension. This research reveals that the collaboration between entrepreneurs and the government were successful to minimize the environmental damage.

This study, moreover, is consistent with some previous research findings highlighting eco-friendly innovations by focusing on some key organizational learning and

inter-organizational processes (Huber, 1991; Wang, Hermens, Huang, &Chelliah, 2015). The Batik entrepreneurs in this city took their 'knowledge acquisition' from environmental changes. It can be noticed that water pollution and a decline in the quality and quantity of raw materials had great impacts on their products. Consequently, the entrepreneurs should look for the alternative information to solve the problems. The government requires to collaborate with universities, researchers, teachers to find supporting information related to the environmental damage caused by industry. Furthermore, the new natural resources shared by the distribution of information for entrepreneurs lead to new information or comprehensive understanding. In Batik industry, natural dyes have become a new paradigm. These dyes are used as environmental understanding that results from new innovations and creative processes (Noci, & Verganti, 1999).

The environmental damage and limited raw materials are no longer a barrier to business continuity. It indicates that the interpretation of the obtained information requires a cognitive processes. As a result, media and information centers have a crucial role for the Batik entrepreneurs because high cost of products and social cost demand a good style of business management. Likewise, social and environmental problems become responsibilities not only for entrepreneurs, but also the nation, and even other countries. The common understanding of global changes makes the resilience of industry happen more accurately. Besides, eco-friendly innovations are proposed toward the survival of the universe. Functioning as an organization, Batik industry operates itself as experimenting or self-designing organization. This industry maintains a structure, processes, goals, and relationship between management with environmental changes in good adaptation. Sometimes, technology and research should be considered to fix and maximize the utility of products in this condition (Bressler, Bressler, &Bressler, 2011).

5. Conclusion

A positive discourse on innovations and sustainability has been a wide array of concerns since a decline in economy and environmental damage disrupt human life. Accordingly, organizational learning is required to facilitate the relationship between eco-friendly innovations and industry positively. In addition, the sustainability of eco-friendly and value-added innovations simultaneously proposes new behavior for not only the economic sustainability, but also the spiritual dimension. A critical function of this kind of

innovation demonstrates what is deemed pivotal for the sustainability of Batik industry. This study also shows some challenges faced by the Batik industry in Pekalongan City, namely:1) a limited entrepreneurship knowledge and skills of waste management, 2) environmental awareness, particularly for waste water disposal, (c) high cost of a home-scale wastewater treatment plant, and 4) complicated processes of Batik production with natural dyes.

Furthermore, the innovation on the Batik products is done by replacing chemical dyes with natural ones. The consumer demand of trends toward the Batik products with soft natural dyes contributes to the development of eco-friendly innovations. Not to mention, it is supported by the role of a local department of trade and tourism in organizing several exhibitions on both national and international scales every year that makes Batik more fashionable with a fairly high transaction value. Lastly, critical evaluation on the sustainability of Batik industry needs natural, physical, and spiritual values. All of these values simultaneously stimulate the Batik entrepreneurs to change the established economic goals from material or physical development into socialism as an economic system for the betterment of human welfare.

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