ADOPTION OF NATURAL DYES FOR BATIK ARTISANS IN YOGYAKARTA, INDONESIA

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Review of
Integrative Business & Economics
Research

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ABSTRACT

This research emphasizes the natural behavior of batik artisans in adopting natural dyes in Yogyakarta, Indonesia. Indonesian batik, as one of the leading Indonesian artwork, which has received recognition from UNESCO as a heritage of humanity's oral and non-material culture and became its own cultural phenomenon. In addition to having received recognition from UNESCO as a great traditional craft, Indonesian batik is expected to synergize with the environment and create a harmonious balance of the ecosystem. This research discusses some of the issues associated with factors that influence the adoption of natural dyes by batik artisans in Yogyakarta, Indonesia. Based on the Theory of Planned Behavior, this research added factors of perceived environmental responsibility, trialability, ease of use, and experience as factors that affect the adoption of natural dyes in batik-making practices. The sample of this study are all artisans in Batik SMEs, Yogyakarta. The total number of artisans in Yogyakarta, Indonesia is 130. Sampling was done by purposive sampling. The results showed that the model of adoption of natural dyes is accepted. Perceived environmental responsibility, experience, trialibility, and ease of use have a positive influence on attitude, which in turn has a positive influence on the adoption natural dyes.

Keywords: batik artisans; natural dyes; adoption.

1.1. Introduction

Batik industry in Indonesia is generally a small Batik Summit 2011 in Jakarta resulted in a joint declaration , stating Indonesian batik industry should be based on the protection of nature and the environment, as well as research on the provision of traditional natural dyes in large quantities it is important to be encouraged. Data from the Ministry of Cooperatives and SMEs in 2012, the number of batik artisans currently listed 48.300 units throughout Indonesia. Suppliers Jogja batik course, only around 25 % of Jogja batik entrepreneurs themselves, the rest of the Solo and Pekalongan and mostly using chemical dyes. Industry conditions, especially batik batik natural dyes in

Yogya and Solo batik although not as severe as in other cities, but production is greatly decreased .

Yogya and Solo batik craftsmen wane, even if there are production orders are usually based in small parties and deposited in the well-known brand owners. As one of the leading Indonesian artworks. In October 2009, Indonesian batik already received recognition from UNESCO as a cultural heritage of humanity for a review of oral and non- material and become a cultural phenomenon, as well as gaining recognition from UNESCO as a traditional craft. Batik Indonesia is expected to be in synergy with the environment and create a harmonious balance of the ecosystem. Unfortunately, the waste generated in the process of making batik have often bad for the environment. Actually for batik process can be done in a way that is cleaner and environmentally friendly. natural batik dyeing process, many using basic materials plant. The use of herbs as dye batik cloth can also create a sense of concern for nature . Waste generated from natural dye batik production process can reduce environmental pollution.

1.2. Objectives

This study emphasizes the natural behavior of batik artisans in adopting natural dyes in Yogyakarta. This study aims to discuss some of the issues associated with the factors that influence the adoption of natural dyes by batik artisans in Yogyakarta, Indonesia. The research was based on the Theory of Planned Behavior by adding variables perceived environmental responsibility, experience, trialibility, and ease of use as a factor affecting adoption intention. The reason for adding these four factors caused by the Theory of Planned Behavior (TPB) only describes the relationship between beliefs, attitudes, behavior and behavioral intentions. TPB is not in detail explained some factors that can shape attitudes, intentions and behaviors. TPB is possible to applied research in various fields (Ajzen dan Fishbein, 2005). The addition of perceived environmental responsibility, experience, triability, and ease of use in this research as an attempt to understand the limitations that are owned by the TPB. According to Chau and Hu (2002), the addition of various factors in TPB strengthen the influence attitudes and intentions of individuals to perform certain behaviors. Under these conditions, this study is expected to develop a model that describes a number of aspects that influence the behavior of batik artisans in adopting natural dyes.

1.3. Literature review and theoretical framework

This study uses the definition of innovation proposed by Rogers (2003). Innovation Rogers offered the following description of an innovation: "An innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (Rogers, 2003). An innovation may have been invented a long time ago, but if individuals perceive it as new, then it may still be an innovation for them. The newness characteristic of an adoption is more related to the three steps (knowledge, persuasion, and decision) of the innovation-decision process that will be discussed later. Rogers (2003), also stated that innovation in general will force a consumer to change, and usually consumers who are faced with innovation will resistance to change. In fact, people will naturally resist change and try to maintain the status quo.

Joseph (2005), also states that an innovation will be faced with high rejection if such innovations disrupt normal behavior patterns experienced by individuals. This research model combines TPB with several variables that are believed to affect the natural dyes of innovation adoption by batik artisans nature, ie perceived environmental responsibility, experience, trialibility, ease of use and attitude.

Perceived environmental responsibility

Perceived environmental responsibility can be defined as the actions of individuals or groups that promote the use of natural resources in a sustainable manner (Sivek dan Hungerford, 1990). A meta analysis of research on attitudes - environmental behavior found that individuals with a more positive attitude towards the environment are more likely to participate in pro - environmental behavior (Hines, Hunderford dan Tomera, 1987). Individuals who have a responsibility to the environment will show a positive attitude towards the environment and recognizes the importance of nature and the environment (Schultz, 2000; Stern, Dietz dan Guagnano, 1995). Cherian and Jacob (2012), shows the importance of testing the perceived environmental responsibility in attitude, because there are changes in consumer attitudes towards green lifestyle. People are actively trying to reduce the impact of environmentally unfriendly products. Chen and Chai (2010), tested the effect of perceived environmental awareness and responsibility in attitudes towards the use of green products and the attitude towards the environment on a group of women in Malaysia . Testing is done by linear regression . The result shows that awareness and responsibility towards the environment positive effect on attitudes towards the use of green products. The hypothesis is as follows:

Hypothesis 1 :   Perceived environmental responsibility influences positively on attitude towards the adoption of natural dyes.

Experience

Experience is everything I've ever experienced or perceived by consumers. The evaluation process helps the formation of attitudes towards the object. With reference to the learning theory, Park, Yang and Lehto (2007) suggested that the experience or behavior that reward will tend to be repeated while the thoughts or behaviors that lead to punishment will not be repeated. Individuals usually will not forget the experience of previous.

The concept of this experience shows that the level of use of the product will be higher if the consumer experience of the product is good. If the experience is not good for the use of the product, consumers tend to refuse to use the product again (Gahtani, 2003). Research conducted Park, Mothersbaugh and Feick (1994), also showed that the experience of the use of a product has a stronger relationship to knowledge, and through the experience of consumption, consumers build cognitive structure. As a result, consumer confidence will rise and acceptance of products also increased. However, if the experience of the consumed ever done is not good, then the rejection of the products will also increase. Fiore and Kim (2007) explains that past experiences have an influence on consumer attitudes. The better the experience is felt, would lead to high adoption as well. The second hypothesis in this study was formulated as follows:

Hypothesis 2 : Experience influences positively on attitude towards the adoption of natural dyes.

Trialibility

According to Rogers (2003), "trialability is the degree to which an innovation may be experimented with on a limited basis". Also, trialability is positively correlated with the rate of adoption. The more an innovation is tried, the faster its adoption is. As discussed in the implementation stage of the innovation-decision process, reinvention may occur during the trial of the innovation. Then, the innovation may be changed or modified by the potential adopter. Increased reinvention may create faster adoption of the innovation. For the adoption of an innovation, another important factor is the vicarious trial, which is especially helpful for later adopters. However, Rogers stated that earlier adopters see the trialability attribute of innovations as more important than later adopters.

Karahanna et al, (1999); Reiss and Wacker, (2000), showed that the rate of adoption of innovative products will be high if the consumer perceives the ease to try the first product offered. If consumers do not have a chance to try it first, then the consumer will have a negative attitude or do not like the new product. Consumers are assumed new products as consumers tend to be rational and have consideration for the selection of new products containing the aspect of uncertainty about the consequences of use (Venkatesh et al., 2003). Trialibility can reduce consumer concerns in deciding the adoption of new products. If a consumer success with the experiments, the risk associated with the purchase of the product is reduced. Hovav and Schuff (2005) stated that the ability to be tested an innovation impact on the perception of risk innovation. If products with new innovations can not be tested by the consumer before the purchase, then the consumer will perceive that the purchase of products that are at risk and will be increasingly difficult weeks to be adopted

Hypothesis 3 : Trialibility influences positively on attitude towards the adoption of natural dyes.

Perceived ease of use

Researchers argued that perceived ease of use is the extent to which a person accepts as true that using an exacting method would be at no cost to that individual (Davis et al., 1989; Mathieson, 1991; Gefen and Straub, 2000; Gahtani, 2001). Rogers (2003) affirmed perceived ease of use is the term that represents the degree to which an innovation is perceived not to be difficult to understand, learn or operate. He further stated that perceived ease of use is the degree to which consumers perceive a new product or service as better than its substitutes (Rogers, 1983). Similarly, Zeithaml et al. (2002) stated that the degree to which an innovation is easy to understand or use could be considered as perceived ease of use. Many literatures provide evidences of the impact of perceived ease of use on the attitude towards usage and behavioural intention (Šumak, Hericko, Pusnik, and Polancic, 2011; Teo, 2011; Wong & Teo, 2009). Wong and Teo (2009) find that perceived ease of use is significant determinants of the attitude and intention to use technology. Šumak et al. (2011) reveals that the perceived ease of use is a factor that directly affects students' attitude. This finding is in congruence with that of Davis (1989) and Davis et al.

(1989). Davis et al. also find that perceived ease of use would have only one direction towards perceived usefulness and this has been confirmed by recent studies (Antonio et al., 2008; Šumak et al. 2011, Teo, 2011). In addition, it has been noted in technology acceptance research that perceived ease of use has direct and indirect effects towards behavioural intention (Davis, 1989; Teo, 2009; Wong & Teo, 2009).

Hypothesis 4 : Perceived ease of used influences positively on attitude towards the adoption of natural dyes.

Attitude and adoption

Attitude is one of the fundamental factors influencing consumers" buying behaviour and have, therefore, attracted considerable attention from researchers probing the behavior. According to Venkatesh et al., (2003), attitude toward innovation is defined as an individual"s overall affective reaction to using the innovation. Attitude is one of the internal factors that are strong enough influence on behavior. In general, the attitude to the behavior relationship will be in harmony , though it takes more psychological factor that is the intention of the behavior (Ajzen, 1991). There is a growing number of research to suggest that attitude towards computer use have a strong link to behavioural intention and thereafter to actual behaviour (Davis, 1989; Wong and Teo, 2009; Šumak et al., 2011). Behavioural intention is used as the dependent variable in this study as it is known to be a more practical way to measure technology use among student teachers (Teo & Noyes, 2011). Teo et al. (2008) reveal that attitude towards computer use explain 88% of the variance in behavioural intention among Malaysian pre-service teachers. In other words, attitude towards computer use affect how teachers respond to the technology. This argument supports the framework of other research in the theory of behavior as proposed by Bagozzi (1981) . More specifically, the relationship attitude - intention - behavior would be stronger if a person is free to take action. Davis et al (1989), states that a person's positive attitude will encourage the positive intention toward innovation adoption behavior.

Hypothesis 5 : Attitude influences positively on adoption of natural dyes.

1.4. Theoretical framework

Based on the previous research, a theoretical model was developed. Figure 1 represents a theoretically interesting model to be tested and analyzed. The arrows linking constructs (latent variables) specify hypothesized causal relationships in the direction of arrows. perceived environmental responsibility, trialibilty, experience and ease of use, can be considered cognitive constructs. Attitude might be considered an affective construct. Meanwhile, adoption could be regarded as a behavioral construct. In the model, x represents observed exogenous indicators and y represents observed endogenous indicators. To make the model simple to comply with space constraints, error terms for all observed indicators are excluded from the figure 1.
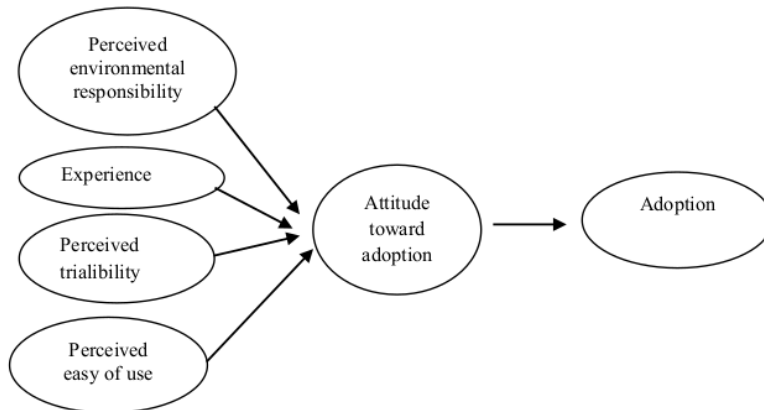
Figure 1. Theoretical framework

1.5. Research Method

Research Design

Data were gathered with a survey questionnaire, containing questions focusing on demographics and scales measuring the variables in the research model: perceived environmental responsibility, trialibilty, experience and ease of use, attitude and adoption. Confirmatory factor analysis (CFA) was carried out to establish factorial validity and the structural equation modelling (SEM) was used for model comparison and hypotheses testing.

Instruments and data collection

A self-report questionnaire was used in this study. In addition to providing their demographic information, participants were required to respond to 21 items, specifically, perceived environmental responsibility (6), trialibilty (3), experience (3) ease of use (3), attitude (3) and adoption (3). Respondents were asked to indicate the items on a five Likert scale whether they strongly disagree (1), slightly disagree (2), neutral (3), slightly agree, (4) and strongly agree (5) with the statements.

Sample and procedure

The population in this study are all batik artisans in Batik SMEs, Yogyakarta. Sampling was done by purposive sampling. The characteristics of the respondents in this study is batik artisans who can make batik and batik artisans who are already using natural dyes more than one year. the number of samples in this study were 130 respondents. data collection results obtained by researchers are presented in Table 1.

Analysis of the Validity and Reliability

Results of data analysis showed that the six main constructs: Perceived environmental responsibility, Experience, Perceived trialibility, perceived easy of use, Attitude toward adoption and adoption which consists of a 21-point question has good validity. When the confirmatory factor analysis was conducted to test the construct validity, then to 21 such instruments have the factor loadings> 0.5. Internal consistency reliability testing results for each construct above show good results because Conbach's Alpha coefficients were obtained in compliance with the rules of

thumb that is required is > 0.7. In addition to testing the internal consistency, Cronbach's Alpha, it is also necessary to test the construct reliability and variance extracted. Both tests are still in the realm of internal consistency test that will give researchers greater confidence that individual indicators measure the same measurement. Results of testing the reliability of the instrument to construct reliability and extracted variance showed a reliable instrument, which is indicated by the value construct reliability above 0.07.

Table 1. Characteristics of respondents

Description	Category	Number	Percent
Gender	Male	25	19
	Female	105	81
Age (years)	< 25 years	3	2
	25 - 30 years	5	4
	31 - 35 years	17	13
	36 - 40 years	27	21
	> 40 years	78	60
Education	Junior high school	10	8
	Senior High School	117	90
	Diploma	2	2
	Bachelor	1	1
Length of using natural dyes	1-2 years	13	10
	2-3 years	21	16
	More than 3 years	96	74

Tabel 2. Reliability testing results

Description	Item Number	Cronbach Alpha	Construct Reliability	Variance extracted
Perceived environmental responsibility	4	0.835	0.982	0.918
Experience	3	0.710	0.815	0.530
Perceived trialibility	3	0.847	0.933	0.823
Perceived easy of use	4	0.816	0.863	0.685
Attitude toward adoption	4	0.880	0.846	0.583
Adoption	3	0.725	0.984	0.945

1.6. RESULTS

The analysis of the research was conducted in two phases. The first phase involved the validation of the model. The second phase involved the assessments and significance of the exogenous and endogenous variables towards adoption batik craftsmen.   Table 3 shows a summary of the overall model fit measures. Except for the χ^2 test result, all absolute measures were significant and considered acceptable. Since χ^2 statistics are sensitive to the number of subjects and require assumption of multivariate normal distribution, other measures are better to consider as criteria for model fitting. In addition to absolute values which are the root mean squared residual (RMR), the root mean squared error of approximation (RMSEA), the goodness-of-fit index (GFI), and the adjusted goodness-of-fit index (AGFI), and NFI as comparative fit measures were examined. Assessing all measures, the full general structural model

was accepted and believed to be good enough to analyze the parameter estimates. Hypotheses testing was conducted within the context of the structural model.

Table 3. Goodness-of-fit measures for SEM

Fit measures	Indeks goodness of fit	Recommended value	Value	Keterangan
Absolute fit measures	Chi-Square χ^2	Small ≥ 0.05	4,376 0,039	Good Moderate
	GFI	≥ 0.90	0,926	Good
	RMSEA	≤ 0.08	0,069	Good
Incremental fit measures	AGFI	≥ 0.90	0,925	Good
	CFI	≥ 0.90	0,991	Good
Parsimonious fit measures	Normed χ^2 (CMIN/DF)	$1\leq$ Normed $\chi^2\leq 5$	2,594	Good

Hypotheses were examined by confirming the presence of a statistically significant relationship in the predicted direction. As far as adoption is concerned, perceived environmental responsibility, trialibilty, experience, ease of use, attitude were identified to be significant. Perceived environmental responsibility, trialibilty, experience, ease of use had effect on attitude toward adoption. On the other hand, subjective attitude had significant relationship with adoption. The parameter estimates for the hypothesized paths, their t-values, and result of hypotheses are summarized in Table 4.

Table 4. Parameter estimates, t-value, and results of hypotheses

	Hypothesized path	Standardized estimate	CR	Result of hypotheses
H1	Attitude <----- PER	0,220	2,538	Supported
H2	Attitude <------ Trialibility.	0,231	2,677	Supported
H3	Attitude <------ Experience	0,238	2,027	Supported
H4	Attitude <------ Easy of use	0,455	3,092	Supported
H5	Intention <----- Attitude	0,369	5,012	Supported

In the context of behavioral intention, key endogenous constructs of the study, all the relationships among the constructs were significant. The strongest magnitude was found in a relationship between easy of use and attitude toward adoption = .455, followed by experience = .238. trialibility had effect on attitude toward adotion = .231, perceived environmental responsibility had effect on attitude toward adotion = .220, and finally the attitude was identified determinant to adoption = .369.

1.7. Conclusion and discussion

Study confirmed Theory of planned behavior (Ajzen, 1991) with the addition of variables environmental responsibility, trialibilty, experience, ease of use to be a useful theoretical model in helping to understand and explain behavioral adoption. Results of the present research led to the conclusion that the model well represented the collected data according to the result of goodness-of-fit test. One of interesting results of the study is that trialibilty, experience, ease of use an important role in affecting attitude towards ado natural dyes. One possible explanation for Technology Acceptance model (Davis, F. D., Bagozzi, R. P., and Warshaw, P. R.

1989). Perceived environmental responsibility possible explanation for pro-environmental behavior (Hines, Hunderford dan Tomera, 1987). This theory indicates that individuals who have a responsibility to the environment will show the attitude towards the environment that recognizes the importance of nature and the environment. This study can provide a predictive model that can be used to explain the behavior of the adoption of batik nature and a reference to resolve the problem for batik artisans nature. To make the program successful go green, then the goverment should provide socialization and motivation to the batik makers to always use natural materials that do not pollute the environment . The government should also provide education on innovative natural ingredients that can be used by craftsmen in producing batik batik nature to make it more attractive and has a sale value. Finally, government policies associated with the planting of nature conservation values and product innovations can be done through counseling, education and training about the importance of awareness to protect nature and the use of green products that are environmentally friendly .

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