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# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

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| **Abstract:** | Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms. The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value, quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production. |
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| 4 | Keywords | producer; natural dye, batik, perspective |

Please kindly acknowledge me for the receipt of the manuscript. If you have any inquiries, please do not hesitate to contact me through my email at adhi_kusumastuti@mail.unnes.ac.id. Your cooperation regarding this matter is very much appreciated.
Thank you and with kind regards.

Yours sincerely,

**Dr. Adhi Kusumastuti**

# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

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## Abstract

Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms.

The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value,

quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

Keywords: producer; natural dye, batik, perspective

## 1 Introduction

Batik is the Indonesian art masterpiece as a blend of art and technology inherited by the ancestors. Batik fabric is a variety of decorative fabrics produced by resist dyeing using wax as colour barrier. Batik production process included motif drawing, dyeing, and wax removal. The most common used dyes in the batik-production process include naphthol, indigosol, Procyon, and Remazol.

Batik is produced by various regions in Indonesia with regional characteristics. Among the regions in Indonesia whose economy is dominated by the batik industry is Pekalongan. In 2011, there were 1342 small industries in Pekalongan of which about 83.1% were batik industries [1]. With a production capacity of around 300 to 1000 pieces of cloth per month [2], each industry has the potential to generate 202.4 m3 of waste. Considering that only about 0.6% of the industry has a sewage treatment unit [1], while the rest discharges wastewater directly into the environment, serious move should be applied. Textile wastewater generally contains heavy metals such as chromium, copper, and cadmium. This waste can contaminate soil and surface water which in turn contaminates ground water. As a pollutant, the accumulation of heavy metals results in various disorders of the body's organs because heavy metals cannot be degraded [3].

In the last two decades, green technology has received more attention. Green technology refers to all environmentally friendly technologies that do not interfere with or damage the environment and natural resources. The overuse of chemicals and overexploitation of resources lead to a worsening greenhouse effect, disturbed ecosystems, and global warming. With regard to the hazard posed by the use of synthetic dyes, natural dyes are reused back commercially. The use of natural dyes has increased along with the increasing awareness of consumers to get environmentally friendly textiles and the need to preserve the environment. This is driven by the carcinogenic nature of some synthetic dyes [4-6]. In addition, Indonesia has many types and sources of natural dyes. Natural dyes have a complex chemical structure [7], however, natural dyes also have disadvantages such as the long colouring process, inconsistent colour reproducibility, and relatively expensive costs [8, 9].

Various studies discussed about application of natural dyes on batik processes have been carried out. Some reports on customer behaviour in the selection of batik are also available. In addition, other studies were conducted on the general description of the batik industry [10-14]. However, there has been no study on the behaviour of batik craftsmen in the use of natural dyes. This study needs to be carried out to determine the behaviour and motivation of batik artisans to use natural dyes. The use of natural dyes is expected to minimize environmental pollution, increase the economic value of renewable natural materials, and the selling value of batik itself. In addition, the impact of the use of natural dyes on the sustainability of dye plants and the environment will be

analysed. In the end, it will be used to determine the policy direction for the use of natural dyes in the batik industry.

In the 1990s, manufacturers and retailers performed perceived value as an imperative strategic that will continue to be important well into the twenty-first century. Sweeney and Soutar [15] declared that from a retailing perspective, people-based needs could be satisfied by delivering value thus put them in a much stronger position in the long term. Another statement given by Burden [16], in which to increase retails target, through customer who emphasis the value and customer who gives time pressure. The retailing value move seems to be a global phenomenon as the most compelling (Asian retail) opportunities those are at the value end of the market given that consumers in Asia today are much more value conscious than they were in the mid-1990s.

Perceived value can be interpreted as a customer's overall assessment of the product or service benefits by taking into account the paid price with the obtained value. It is therefore, perceived value is assessed based on a comparison between what is obtained from the product or service with the components provided. Value is commonly defined as ratio or trade-off between quality and price which is a value-for-money conceptualization. Considering the fact that retail customers are "value-driven" customer's value should be deeply understood by managers thus could focus their attention to achieve the needed market place advantage.

This research is very prospective in contributing data regarding the behaviour of natural dye batik craftsmen. The use of natural dyes is very important to minimize waste pollution due to the use of synthetic dyes and their additive materials. The data obtained is expected to be used to make policies related to the use of natural dyes in the batik industry.

## 2 Literature Review and Hypothesis

Figure 1 depicts conceptual model of the proposed framework. Totally, 10 hypotheses were drawn from six constructs, i.e., social value, economic value, quality value, green value, attitude, satisfaction, and production intention of natural dyes batik.

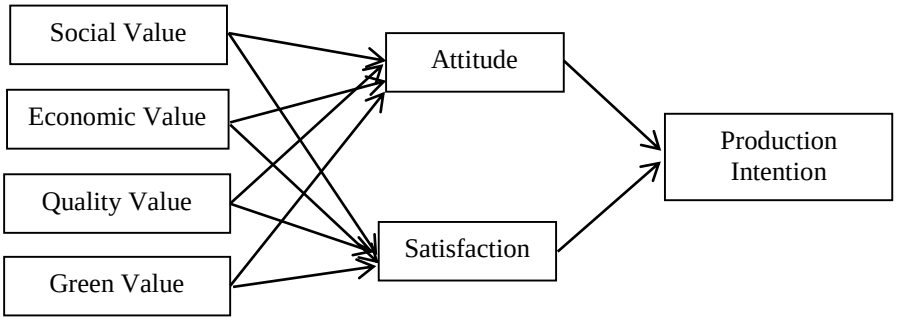


**Figure 1** Conceptual Model

Attitude is a concept that includes evaluation of people, problems, objects, or events. Attitudes could change as the development of people's experience and knowledge. Attitude is the part that has a strong influence on behaviour. Attitude could be reflected from experience or background. Attitudes are something could be learned, affected by information and experiences. Furthermore, the fact that attitudes are predispositions to

respond leads to their relationship with actual producer behaviour. Producers attitude strongly affect production behaviours. Molina [17] stated that intention, attitude and subjective norms determine behaviours. Empiric studies about the relationship of attitude and behavioural intentions have been carried out before. Attitude could also be defined as individual characteristics which depicts either positive or negative behaviour and reflects feeling and knowledge to certain concept or subject [18]. Mantle-Bromley [19] stated that in the psychology study, attitude consists of three components, i.e., affect, cognition and behaviour. The components refer to people preferences level, person's knowledge of the attitudinal object and reactions and intention to the object, respectively. Another definition of attitude is a conviction in something that applies in a certain period of time that influences people to behave in a certain way regarding the matter. Attitude refers to psychological tendency that is expressed by assessing a particular system at certain degree of favourness. A single behaviour on a particular attitude object is strongly predicted by a specific attitude [20].

Social value is the utility of a product or service in enhancing the producer's perceived self-concept related to a particular social, demographic, socioeconomic or cultural group. Social value relates to self-image. It is believed that an action of producing natural dyes batik could improve producers' social-status. In terms of green products, social value is a perceived net utility gained from green product production based on the insight regarding social pressure or status gain. Social value has a significant positive influence on sustainable production behaviour [21]. Emotional value is the value obtained after the producer delivers product or service and finds that the resulting product has higher value thus cause emotional response. Social value could be determined as the emotional benefits acquired by the producers through the interaction with other producers in the community [22]. Producers are motivated by social affiliation to behave in the same way that of their social class. Producers tend to generate the products that represent their social status. Producers think their green production behaviour is a modern way of life. The production of natural dyes batik is important for their social identity in society. Hence, based on the above description, this study hypothesizes that:

Hypothesis 1a. Social value will positively affect producer attitude.

Producer satisfaction is the difference between the total benefits expected from a product/service and the total costs incurred to generate that product or service. Besides, producer satisfaction refers to the difference between the actual performance experienced and the expectation of the producer. Producer satisfaction refers to a person's subjective evaluation of the situation that result in a positive emotional response. Considering the intense competition, a successful response of producer satisfaction significantly defines the survival and long-term profitability of a business. Producers need to perform better thus resulting in higher service/product quality in order to establish and maintain a strong and long-term relationship with customers [23]. Previous study on producer satisfaction was done by Wagner [24]. They found that the average producer satisfaction was higher with flat and pit parlours over stall barns with pipeline systems for most areas surveyed. Kiss [25] revealed that despite their higher consumer prices, producer satisfaction in terms of saleable products quantity, selling prices, and customers number were the highest thing in the case of producer markets. Govindasamy [26] believed that producer's satisfaction is of important to appraise the

future growth prospect of the markets as well as to define the potential of recruitment targets for both existing and new outlets. The readiness to shift marketing and production focuses need to be done to satisfy customer request thus leads to long-term profitability as well as satisfaction. In perspective of producer, perceived satisfaction can be defined as producer acceptance of natural dyes batik and the comfort degree involved in the production. Shee and Wang [27] defined satisfaction as the pleasure or contentment in performing a compulsory or desirable action and experiences the result. In positive way, satisfaction is conceptualized as collection of feelings or attitudes against numerous factors that determine a particular situation. A higher degree of producer satisfaction signifies a higher degree of willingness to carry the process. A great deal of efforts has been carried out to estimate user satisfaction. It was revealed that user satisfaction is a complex concept, the matter varies with the experience or case character [28]. It is therefore, the following hypothesis was developed:

Hypothesis 1b. Social value will positively affect producer satisfaction.

In term of producer, economic value associates to profits generated by production as well as relationship with supplier and customer in relation to realised costs [29]. Economic value refers to value that person gives on an economic good based on the advantage of the good. Economic value is commonly estimated based on the person's willingness to pay for the good, typically measured in units of currency. Production of natural dyes batik offers producers perceived economic value through tangible benefits, such as low materials and production costs as well as maximum price. Research analysis of Jelcic and Mabic [29] showed that satisfaction was determined by economic value. However, the standardised coefficients beta revealed the higher contribution of emotional value in predicting client satisfaction than economic value. Wei et al. [30] defined economic value in terms of more reasonable pricing of brand agricultural products, in line value of brand agricultural products with the price, more economical brand agricultural products. Economic value is believed to determine purchase intention. Thus, it is hypothesized that:

Hypothesis 2a. Economic value will positively affect producer attitude.
Hypothesis 2b. Economic value will positively affect producer satisfaction.

Perceived quality is another dimension of brand value that is very important for producers in choosing the materials for production. It is important to note that product quality is an important company resource to achieve competitive advantage. Perceived quality reveals assessment (perception) of overall product advantages compared to its alternative product/service. Based on this definition it is also known that perceived quality is product ability to be accepted in providing satisfaction compared relatively to the available alternatives' product. High perceived quality indicates that the differences and advantages of the product to those of similar products after a long period of time have been discovered. Perceived quality is a component of brand value, therefore high perceived quality will encourage consumers' preference to our brand over the competitors. Product quality significantly enhances purchase motivation thus in turn affects consumer's purchasing decisions [31]. They discovered that the eagerness of consumers to continue purchasing luxury fashion brands in the future was determined by perceived brand quality and customer service. Previous studies related perceived

quality with willingness to purchase, brand purchase intentions and brand choices [32]. Considering the importance of natural dyes batik quality in ensuring the business sustainability, the following hypothesis are developed:

Hypothesis 3a. Quality value will positively affect producer attitude.
Hypothesis 3b. Quality value will positively affect producer satisfaction.

Green value is the producer's overall assessment of the product or service benefits related to the balance of capital and earnings based on the producer's environmental desires, sustainable expectations, and environmentally friendly needs for producers [33]. While Hamzah and Tanwir [34] defined perceived green value as an individual's moral sense in honouring pro-environmental actions that advantage them through the decrease of both environmental damage and energy costs. Demand increment of natural dyes batik is ignited due to natural dyes batik purchase may enhance social status. Wearing natural dyes batik indicates environmentally friendly manner thus give high contribution to society. This behaviour relates to the fact that wearing natural dyes batik signal to others that a person is pro-social rather than pro-self-individual. Due to the current prevalence of environmental consciousness is "green perceived value" was developed by Chen and Chang [35] and defined as overall consumer's judgment of the net benefit of a product or service of the proper balance of expended capital towards the obtained results based on the consumer's environmental preference, sustainable expectations, and green requirement. Based on their study, Hur [36] indicated that focus on value perception need to be increase by producer of green products by clarifying the physical and psychological advantages of green products. Despite the introduction of green attributes of green products to enhance green product consumption, greenness itself is insufficient to encourage consumer request for the products. Thus, importantly producers have to recognize the needs that boost the purchases. Green products purchase is associated to consumers' individual perceived values. Hur [36] discovered that customer satisfaction, customer retention increment and price sensitivity decrease determine perceived value. The considerations lead to the following hypothesis:

Hypothesis 4a. Green value will positively affect producer attitude.
Hypothesis 4b. Green value will positively affect producer satisfaction.

Perceived intentions represent more normative beliefs leading to behavioural outcomes. Perceived intention is a context-specific perception that is derived from normative beliefs. Production intentions can be used to verify the application of a new products in line with environmental concerns thus help managers define whether the concept worthy of further establishment and determine which geographic markets and consumer segments to target through the channel. Production intention is of important in predicting actual behaviour. To predict production intention, it is important to understand the social, economic, quality, and green values that ultimately generate the attitudes and satisfaction. It is therefore, the following hypothesis is proposed:

Hypothesis 5. Attitude will positively affect production intention.
Hypothesis 6. Satisfaction will positively affect production intention.

# 3 Methodology

## 3.1 Sample

Currently, data collection could be effectively carried out through web-based surveys. The empirical data for the present study were collected through Google form and paper-based questionnaire. A broadcast of the survey goals was posted for 1 week on WhatsApp groups of the batik community. Considering that most batik producers are not familiar with filling out online forms, paper-based questionnaire was also applied. There were 40 respondents filled out the online form and 169 respondents filled out the paper-based questionnaire. To avoid duplicate responses, a single IP address or email account was applied. The final sample included 209 valid responses.

Among the respondents, 32.5% were male, 90% were under the age of 50, 91% were high school graduates and 42% had experience in producing natural dyes batik for 1-5 years. Table 1 summarizes the demographics of the respondents. The demographic profile showed that producers are mostly in productive ages and well experienced.

**Table 1** Demographic Profile

| Measure | Items | Frequency | Precent |
|---|---|---|---|
| Gender | Male | 68 | 32.5 |
| | Female | 141 | 67.5 |
| Age | 20-24 | 24 | 11.5 |
| | 25-29 | 22 | 10.5 |
| | 30-34 | 38 | 18.2 |
| | 35-39 | 35 | 16.8 |
| | 40-44 | 51 | 24.4 |
| | 45-49 | 22 | 10.5 |
| | >50 | 17 | 8.1 |
| Domicile | Banten | 1 | 0.48 |
| | Jawa Barat | 9 | 4.3 |
| | Jawa Tengah | 197 | 94.26 |
| | Jawa Timur | 1 | 0.48 |
| | DIY | 1 | 0.48 |
| Education | High School | 190 | 90.91 |
| | College | 5 | 2.39 |
| | Undergraduate Degree | 14 | 6.7 |
| Experience | 1-5 years | 87 | 41.63 |
| | 6-10 years | 50 | 23.92 |
| | 11-15 years | 60 | 28.71 |
| | >16 years | 12 | 5.74 |
| Production Capacity/Momth | < 100 pcs | 26 | 12.44 |
| | 101-200 pcs | 27 | 12.92 |
| | 201-300 pcs | 12 | 5.74 |
| | 301-400 pcs | 13 | 6.22 |
| | >401 pcs | 31 | 14.83 |

### 3.2 Measure

Measurement variables, as shown in Table 2, considered each construct used in this study. Variables were either selected or modified from previous studies. A total of seven constructs were applied. Social value was measured on four items and developed from previous study [37]. The validated four items were used to measure economic value. The quality was also measured on four items based on previous research [37]. Then, green value was measured by five different items. Subsequently, attitude was measured using two items based on previous studies [38, 39]. Satisfaction was then measured using four items based on previous study of Hsu and Lin [39]. Finally, production intention for natural dyes batik products was measured through four items taken from Paul et al. and Yadav and Pathak [38, 40] q. A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was applied in the questionnaire. This scale requests respondents to declare the level of strongly disagree or agree with a sequence of statements on a certain topic.

Descriptive statistics of the questionnaire items are available in Table 2, including the mean values of social value, economic value, quality, green value, attitude, satisfaction and production intention for natural dyes batik products were quite high and relatively favourable. The mean values of the lower costs of production of natural dye batik were low compared with the other constructs at 3.622 because most producers assume production of natural dyes batik is a long process thus requires higher costs. All data have standard deviation of almost 0, shows that no deviation found in the data distribution, no outlier exists in the data. The sample perception is uniform.

**Table 2** Descriptive Statistic Results

| Constructs/ Questionnaire Items | Mean | Standard Deviation |
|---|---|---|
| **Social Value** | | |
| My friends would think producing natural dye batik is a good idea [37] | 4.072 | 0.677 |
| Producing natural dye batik improves the way I am perceived [37] | 3.967 | 0.473 |
| Producing natural dye batik makes a good impression [37] | 4.043 | 0.482 |
| Producing natural dye batik shows that I am environmental care | 4.086 | 0.714 |
| **Economic Value** | | |
| Production of natural dye batik needs lower costs | 3.622 | 0.862 |
| Natural dye batik is more marketable | 3.746 | 0.617 |
| Selling natural dye batik increases my income as batik craftsman | 3.986 | 0.729 |
| Natural dyes are less expensive | 3.713 | 0.920 |
| **Quality** | | |
| The natural dye batik is of good quality [37] | 4.392 | 0.691 |
| The natural dye batik is of well-made [37] | 4.273 | 0.632 |
| The natural dye batik is long lasting | 4.278 | 0.764 |
| Natural dye batik has excellent colour fastness | 4.364 | 0.808 |

| | | |
|---|---|---|
| **Green Value** | | |
| Natural dyes for batik dyeing generate less wastewater | 4.522 | 0.619 |
| Natural dyes utilise the unused natural resources | 4.316 | 0.682 |
| Natural dyes explore local materials | 4.263 | 0.628 |
| N<br>atural dyes generate harmless wastewater | 4.301 | 0.570 |
| Natural dyes need simple wastewater treatment facility | 3.885 | 0.689 |
| **Attitude** | | |
| I like the idea of producing natural dye batik [38] | 4.100 | 0.512 |
| I have favourable attitude towards producing natural dye batik [38] | 4.091 | 0.523 |
| My attitude toward producing natural dye batik is favourable [39] | 3.895 | 0.769 |
| **Satisfaction** | | |
| Producing natural dye batik makes me feel very satisfied [39] | 3.856 | 0.718 |
| Producing natural dye batik gives me a sense of enjoyment [39] | 3.995 | 0.786 |
| Producing natural dye batik makes me feel very contented [39] | 3.885 | 0.689 |
| Producing natural dye batik makes me feel very delighted [39] | 3.962 | 0.757 |
| **Production Intention** | | |
| I'm willing to produce natural dye batik [40] | 4.072 | 0.738 |
| I will make an effort to produce natural dye batik [40] | 4.120 | 0.719 |
| I will consider switching to environmental friendly materials for ecological reasons [38] | 4.153 | 0.716 |
| I expect to produce natural dye batik for the positive environmental contribution [38] | 4.488 | 0.706 |

## 4 Tools for Analysis

Data analyses were conducted using the statistical package with graphical user interface for variance-based structural equation modelling using the partial least squares path modelling method (SmartPLS). The software was used to test hypotheses of this study. SmartPLS was used for descriptive analysis to analyse preliminary results.

### 4.1 Testing of Reliability and Validity of the Measurement Model

Confirmatory factor analysis (CFA) was applied to evaluate the measurement model. The measurement model confirms the factor loadings of the seven constructs; social value, economic value, quality value, green value, attitude, satisfaction and production intention for natural dyes batik products. Model validity and reliability verification

was carried out by analysing convergent and discriminant validities and the overall fit with data. The internal consistency of the indicators of each studied construct was examined using the most common method, by determining the coefficient alpha of a given construct [41]. Table 3 reveals that Cronbach's α coefficients were calculated for internal validity, and the values ranged from 0.722 to 0.924. Nunnally and Bernstein [42] suggested Cronbach's level beyond 0.700, thus, the values obtained recommended that all constructs were internally consistent and reliable. The loading factor showed that all items used to measure the variable are valid.

Hair et al. [43] determined that the factor loading should be higher than 0.700. It was found that all of standardized factor loadings were significant ranging from 0.722 to 0.924. Composite reliability measures were used to examine the construct reliability thus assess the extent to which items in the construct measure the latent concept. Composite reliability (CR) and the average variance extracted (AVE) contribute to convergent validity of the CFA results [43]. It was determined that the approximation of CR and AVE, which measures the amount of variance explained by the given construct, should be higher than 0.700 and 0.500, respectively [43]. Table 3 shows that the CR and AVE values ranged from 0.824 to 0.946 and 0.487 to 0.814, respectively, surpassing the respective recommended levels of 0.700 and 0.500. The AVE value describes the variance or diversity of the manifest variables possed by the latent construct. Thus, the greater the variance or diversity of the manifest variables that can be contained by the latent construct leads to greater representation of the manifest variable on the latent construct. The AVE value of 0.5 represents adequate convergent validity, which means that in average, one latent variable is able to explain more than half of the variance of its indicators. In the green value construct, the AVE value of 0.487 is considered close to the minimum value that must be achieved. The CFA results shows that the measurement model had suitable convergent and discriminant validities. It was also revealed that the hypothesized measurement model was reliable and considerable to justify the structural associations among the constructs.

Table 4 shows the fit measures results of the model. NFI calculates the $Chi^2$ value of the proposed model and compares it with a significant benchmark. Due to the insufficient information of $Chi^2$ value of the proposed model to evaluate model fit, the NFI applies the $Chi^2$ value from the null model, as a measurement standard. The NFI ranges in values between 0 and 1. The NFI value closer to 1 indicates the better fit. NFI values beyond 0.9 usually shows acceptable fit. The RMS_theta evaluates the correlation degree of outer model residuals. The value should be almost zero to represent good model fit, since it would mean that the correlations of the outer model residuals are very low (close to zero).

**Table 3** Reliability and Validity of the Constructs

| Constructs/ Questionnaire Items | Question Item | Cronbach's α | Standardized Factor Loading | Composite Reliability | Average Variance Extracted |
|---|---|---|---|---|---|
| **Social Value (SCV)** | | | | | |
| | SCV1 | **0.763** | 0.768 | **0.849** | **0.587** |
| | SCV2 | | 0.852 | | |
| | SCV3 | | 0.822 | | |
| | SCV4 | | 0.228 | | |
| **Economic Value** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | EV1 | | 0.635 | | |
| | EV2 | **0.722** | 0.749 | **0.827** | **0.547** |
| | EV3 | | 0.522 | | |
| | EV4 | | 0.603 | | |
| **Quality** | | | | | |
| | QV1 | | 0.808 | | |
| | QV2 | **0.771** | 0.717 | **0.847** | **0.581** |
| | QV3 | | 0.812 | | |
| | QV4 | | 0.706 | | |
| **Green Value** | | | | | |
| | GV1 | | 0.641 | | |
| | GV2 | | 0.574 | | |
| | GV3 | **0.742** | 0.788 | **0.824** | **0.487** |
| | GV4 | | 0.750 | | |
| | GV5 | | 0.714 | | |
| **Attitude** | | | | | |
| | ATT1 | | 0.850 | | |
| | ATT2 | **0.725** | 0.860 | **0.844** | **0.646** |
| | ATT3 | | 0.689 | | |
| **Satisfaction** | | | | | |
| | STF1 | | 0.922 | | |
| | STF2 | **0.924** | 0.883 | **0.946** | **0.814** |
| | STF3 | | 0.922 | | |
| | STF4 | | 0.882 | | |
| **Production Intention** | | | | | |
| | PDI1 | | 0.894 | | |
| | PDI2 | **0.833** | 0.919 | **0.886** | **0.663** |
| | PDI3 | | 0.754 | | |
| | PDI4 | | 0.663 | | |

**Table 4** Fit Measures Results

| | Saturated Model | Estimated Model |
|---|---|---|
| **SRMR** | 0.108 | 0.120 |
| **d_ULS** | 4.753 | 5.859 |
| **d_G** | 1.477 | 1.578 |
| **Chi-Square** | 1644.483 | 1696.134 |
| **NFI** | 0.592 | 0.579 |
| **Rms Theta** | 0.185 | |

Table 5 shows the inter-correlations among measurement variables in the research model. It was showed that all correlations were significant ($p < 0.001$).

**Table 5** Inter-correlation among model variables

| | ATT1 | ATT2 | ATT3 | EV1 | EV2 | EV3 | EV4 | GV1 | GV2 | GV3 | GV4 | GV5 | PDI1 | PDI2 | PDI3 | PDI4 | QV1 | QV2 | QV3 | QV4 | SCV1 | SCV2 | SCV3 | SCV4 | STF1 | STF2 | STF3 | STF4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ATT | 1.000 | 0.608 | 0.452 | 0.249 | 0.247 | 0.235 | 0.132 | 0.287 | 0.101 | 0.111 | 0.289 | 0.304 | 0.424 | 0.422 | 0.271 | 0.288 | 0.226 | 0.240 | 0.271 | 0.120 | 0.282 | 0.349 | 0.389 | 0.212 | 0.520 | 0.393 | 0.426 | 0.442 |
| ATT | | 1.000 | 0.345 | 0.341 | 0.323 | 0.330 | 0.193 | 0.356 | 0.161 | 0.436 | 0.245 | 0.268 | 0.528 | 0.556 | 0.448 | 0.411 | 0.219 | 0.402 | 0.320 | 0.182 | 0.373 | 0.440 | 0.326 | 0.338 | 0.493 | 0.397 | 0.427 | 0.492 |
| ATT | | | 1.000 | 0.157 | 0.236 | 0.074 | 0.316 | 0.196 | 0.127 | 0.374 | 0.236 | 0.468 | 0.392 | 0.377 | 0.099 | 0.288 | 0.267 | 0.157 | 0.172 | 0.216 | 0.428 | 0.214 | 0.244 | 0.147 | 0.570 | 0.625 | 0.492 | 0.388 |
| EV1 | | | | 1.000 | 0.315 | 0.289 | 0.370 | 0.217 | 0.236 | 0.263 | 0.203 | 0.064 | 0.389 | 0.390 | 0.327 | 0.217 | 0.217 | 0.145 | 0.319 | 0.204 | 0.063 | 0.157 | 0.131 | 0.170 | 0.191 | 0.047 | 0.185 | 0.271 |
| EV2 | | | | | 1.000 | 0.620 | 0.428 | 0.296 | 0.213 | 0.320 | 0.204 | -0.023 | 0.334 | 0.327 | 0.380 | 0.394 | 0.402 | 0.300 | 0.434 | 0.511 | 0.169 | 0.151 | 0.149 | 0.039 | 0.285 | 0.205 | 0.292 | 0.225 |
| EV3 | | | | | | 1.000 | 0.344 | 0.335 | 0.288 | 0.301 | 0.264 | 0.054 | 0.295 | 0.387 | 0.252 | 0.246 | 0.315 | 0.248 | 0.411 | 0.375 | 0.070 | 0.110 | 0.097 | 0.030 | 0.325 | 0.175 | 0.340 | 0.251 |
| EV4 | | | | | | | 1.000 | 0.137 | 0.000 | 0.271 | 0.092 | -0.022 | 0.044 | 0.088 | 0.139 | 0.275 | 0.298 | 0.192 | 0.202 | 0.321 | 0.256 | 0.143 | 0.157 | 0.016 | 0.112 | 0.177 | 0.107 | -0.002 |
| GV1 | | | | | | | | 1.000 | 0.528 | 0.360 | 0.354 | 0.196 | 0.326 | 0.429 | 0.316 | 0.381 | 0.383 | 0.333 | 0.382 | 0.290 | 0.184 | 0.272 | 0.357 | 0.169 | 0.341 | 0.251 | 0.342 | 0.298 |
| GV2 | | | | | | | | | 1.000 | 0.376 | 0.333 | 0.159 | 0.278 | 0.323 | 0.234 | 0.266 | 0.204 | 0.133 | 0.310 | 0.374 | 0.055 | 0.181 | 0.133 | 0.092 | 0.239 | 0.128 | 0.271 | 0.200 |
| GV3 | | | | | | | | | | 1.000 | 0.486 | 0.423 | 0.527 | 0.534 | 0.283 | 0.411 | 0.258 | 0.241 | 0.147 | 0.217 | 0.450 | 0.432 | 0.294 | 0.344 | 0.444 | 0.468 | 0.445 | 0.454 |
| GV4 | | | | | | | | | | | 1.000 | 0.441 | 0.392 | 0.367 | 0.098 | 0.193 | 0.125 | 0.144 | 0.214 | 0.136 | 0.204 | 0.357 | 0.388 | 0.171 | 0.421 | 0.259 | 0.417 | 0.315 |
| GV5 | | | | | | | | | | | | 1.000 | 0.411 | 0.346 | -0.061 | -0.131 | -0.096 | 0.039 | -0.185 | -0.269 | 0.274 | 0.443 | 0.432 | 0.331 | 0.508 | 0.503 | 0.516 | 0.469 |
| PDI1 | | | | | | | | | | | | | 1.000 | 0.822 | 0.504 | 0.392 | 0.254 | 0.307 | 0.304 | 0.157 | 0.296 | 0.390 | 0.300 | 0.324 | 0.642 | 0.603 | 0.665 | 0.784 |
| PDI2 | | | | | | | | | | | | | | 1.000 | 0.569 | 0.469 | 0.291 | 0.349 | 0.401 | 0.238 | 0.277 | 0.378 | 0.303 | 0.344 | 0.590 | 0.509 | 0.617 | 0.694 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PDI3 | 1.000 | 0.572 | 0.440 | 0.384 | 0.447 | 0.326 | 0.224 | 0.354 | 0.314 | 0.227 | 0.322 | 0.308 | 0.356 | 0.488 |
| PDI4 | | 1.000 | 0.559 | 0.442 | 0.512 | 0.494 | 0.387 | 0.292 | 0.205 | 0.154 | 0.270 | 0.315 | 0.263 | 0.339 |
| QV1 | | | 1.000 | 0.390 | 0.546 | 0.507 | 0.226 | 0.040 | 0.136 | -0.010 | 0.249 | 0.294 | 0.265 | 0.294 |
| QV2 | | | | 1.000 | 0.339 | 0.190 | 0.234 | 0.287 | 0.134 | 0.043 | 0.276 | 0.330 | 0.314 | 0.302 |
| QV3 | | | | | 1.000 | 0.767 | -0.038 | -0.027 | 0.020 | -0.061 | 0.186 | -0.006 | 0.215 | 0.184 |
| QV4 | | | | | | 1.000 | 0.040 | -0.131 | -0.052 | -0.129 | 0.115 | 0.010 | 0.109 | 0.085 |
| SCV1 | | | | | | | 1.000 | 0.470 | 0.474 | 0.324 | 0.454 | 0.522 | 0.376 | 0.369 |
| SCV2 | | | | | | | | 1.000 | 0.615 | 0.377 | 0.423 | 0.450 | 0.429 | 0.384 |
| SCV3 | | | | | | | | | 1.000 | 0.420 | 0.391 | 0.329 | 0.375 | 0.332 |
| SCV4 | | | | | | | | | | 1.000 | 0.267 | 0.240 | 0.273 | 0.343 |
| STF1 | | | | | | | | | | | 1.000 | 0.762 | 0.847 | 0.721 |
| STF2 | | | | | | | | | | | | 1.000 | 0.741 | 0.708 |
| STF3 | | | | | | | | | | | | | 1.000 | 0.735 |
| STF4 | | | | | | | | | | | | | | 1.000 |

Structural Equation Model was arranged by smartPLS using a maximum likelihood parameter that assessed the hypothesized conceptual model of this study as given in Figure 2.

The results of the structural model and the standardized path coefficient represented positive effects among the constructs in the structural model are available in Table 6. Totally, nine of ten hypotheses were accepted. The positive relationship between social value towards production intention of natural dyes batik products (H1: 1 = 0.379, t = 5.005, p = 0.0) indicated that H1 was accepted. According to H2, the positive estimate of coefficients of social value and satisfaction of natural dyes batik production had significant positive effects (H2: 2 = 0.302, t = 4.483, p = 0.0), thus, H2 was accepted. The impact of economic value (H3: 3 = 0.151, t = 1.908, p < 0.001) had significant positive effects on attitude of natural dyes batik production, accepting H3. Economic value had insignificant positive effect on satisfaction of natural dyes batik production (H4: 4 = 0.025, t = 0.434, p = 0.665). Furthermore, quality value gave significant positive effect to attitude of producing natural dyes batik (H5: 5 = 0.227, t = 3.725, p = 0.0) and satisfaction (H6: 6 = 0.169, t = 2.367, p = 0.018). Green value significantly affected attitude (H7: 7 = 0.165, t = 2.054, p = 0.040) and satisfaction (H8: 8 = 0.387, t = 5.461, p = 0.0) of natural dyes batik production. Finally, attitude (H9: 9 = 0.257, t = 3.558, p = 0.0) and satisfaction (H10: 10 = 0.541, t = 9.108, p = 0.0) of natural dyes batik production showed significant positive influences on production intention of natural dyes batik.

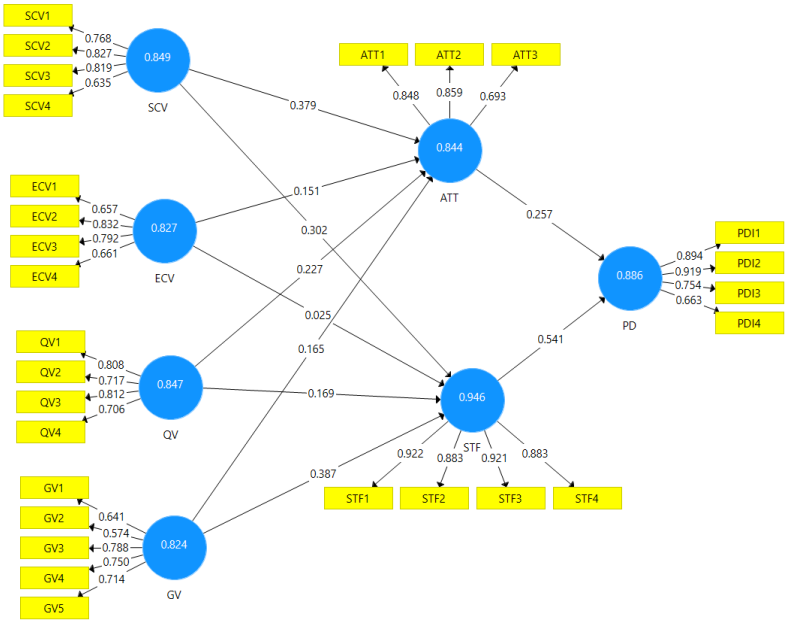


**Figure 2** Standardized Factor Loading

**Table 6** Hypotheses Result for the Structural Model

| | Path Coefficient | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| H1 | SCV -> ATT | 0.379 | 0.076 | 5.005 | 0.000 |
| H2 | SCV -> STF | 0.302 | 0.067 | 4.483 | 0.000 |
| H3 | ECV -> ATT | 0.151 | 0.079 | 1.908 | 0.057 |
| H4 | ECV -> STF | 0.025 | 0.057 | 0.434 | 0.665 |
| H5 | QV -> ATT | 0.227 | 0.061 | 3.725 | 0.000 |
| H6 | QV -> STF | 0.169 | 0.071 | 2.367 | 0.018 |
| H7 | GV -> ATT | 0.165 | 0.080 | 2.054 | 0.040 |
| H8 | GV -> STF | 0.387 | 0.071 | 5.461 | 0.000 |
| H9 | ATT -> PD | 0.257 | 0.072 | 3.558 | 0.000 |
| H10 | STF -> PD | 0.541 | 0.059 | 9.108 | 0.000 |
| H8 | GV -> STF | 0.387 | 0.071 | 5.461 | 0.000 |

## 5 Results and Discussion

This study investigated the extended framework of the perceived model, in which social value, economic value, quality value and green value are added as antecedents of attitude and satisfaction of natural dyes batik production. The purpose was to examine Indonesian natural dyes batik producers on the production intention of natural dyes batik products. The result recommended that producers' intention for this group to produce natural dyes batik products can be predicted by attitude, satisfaction, social value, economic value, quality value and green value.

Attitude and satisfaction were found to give significant positive impacts on production intention of natural dyes batik products. Satisfaction had the most significant influence on producers' production intention, which reveals that satisfaction was the strongest predictor of production intention of natural dyes batik products followed attitude. The overall results assured that the perceived model and its behaviour were suitable for the investigated group. Ajzen [44] revealed that higher positive attitude consumers have towards purchase behaviour, leads to stronger consumer's intentions to implement a behaviour under their control. Molina [17] revealed that in the field of clothing and footwear, no exact association was found between the determinants of attitude and loyalty towards the sellers. Study of Tomasetti showed the positive influence of attitude towards behavioural intention of restaurants consumers. Maichum [41] determined positive correspondence between attitude of purchasing green products and purchase intention of green products. However, Hamzah and Tanwir [34] revealed that no significant relationship was observed between

Green Purchase Attitude towards intention to purchase hybrid vehicles. They assumed that a positive attitude of having environmental-friendly products does not ignite consumers' motives towards pro-environmental attitude.

Equally, there were positive relationships between social value towards attitude and satisfaction of producers in producing natural dyes batik. Producers would have positive attitude and satisfaction towards producing natural dyes batik when they have high level of social value. Perceived impression of natural dyes batik production as well as the image as environmental care people are good motives in producing natural dyes batik. Producers would satisfy and enjoy the process of natural dyes batik production. Different trend was obtained by Hamzah and Tanwir [34], in which subjective norms insignificantly affected purchase intention. This is due to the consumers' social network, involving co-workers and fellow as well as relatives gave insufficient effect in determining their compliance to purchase hybrid vehicles. Another reason is their social influencers are not entirely knowledgeable of the advantages of applying pro-environmental behaviour. No significant relationship was obtained between social value and behavioural intention to consume organic food products. It was mean that no social recognition or social image enhancement was perceived by taking organic food products [21].

Economic value significantly defined attitude of producing natural dyes batik. The belief of low production costs and more marketable products leads to the higher level of producing natural dyes batik attitude. Moreover, the exclusivity of natural dyes batik products may enhance the sales thus in turn increase the profits. The low production costs gave impact in lower selling price. As a result, producers have favourable attitude towards resulting the products. Producers are currently more environmentally aware about the hazard of textile dyes and chemical agents used in conventional dyeing process. Their awareness is able to increase their responsibility to protect the environment through the use of natural dyes to minimize environmental pollution. This is in accordance with the finding of Qasim [21] that economic value is among the performance factors assessed by consumers. They tend to purchase premium costly products as long as the products provide high return. On the other hand, economic value insignificantly determined producer satisfaction. Despite their responsible attitude towards the environment, producers are not satisfied with the results obtained, especially during the pandemic. Basic daily necessities are more preferable rather than natural dyes batik product. Yuniarti et al. [45] recorded low inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of profits.

Producers' attitude and satisfaction are also affected by quality value. Natural dyes batik products generated at premium quality could improve the favourable attitude of producers. They could get more idea to sustainably produce good batik products by maintaining superior quality. A confidence attitude leading to a better comprehension towards the utility of technology, thus inducing to a tendency to apply these technologies. Producers who exhibited conviction about applying and learning technologies and perceived a net gain from applying these technologies indicated higher trend to use accurate agriculture technologies [46]. Verbeke [47] exhibited that every producer assured that his production method

serves good quality products. Study in the meat producers was carried out towards 12 livestock producers. Based on the interviews results, it was obtained that good quality meat was achieved through about the same production details. Producers had about the same attitude in resulting good quality meat. Producing excellent quality of natural dyes batik, in term of long lastness, good colour fastness, as well as well-made products enhance producers' satisfaction. Producer satisfaction plays an important role in determining the success of natural dyes batik production. Producers' satisfaction is also of important in determining the growth and future success of natural dyes batik industries. Thielemann [48] suggested that quality and value directly affected customer satisfaction. Perceived value shows to certainly influence customer loyalty with satisfaction as a partial mediator. Govindasamy [26] found that sustainable financial gain and satisfaction with returns from direct trading is associated to compliance to modify selling as well as production focus to satisfy customer requests. Mutonyi [49] described that trust moderates price satisfaction and producer loyalty. Trust could affect the likeness of social values of producer and customer, which severally generates the increase of buyer bounding, the enhance of retaliation and the development of sustainable relationships.

The study found that green value significantly determined producer attitude and satisfaction. The facts that natural dyes batik production generate less and harmless wastewater lead to the positive attitude thus very helpful in achieving their goals. They could continue producing natural dyes batik without worrying about the negative impact on the environment. The negative impacts toward customer body as well as surrounding environment by the production of natural dyes batik are negligible. In term of satisfaction, the pro-environment facts of natural dyes batik induce producers' contentment. The other facts are the employment of unused natural resources and local material in the production of natural dyes batik. This selection causes an attitude of pride and satisfaction for producers.

## 6 Conclusion

Production intention of environmentally friendly fashion products has been evaluated successfully. This work focused on the natural dyes batik producers in Indonesia. The results showed that production intention was affected significantly by the producers' attitude and satisfaction. In the meantime, the attitude and satisfaction of the producer were highly influenced by social value, quality value, and green value parameter. Economic value, however, provided contribution on the producer's attitude, but insignificantly contributed to the producer's satisfaction. Overall, production intention of natural dyes batik was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

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## Declarations

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# ESPR: Your manuscript ESPR-D-22-02442 - [EMID:030e661be3819807]

From: Philippe Garrigues (em@editorialmanager.com)

To: adhi_kusumastuti@mail.unnes.ac.id

Date: Monday, 11 April 2022 at 02:39 am GMT+7

Ref.:
Ms. No. ESPR-D-22-02442
Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen
Environmental Science and Pollution Research

Dear Dr Kusumastuti,

Reviewers have now commented on your paper. You will see that there are a number of issues that need to be addressed before the paper can be accepted for publication by ESPR.

Please include continuous line numbers in your manuscript to facilitate editorial handling and reviewing.

We ask that you give the comments raised by the referees your careful consideration and that you submit a revised version of your manuscript as well as an itemized reply to each of the reviewers' comments. Please make sure to mark all changes in a different colour and to submit your editable source files (i. e. Word, TeX)

Your revision is due by 10 May 2022.

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

If you need extra time to revise your manuscript, please contact Mrs. Cayago + Carmina.Cayago@springernature.com

To submit a revision, go to https://www.editorialmanager.com/espr/ and log in as an Author. You will see a menu item called 'Submissions Needing Revision'. You will find your submission record there.

I am looking forward to receiving you revised manuscript!

Yours sincerely,

Dr. Philippe Garrigues
Managing Editor
Environmental Science and Pollution Research

Reviewers' comments:

Reviewer #1:
1. The use of language is quite mixed; it is acceptable is some areas, while isn't in other areas. Similarly, there are sentences that need to be simplified. Please check and improvise the use of language, and grammar. For instance, the language used in the introduction of 'attitude' appears to be very 'flat' and monotonous(line 140-144)

2. A main issue with the manuscript in its present form is its lack of motivation. It is not clear why you are doing this study and why it is important for the field that you do it. The introduction should be the section driving this. However, what presented in the Introduction is not enough to establish a need for the study. Without a strong problematization of relevant literature, findings lose meaningfulness. Findings need to work to help you address the problem. Thus, it was also hard for me to follow the logic of this manuscript as it has no underlying theory. Without an underlying theory, the research gap and novelty aspects are severly compromised.

3. The engagement with the literature is descriptive and not critical. In other words, its a summary of what other people/research says. Please offer critical debate/argument that could enrich this section with valuable insights. Start by dveloping your own original thoughts. Then imagine yourself on the opponent's side, and think of the counter-arguments that can be used to rebut your original views. You may read further from this interesting web article:
https://patthomson.net/2017/09/11/avoiding-the-laundry-list-literature-review/

4.-In line 92-93, the author(s) claimed: "However, there has been no study on the behaviour of batik craftsmen in the use of natural dyes". The tone of this statement sounds exaggerated, while the word 'behavior' alone is too general.

5.-In line 125, "were drawn from six constructs,". Shouldn't it be seven constructs (as depicted in Figure 1).

6.-In methodology-sample section, please highlight the inclusion and exclusion criteria. Does this mean that all batik producers from various background are qualified to participate? How did you filter their participation?

7. -In methodology-sample section, is there any content validation by experts prior to data collection? I notice that some of the wordings of the measures are prone to grammatical errors/issues (e.g."Producing natural dye batik shows that I am environmental care"; "Selling natural dye batik increases my income as batik craftsman"). In addition, you have not declared if dual-languag is used (e.g. Bahasa Indonesia?) considering majority of them were school-leavers.

8- In terms of the chosen analysis methods, common method bias (CMV) should be assessed in more detail, as it can be an issue here considering the samples involving single-source informants (even to simply have different Likert-scale point items and running the Harman's test is not yet sufficient).

9- In Table 3, there's no need to include Cronbach Alpha results. As for model fit measures (Table 4), these indicators should not be reported in line with experts (e.g Hair) recommendation to use fit indicators with caution when using smartPLS.

10- Referring to Table 5, why do you need to show the inter-correlation of items? Instead, provide the inter-construct correlations. Please provide a proper table of discriminant validity analysis (using the HTMT matrix), and also another table depicting cross-loadings among the items.

11- In line 342-354, you mention that "Hair et al. (2009) determined that the factor loading should be higher than 0.700. It was found that all of standardized factor loadings were significant ranging from 0.722
to 0.924.". This statement is flawed. But in Table 3, the loadings for EV1, EV4, GV2, ATT3, and PDI4 is below 0.7 (It's ok to have loadings below 0.7 if others have higher values that can complement the AVE to achieve value of >0.5, refer to Hair: a primer on PLS). To make things worse, item SCV4 has a very poor loading of .228 (which should have been removed). Please re-analyze your data, as the model, and results now seems to be inconvincing.

12a- Please check on your reporting standard (page 15). Beta coefficient symbol is missing. You do not have to indicate the exact p-value. Instead remove them, as t-value is suffice to show the level of significance.

Most importantly, there are multiple errors in reporting (statistics in tables do reflect the stats in the paragraphs).

In line 401 (H3: 3 = 0.151, t = 1.908, p < 0.001), either there's something wrong between t-value & p-value (for a t-value of 1.9, the p-value should be somewhere above -not below, 0.001. Might be typo error?). A check on Table 6 indicates that the p-value is 0.057. Furthermore, remove the Hypothesis symbol (H) in the brackets as this same hypothesis indicator is redundant with the subsequent explanation. The emergence of these errors warrant further close scrutiny on your side to check and rectify these mistakes.

12b- The naming convention for each variable needs to be consistent. For instance, In Table 6 and Figure 2, economic value is abbreviated as ECV, while this differs in Table 3 (EV)

13- The Discussion section needs to be split into a section discussing the results (a Discussion section that explains why the results appear like that), one discussing the Implications for Theory and Practice,and one Conclusion section. Also, in these sections (especially the one related to the Theoretical Implications) you would need to refer to earlier studies to clarify what the incremental contribution of your work has been.

14-In the discussion section, the author(s) provide little concrete/solid reasonings on why such results occurred. Even if there are some, these sound very descriptive and did not offer convincing explanation. In most cases, I don't really get what the paragraphs are trying to convey.

For instance, in line 474-477:
"Basic daily necessities are more preferable rather than natural dyes batik product. Yuniarti et al. (2021) recorded low inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of profits."

This is just one of the many paragraphs that I found it difficult to understand and relate. Please examine other articles published in ESPR to make your presentation, arguments and flow consistent with the journal's norms.

15- The conclusion section is poorly written. Please highlight the study's Limitations and future research direction [what's insufficient in your research & how can future researchers address these issues, one for each of the limitation].

16-Make sure to have your paper inspected by a professional proof reader, to check for grammar, sentence construction and word choice.

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Environmental Science and Pollution Research

# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

--Manuscript Draft--

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| **Manuscript Number:** | ESPR-D-22-02442R1 |
| **Full Title:** | Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen |
| **Article Type:** | Research Article |
| **Corresponding Author:** | Adhi Kusumastuti<br>Universitas Negeri Semarang Fakultas Teknik<br>INDONESIA |
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| **Abstract:** | Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms. The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value, quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production. |
| **Response to Reviewers:** | NoCommentsRevision<br>1The use of language is quite mixed; it is acceptable is some areas, while isn't in other areas. Similarly, there are sentences that need to be simplified. Please check and improvise the use of language, and grammar. For instance, the language used in the introduction of 'attitude' appears to be very 'flat' and monotonous (line 140-144)<br>The language in the manuscript has been rechecked and revised. The above-mentioned part has been revised: |

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| | “Attitude is a concept that includes evaluation of people, problems, objects, or events. Attitudes could change as the development of people's experience and knowledge. It is the part that has a strong influence on behaviour. Behaviour could be reflected from experience or background. People's perspective can be learned and influenced by information and experiences. Furthermore, the fact that attitudes are predispositions to respond leads to their relationship with actual producer behaviour. Producers attitude strongly affect production behaviours. The mindset of the producer has a significant impact on production behaviour.”<br>2A main issue with the manuscript in its present form is its lack of motivation. It is not clear why you are doing this study and why it is important for the field that you do it. The introduction should be the section driving this. However, what presented in the Introduction is not enough to establish a need for the study. Without a strong problematization of relevant literature, findings lose meaningfulness. Findings need to work to help you address the problem. Thus, it was also hard for me to follow the logic of this manuscript as it has no underlying theory. Without an underlying theory, the research gap and novelty aspects are severely compromised.<br>These following sentences have been added to strengthen the study objective:<br>“However, many studies have shown that the potential benefits of natural dye batik are not always recognized in all areas and in all management systems. This is due to natural dyes have a complex chemical structure (Patel and Vashi 2010), long colouring process, inconsistent colour reproducibility, and relatively expensive costs (Makkar 2010; Comlekcioglu et al. 2015). At the same time, the implementation of natural dyes batik development policy depends on the willingness of craftsmen to participate and make changes on their batik products. As a result, it's critical to gain a better knowledge of how these artisans may be persuaded to use natural dyes in their batik production. In such endeavours, identification of socio-psychological conceptions and ideas that influence craftsmen's intention to use natural dyes in batik production can help build and adapt present policies. In these circumstances, research on producer behavioural intent must combine theories of rational and ethical approach in the development of research models (Valizadeh et al. 2018; Nguyen et al. 2021).”<br>“This study objected to understanding the factors influencing producers’ intentions on natural dyes batik. Moreover, given the factors influencing the intention to produce natural dyes batik, a few recommendations sent to the state management to promote producers’ intentions to fabricate natural dyes batik in Indonesia.”<br>3The engagement with the literature is descriptive and not critical. In other words, it’s a summary of what other people/research says. Please offer critical debate/argument that could enrich this section with valuable insights. Start by developing your own original thoughts. Then imagine yourself on the opponent's side, and think of the counter-arguments that can be used to rebut your original views. You may read further from this interesting web article:<br>https://patthomson.net/2017/09/11/avoiding-the-laundry-list-literature-review/<br>The manuscript has been revised:<br>“In this context, one of the factors influenced the behaviour is attitude (Ruiz-Molina and Gil-Saura 2008) in which attitude consists of three components, i.e. affect that refers to people preferences level, cognition that refers to person’s knowledge of the attitudinal object, and behaviour that refers to reactions and intention to the object (Mantle-Bromley 1995) either positive or negative behaviour to certain concept or subject (Hussein 2017). Moreover, attitude refers to psychological tendency that is expressed by assessing a particular system at certain degree of favourness and period of time that influences people to behave in a certain way regarding the matter. In a specific case, a single behaviour on a particular attitude object is strongly predicted by a specific attitude (Tan 2011).”<br>4In line 92-93, the author(s) claimed: "However, there has been no study on the behaviour of batik craftsmen in the use of natural dyes". The tone of this statement sounds exaggerated, while the word 'behavior' alone is too general<br>The sentence has been revised as:<br>“Study on the intention of batik craftsmen in applying natural dyes on their process is unexplored.”<br>5In line 125, "were drawn from six constructs,". Shouldn't it be seven constructs (as depicted in Figure 1)<br>The part has been revised as suggested<br>“Totally, 10 hypotheses were drawn from seven constructs, i.e.,..”<br>6In methodology-sample section, please highlight the inclusion and exclusion criteria. Does this mean that all batik producers from various background are qualified to |

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| | participate? How did you filter their participation?<br>The inclusion and exclusion criteria have been incorporated<br>“The sample criteria in this study were selected based on the provisions of those who experienced at least 1 year as natural dye batik producer.”<br>7In methodology-sample section, is there any content validation by experts prior to data collection? I notice that some of the wordings of the measures are prone to grammatical errors/issues (e.g., “Producing natural dye batik shows that I am environmental care"; "Selling natural dye batik increases my income as batik craftsman"). In addition, you have not declared if dual-language is used (e.g., Bahasa Indonesia?) considering majority of them were school-leavers.<br>The manuscript has been revised by incorporating information on validation process<br>“Furthermore, to find out the extent of the instrument's representation of the specific behaviour to be measured, content validity was carried out prior to data collection process. Content validity of an instrument is the extent to which the items in the instrument represent the components in the overall content area of the object to be measured and the extent to which the items reflect the behavioural characteristics to be measured (Fernandes 1984; Nunnally and Bernstein 1994). Content validity was determined using the agreement of 3 experts, 2 batik experts and 1 psychological measurement expert. To determine the content validity index based on expert agreement, the content validity index proposed by Aiken (Aiken 1980) was used. Questionnaire items that have been compiled based on indicator variables, was assessed by three experts by filling in a score (Score 1 = Not relevant; Score 2 = less relevant; Score 3 = quite relevant; Score 4 = relevant; Score 5= very relevant). The assessments results of the three experts as validators were then calculated using the Aiken V index formula, and the value was 0.89. It showed that the content validity index of the instrument used was very valid. Considering the respondents backgrounds, the questionnaire was given in Indonesian.”<br>8In terms of the chosen analysis methods, common method bias (CMV) should be assessed in more detail, as it can be an issue here considering the samples involving single-source informants (even to simply have different Likert-scale point items and running the Harman's test is not yet sufficient)<br>Common method bias has been applied and the results have been incorporated in the manuscript<br>“Common Method Bias is an effort made to see the strength or size of gap between the observed correlation and the true correlation between constructs or variables. Therefore, Common Method Bias test in this study was objected to avoid the causes of errors in measuring or testing data. To show the issue of Common Method Bias or not, it can be analysed using the full collinearity test (Kock & Lynn, 2012). Through this procedure, a construct model that may be contaminated by Common Method Bias can be seen based on variance inflation factors (VIFs). VIF > 3.3 indicates a pathological collinearity as well as contaminated model by Common Method Bias. On the other hand, VIF from the full collinearity test of greater than 3.3, the model is considered free from Common Method Bias. Table 3 describes full collinearity test results, reveals that latent variables have a VIF value greater than 3.3, that no Common Method Bias occurred in this study.”<br>9In Table 3, there's no need to include Cronbach Alpha results. As for model fit measures (Table 4), these indicators should not be reported in line with experts (e.g., Hair) recommendation to use fit indicators with caution when using smartPLS.<br>The Cronbach Alpha results have been omitted. Table 4 has been omitted.<br>10Referring to Table 5, why do you need to show the inter-correlation of items? Instead, provide the inter-construct correlations. Please provide a proper table of discriminant validity analysis (using the HTMT matrix), and also another table depicting cross-loadings among the items.<br>Table 5 has been omitted. Table of discriminant validity analysis using the HTMT matrix has been incorporated<br>11In line 342-354, you mention that "Hair et al. (2009) determined that the factor loading should be higher than 0.700. It was found that all of standardized factor loadings were significant ranging from 0.722 to 0.924.". This statement is flawed. But in Table 3, the loadings for EV1, EV4, GV2, ATT3, and PDI4 is below 0.7 (It's ok to have loadings below 0.7 if others have higher values that can complement the AVE to achieve value of >0.5, refer to Hair: a primer on PLS). To make things worse, item SCV4 has a very poor loading of .228 (which should have been removed). Please re-analyse your data, as the model, and results now seems to be unconvincing.<br>In Table 2 and Table 4, SCV4 & GV2 have been removed thus the Average Variance |

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| | Extracted > 0.5<br>12aPlease check on your reporting standard (page 15). Beta coefficient symbol is missing. You do not have to indicate the exact p-value. Instead remove them, as t-value is sufficed to show the level of significance.<br><br>Most importantly, there are multiple errors in reporting (statistics in tables do reflect the stats in the paragraphs).<br><br>In line 401 (H3: 3 = 0.151, t = 1.908, p < 0.001), either there's something wrong between t-value & p-value (for a t-value of 1.9, the p-value should be somewhere above -not below, 0.001. Might be typo error?). A check on Table 6 indicates that the p-value is 0.057. Furthermore, remove the Hypothesis symbol (H) in the brackets as this same hypothesis indicator is redundant with the subsequent explanation. The emergence of these errors warrants further close scrutiny on your side to check and rectify these mistakes.<br>Beta coefficient symbol has been incorporated; p-value has been removed<br>Error in line 401 has been revised: “(ρ3 = 0.148, t = 1.811)”<br>The hypothesis symbols in the brackets have been removed.<br>12bThe naming convention for each variable needs to be consistent. For instance, In Table 6 and Figure 2, economic value is abbreviated as ECV, while this differs in Table 3 (EV)<br>The naming convention of economic value has been consistent in Table 3, Table 6, and Figure 2.<br>13The Discussion section needs to be split into a section discussing the results (a Discussion section that explains why the results appear like that), one discussing the Implications for Theory and Practice, and one Conclusion section. Also, in these sections (especially the one related to the Theoretical Implications) you would need to refer to earlier studies to clarify what the incremental contribution of your work has been.<br>Theoretical and practical implications of the study have been incorporated in the manuscript<br>“5.1Theoretical Implications<br>Application of natural dyes have been widely investigated. Indonesia as tropical country provides abundant types of natural resources having potential to be applied as natural dyes. However, research on producers’ intention towards natural dyes batik has not been found yet. Previous research limited to the relationship exploration of green subjective standards, awareness of green products and attitudes towards green purchasing intentions through the Internal Environmental Control Locus (INELOC) between craft shopping tourists in the Batik town of Pekalongan (Sunarjo et al. 2021). This research was driven by curiosity and the desire to expand knowledge in producers' intention area. It is believed that it gives a specific contribution to the academic body of knowledge in the research area of natural dyes batik producer intention.<br>In the field of natural dyes batik, studying producers’ intentions, this research confirms the role of the theory of planned behaviour in the acceptance of natural dyes. This study confirms the appropriateness theory of planned behaviour in understanding producers’ intention toward natural dyes batik production in Indonesia. This model has proven the suitability of the approaches, in which social value, quality value, economic value, and green value give a direct effect of 43.5% in increasing attitude. Those factors also simultaneously have an impact on satisfaction increment at about 47.3%. Meanwhile, production intention was directly affected by attitude and satisfaction of about 53.6%.<br>5.2Practical Implications<br>Adopting natural dyes batik not only to increase producers’ income but also to protect environmental pollution by avoiding harmful chemicals. In Indonesia, natural dyes batik is becoming a trend thus being promoted through many government policies. In order to increase the intention of adopting natural dyes batik production, the government needs to access to factors that influence the intentions and ethical aspects of producers. Based on the research results of factors affecting producers’ intention toward natural dyes batik production in Indonesia, the following suggestions are given:<br>1. The raising values among producers about the role of natural dyes batik and the health and environmental impacts of not applying natural dyes. This research was developed based on the relationship between the factors in planned behaviour and the relationship between attitude and satisfaction with intentions of producers. Values of |

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| | the consequences of natural dyes application were proven to have a direct and indirect positive effect through the belief of responsibility on the ethical perception of applying or not applying natural dyes.<br>Satisfaction, will positively affect producers' intention toward natural dyes batik production in Indonesia. Besides, producers' intention would also be affected by attitude.<br>2. Communicating to producers through different means about the benefits of natural dyes compared to synthetic dyes on the health of producers themselves and customers. The study contributes to the satisfaction of producers, a factor that has been shown to have the strongest influence on the intention toward natural dyes batik production of Indonesian craftsmen.<br>3. Forming information spill over groups between craftsmen who have developed natural dyes batik and others who have not yet done so. Those who have not practiced natural dyes batik will be given precise and practical information on the benefits of natural dyes thus forming natural dyes intentions. Information exchange among these craftsmen will affect attitude."<br>14In the discussion section, the author(s) provide little concrete/solid reasonings on why such results occurred. Even if there are some, these sound very descriptive and did not offer convincing explanation. In most cases, I don't really get what the paragraphs are trying to convey.<br><br>For instance, in line 474-477:<br>"Basic daily necessities are more preferable rather than natural dyes batik product. Yuniarti et al. (2021) recorded low inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of profits."<br><br>This is just one of the many paragraphs that I found it difficult to understand and relate. Please examine other articles published in ESPR to make your presentation, arguments and flow consistent with the journal's norms.<br>Addition information has been incorporated to clarify the previous statements<br>"It is therefore, the natural dyes batik sales tent to decrease during pandemic. This is supported to the fact that study of Yuniarti et al. (2021) recorded inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of producers' profits."<br>15The conclusion section is poorly written. Please highlight the study's Limitations and future research direction [what's insufficient in your research & how can future researchers address these issues, one for each of the limitation].<br>Limitations and future research direction have been added in the manuscript:<br>"The current research has some limitations that need further investigation in the future. The study only focused on producers' intention toward natural dyes batik in some areas of Central Java; the findings are therefore not generalizable to all batik craftsmen in the country. Therefore, future studies should include producers from different areas. The use of intentions instead of actual behaviour is another limitation of this study, thus future studies need to investigate the impacts of factors in the model on natural dyes batik production implementations. The results on the difference and characterization of the demographic variables such as gender, age, domicile, education level, experience in batik production as well as the annual capacity of batik production should be taken into account that how they impact the intention toward natural dyes batik production in the next studies." |
| **Additional Information:** | |
| **Question** | **Response** |
| §Are you submitting to a Special Issue? | Yes |
| (If "yes") Please select a Special Issue from the following list:<br>as follow-up to "§Are you submitting to a Special Issue?<br>" | SI: ICENV2021 |

31 May 2022

Chief Editor
Environmental Science and Pollution Research

Dear Professor Philippe Garrigues,

MS entitled: **"Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen"**

I am resubmitting a revised version of our manuscript for possible publication in Environmental Science and Pollution Research for Special Issue of Green Technology and Industrial Revolution 4.0 for a Greener Future. The revised parts are highlighted in yellow. The revisions are listed in the table below:

| No | Comments | Revision |
|---|---|---|
| 1 | The use of language is quite mixed; it is acceptable is some areas, while isn't in other areas. Similarly, there are sentences that need to be simplified. Please check and improvise the use of language, and grammar. For instance, the language used in the introduction of 'attitude' appears to be very 'flat' and monotonous (line 140-144) | The language in the manuscript has been rechecked and revised. The above-mentioned part has been revised: "Attitude is a concept that includes evaluation of people, problems, objects, or events. Attitudes could change as the development of people's experience and knowledge. It is the part that has a strong influence on behaviour. Behaviour could be reflected from experience or background. People's perspective can be learned and influenced by information and experiences. Furthermore, the fact that attitudes are predispositions to respond leads to their relationship with actual producer behaviour. Producers attitude strongly affect production behaviours. The mindset of the producer has a significant impact on production behaviour." |
| 2 | A main issue with the manuscript in its present form is its lack of motivation. It is not clear why you are doing this study and why it is important for the field that you do it. The introduction should be the section driving this. However, what presented in the Introduction is not enough to establish a need for the | These following sentences have been added to strengthen the study objective:<br>"However, many studies have shown that the potential benefits of natural dye batik are not always recognized in all areas and in all management systems. This is due to natural dyes have a complex chemical structure (Patel and Vashi 2010), long colouring process, inconsistent colour reproducibility, and |

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| | study. Without a strong problematization of relevant literature, findings lose meaningfulness. Findings need to work to help you address the problem. Thus, it was also hard for me to follow the logic of this manuscript as it has no underlying theory. Without an underlying theory, the research gap and novelty aspects are severely compromised. | relatively expensive costs (Makkar 2010; Comlekcioglu et al. 2015). At the same time, the implementation of natural dyes batik development policy depends on the willingness of craftsmen to participate and make changes on their batik products. As a result, it's critical to gain a better knowledge of how these artisans may be persuaded to use natural dyes in their batik production. In such endeavours, identification of socio-psychological conceptions and ideas that influence craftsmen's intention to use natural dyes in batik production can help build and adapt present policies. In these circumstances, research on producer behavioural intent must combine theories of rational and ethical approach in the development of research models (Valizadeh et al. 2018; Nguyen et al. 2021)."<br>"This study objected to understanding the factors influencing producers' intentions on natural dyes batik. Moreover, given the factors influencing the intention to produce natural dyes batik, a few recommendations sent to the state management to promote producers' intentions to fabricate natural dyes batik in Indonesia." |
| 3 | The engagement with the literature is descriptive and not critical. In other words, it's a summary of what other people/research says. Please offer critical debate/argument that could enrich this section with valuable insights. Start by developing your own original thoughts. Then imagine yourself on the opponent's side, and think of the counter-arguments that can be used to rebut your original views. You may read further from this interesting web article: https://patthomson.net/2017/09/11/avoiding-the-laundry-list-literature-review/ | The manuscript has been revised: "In this context, one of the factors influenced the behaviour is attitude (Ruiz-Molina and Gil-Saura 2008) in which attitude consists of three components, i.e. affect that refers to people preferences level, cognition that refers to person's knowledge of the attitudinal object, and behaviour that refers to reactions and intention to the object (Mantle-Bromley 1995) either positive or negative behaviour to certain concept or subject (Hussein 2017). Moreover, attitude refers to psychological tendency that is expressed by assessing a particular system at certain degree of favourness and period of time that influences people to behave in a certain way regarding the matter. In a specific case, a single behaviour on a particular attitude object is strongly predicted by a specific attitude (Tan 2011)." |
| 4 | In line 92-93, the author(s) claimed: | The sentence has been revised as: |

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| | "However, there has been no study on the behaviour of batik craftsmen in the use of natural dyes". The tone of this statement sounds exaggerated, while the word 'behavior' alone is too general | “Study on the intention of batik craftsmen in applying natural dyes on their process is unexplored.” |
| 5 | In line 125, "were drawn from six constructs,". Shouldn't it be seven constructs (as depicted in Figure 1) | The part has been revised as suggested “Totally, 10 hypotheses were drawn from seven constructs, i.e.,..” |
| 6 | In methodology-sample section, please highlight the inclusion and exclusion criteria. Does this mean that all batik producers from various background are qualified to participate? How did you filter their participation? | The inclusion and exclusion criteria have been incorporated<br>“The sample criteria in this study were selected based on the provisions of those who experienced at least 1 year as natural dye batik producer.” |
| 7 | In methodology-sample section, is there any content validation by experts prior to data collection? I notice that some of the wordings of the measures are prone to grammatical errors/issues (e.g., “Producing natural dye batik shows that I am environmental care"; "Selling natural dye batik increases my income as batik craftsman"). In addition, you have not declared if dual-language is used (e.g., Bahasa Indonesia?) considering majority of them were school-leavers. | The manuscript has been revised by incorporating information on validation process<br>“Furthermore, to find out the extent of the instrument's representation of the specific behaviour to be measured, content validity was carried out prior to data collection process. Content validity of an instrument is the extent to which the items in the instrument represent the components in the overall content area of the object to be measured and the extent to which the items reflect the behavioural characteristics to be measured (Fernandes 1984; Nunnally and Bernstein 1994). Content validity was determined using the agreement of 3 experts, 2 batik experts and 1 psychological measurement expert. To determine the content validity index based on expert agreement, the content validity index proposed by Aiken (Aiken 1980) was used. Questionnaire items that have been compiled based on indicator variables, was assessed by three experts by filling in a score (Score 1 = Not relevant; Score 2 = less relevant; Score 3 = quite relevant; Score 4 = relevant; Score 5= very relevant). The assessments results of the three experts as validators were then calculated using the Aiken V index formula, and the value was 0.89. It showed that the content validity index of the instrument used was very valid. Considering the respondents backgrounds, the questionnaire was given in Indonesian.” |

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| 8 | In terms of the chosen analysis methods, common method bias (CMV) should be assessed in more detail, as it can be an issue here considering the samples involving single-source informants (even to simply have different Likert-scale point items and running the Harman's test is not yet sufficient) | Common method bias has been applied and the results have been incorporated in the manuscript<br>"Common Method Bias is an effort made to see the strength or size of gap between the observed correlation and the true correlation between constructs or variables. Therefore, Common Method Bias test in this study was objected to avoid the causes of errors in measuring or testing data. To show the issue of Common Method Bias or not, it can be analysed using the full collinearity test (Kock & Lynn, 2012). Through this procedure, a construct model that may be contaminated by Common Method Bias can be seen based on variance inflation factors (VIFs). VIF > 3.3 indicates a pathological collinearity as well as contaminated model by Common Method Bias. On the other hand, VIF from the full collinearity test of greater than 3.3, the model is considered free from Common Method Bias. Table 3 describes full collinearity test results, reveals that latent variables have a VIF value greater than 3.3, that no Common Method Bias occurred in this study." |
| 9 | In Table 3, there's no need to include Cronbach Alpha results. As for model fit measures (Table 4), these indicators should not be reported in line with experts (e.g., Hair) recommendation to use fit indicators with caution when using smartPLS. | The Cronbach Alpha results have been omitted. Table 4 has been omitted. |
| 10 | Referring to Table 5, why do you need to show the inter-correlation of items? Instead, provide the inter-construct correlations. Please provide a proper table of discriminant validity analysis (using the HTMT matrix), and also another table depicting cross-loadings among the items. | Table 5 has been omitted. Table of discriminant validity analysis using the HTMT matrix has been incorporated |
| 11 | In line 342-354, you mention that "Hair et al. (2009) determined that the factor loading should be higher than 0.700. It was found that all of standardized factor loadings were | In Table 2 and Table 4, SCV4 & GV2 have been removed thus the Average Variance Extracted > 0.5 |

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| | significant ranging from 0.722 to 0.924.". This statement is flawed. But in Table 3, the loadings for EV1, EV4, GV2, ATT3, and PDI4 is below 0.7 (It's ok to have loadings below 0.7 if others have higher values that can complement the AVE to achieve value of >0.5, refer to Hair: a primer on PLS). To make things worse, item SCV4 has a very poor loading of .228 (which should have been removed). Please re-analyse your data, as the model, and results now seems to be unconvincing. | |
| 12a | Please check on your reporting standard (page 15). Beta coefficient symbol is missing. You do not have to indicate the exact p-value. Instead remove them, as t-value is sufficed to show the level of significance.<br><br>Most importantly, there are multiple errors in reporting (statistics in tables do reflect the stats in the paragraphs).<br><br>In line 401 (H3: 3 = 0.151, t = 1.908, p < 0.001), either there's something wrong between t-value & p-value (for a t-value of 1.9, the p-value should be somewhere above -not below, 0.001. Might be typo error?). A check on Table 6 indicates that the p-value is 0.057. Furthermore, remove the Hypothesis symbol (H) in the brackets as this same hypothesis indicator is redundant with the subsequent explanation. The emergence of these errors warrants further close scrutiny on your side to check and rectify these mistakes. | Beta coefficient symbol has been incorporated; p-value has been removed<br>Error in line 401 has been revised: "(ρ3 = 0.148, t = 1.811)"<br>The hypothesis symbols in the brackets have been removed. |
| 12b | The naming convention for each variable needs to be consistent. For instance, In Table 6 and Figure 2, economic value is abbreviated as ECV, while this differs in Table 3 (EV) | The naming convention of economic value has been consistent in Table 3, Table 6, and Figure 2. |
| 13 | The Discussion section needs to be | Theoretical and practical implications of the |

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| | split into a section discussing the results (a Discussion section that explains why the results appear like that), one discussing the Implications for Theory and Practice, and one Conclusion section. Also, in these sections (especially the one related to the Theoretical Implications) you would need to refer to earlier studies to clarify what the incremental contribution of your work has been. | study have been incorporated in the manuscript<br>"5.1 Theoretical Implications<br>Application of natural dyes have been widely investigated. Indonesia as tropical country provides abundant types of natural resources having potential to be applied as natural dyes. However, research on producers' intention towards natural dyes batik has not been found yet. Previous research limited to the relationship exploration of green subjective standards, awareness of green products and attitudes towards green purchasing intentions through the Internal Environmental Control Locus (INELOC) between craft shopping tourists in the Batik town of Pekalongan (Sunarjo et al. 2021). This research was driven by curiosity and the desire to expand knowledge in producers' intention area. It is believed that it gives a specific contribution to the academic body of knowledge in the research area of natural dyes batik producer intention.<br>In the field of natural dyes batik, studying producers' intentions, this research confirms the role of the theory of planned behaviour in the acceptance of natural dyes. This study confirms the appropriateness theory of planned behaviour in understanding producers' intention toward natural dyes batik production in Indonesia. This model has proven the suitability of the approaches, in which social value, quality value, economic value, and green value give a direct effect of 43.5% in increasing attitude. Those factors also simultaneously have an impact on satisfaction increment at about 47.3%. Meanwhile, production intention was directly affected by attitude and satisfaction of about 53.6%.<br>5.2 Practical Implications<br>Adopting natural dyes batik not only to increase producers' income but also to protect environmental pollution by avoiding harmful chemicals. In Indonesia, natural dyes batik is becoming a trend thus being promoted through many government policies. In order to increase the intention of adopting natural dyes batik production, the government needs to access to factors that influence the intentions and ethical |

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| | | aspects of producers. Based on the research results of factors affecting producers' intention toward natural dyes batik production in Indonesia, the following suggestions are given:<br>1. The raising values among producers about the role of natural dyes batik and the health and environmental impacts of not applying natural dyes. This research was developed based on the relationship between the factors in planned behaviour and the relationship between attitude and satisfaction with intentions of producers. Values of the consequences of natural dyes application were proven to have a direct and indirect positive effect through the belief of responsibility on the ethical perception of applying or not applying natural dyes.<br>Satisfaction, will positively affect producers' intention toward natural dyes batik production in Indonesia. Besides, producers' intention would also be affected by attitude.<br>2. Communicating to producers through different means about the benefits of natural dyes compared to synthetic dyes on the health of producers themselves and customers. The study contributes to the satisfaction of producers, a factor that has been shown to have the strongest influence on the intention toward natural dyes batik production of Indonesian craftsmen.<br>3. Forming information spill over groups between craftsmen who have developed natural dyes batik and others who have not yet done so. Those who have not practiced natural dyes batik will be given precise and practical information on the benefits of natural dyes thus forming natural dyes intentions. Information exchange among these craftsmen will affect attitude." |
| 14 | In the discussion section, the author(s) provide little concrete/solid reasonings on why such results occurred. Even if there are some, these sound very descriptive and did not offer convincing explanation. In most cases, I don't really get what the | Addition information has been incorporated to clarify the previous statements<br>"It is therefore, the natural dyes batik sales tent to decrease during pandemic. This is supported to the fact that study of Yuniarti et al. (2021) recorded inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower |

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| | paragraphs are trying to convey.<br><br>For instance, in line 474-477:<br>"Basic daily necessities are more preferable rather than natural dyes batik product. Yuniarti et al. (2021) recorded low inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of profits."<br><br>This is just one of the many paragraphs that I found it difficult to understand and relate. Please examine other articles published in ESPR to make your presentation, arguments and flow consistent with the journal's norms. | purchasing power gave impact to the decrease of producers' profits." |
| 15 | The conclusion section is poorly written. Please highlight the study's Limitations and future research direction [what's insufficient in your research & how can future researchers address these issues, one for each of the limitation]. | Limitations and future research direction have been added in the manuscript: "The current research has some limitations that need further investigation in the future. The study only focused on producers' intention toward natural dyes batik in some areas of Central Java; the findings are therefore not generalizable to all batik craftsmen in the country. Therefore, future studies should include producers from different areas. The use of intentions instead of actual behaviour is another limitation of this study, thus future studies need to investigate the impacts of factors in the model on natural dyes batik production implementations. The results on the difference and characterization of the demographic variables such as gender, age, domicile, education level, experience in batik production as well as the annual capacity of batik production should be taken into account that how they impact the intention toward natural dyes batik production in the next studies." |

Please kindly acknowledge me for the receipt of the manuscript. If you have any inquiries, please do not hesitate to contact me through my email at

adhi_kusumastuti@mail.unnes.ac.id. Your cooperation regarding this matter is very much appreciated.
Thank you and with kind regards.

Yours sincerely,

**Dr. Adhi Kusumastuti**

# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

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Abstract

Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms.

The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value, quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

Keywords: producer; natural dye, batik, perspective

## 1 Introduction

Batik is the Indonesian art masterpiece as a blend of art and technology inherited by the ancestors. Batik fabric is a variety of decorative fabrics produced by resist dyeing using wax as colour barrier. Batik production process included motif drawing, dyeing, and wax removal. The most common used dyes in the batik-production process include naphthol, indigosol, Procyon, and Remazol.

Batik is produced by various regions in Indonesia with regional characteristics. Among the regions in Indonesia whose economy is dominated by the batik industry is Pekalongan. In 2011, there were 1342 small industries in Pekalongan of which about 83.1% were batik industries (Fajri 2013). With a production capacity of around 300 to 1000 pieces of cloth per month (Nindita et al. 2012), each industry has the potential to generate 202.4 m3 of waste. Considering that only about 0.6% of the industry has a sewage treatment unit (Fajri 2013), while the rest discharges

wastewater directly into the environment, serious move should be applied. Textile wastewater generally contains heavy metals such as chromium, copper, and cadmium. This waste can contaminate soil and surface water which in turn contaminates ground water. As a pollutant, the accumulation of heavy metals results in various disorders of the body's organs because heavy metals cannot be degraded (Malarkodi et al. 2007).

In the last two decades, green technology has received more attention. Green technology refers to all environmentally friendly technologies that do not interfere with or damage the environment and natural resources. The overuse of chemicals and overexploitation of resources lead to a worsening greenhouse effect, disturbed ecosystems, and global warming. With regard to the hazard posed by the use of synthetic dyes, natural dyes are reused back commercially. The use of natural dyes has increased along with the increasing awareness of consumers to get environmentally friendly textiles and the need to preserve the environment. This is driven by the carcinogenic nature of some synthetic dyes (Bechtold et al. 2007; Saxena and Raja 2014; Hassan et al. 2015). In addition, Indonesia has many types and sources of natural dyes. However, many studies have shown that the potential benefits of natural dye batik are not always recognized in all areas and in all management systems. This is due to natural dyes have a complex chemical structure (Patel and Vashi 2010), long colouring process, inconsistent colour reproducibility, and relatively expensive costs (Makkar 2010; Comlekcioglu et al. 2015). At the same time, the implementation of natural dyes batik development policy depends on the willingness of craftsmen to participate and make changes on their batik products. As a result, it's critical to gain a better knowledge of how these artisans may be persuaded to use natural dyes in their batik production. In such endeavours, identification of socio-psychological conceptions and ideas that influence craftsmen's intention to use natural dyes in batik production can help build and adapt present policies. In these circumstances, research on producer behavioural intent must combine theories of rational and ethical approach in the development of research models (Valizadeh et al. 2018; Nguyen et al. 2021).

Various studies discussed about application of natural dyes on batik processes have been carried out. Some reports on customer behaviour in the selection of batik are also available. In addition, other studies were conducted on the general description of the batik industry (Rahayu 2012; Suryani 2013; Alamsyah 2018; Rhofur 2019; Martuti et al. 2020). Study on the intention of batik craftsmen in applying natural dyes on their process is unexplored. Therefore, in order to find out the factors affecting the intention to produce natural batik, it is necessary to study the rational approach and the ethical approach. This study needs to be carried out to determine the behaviour and motivation of batik artisans to use natural

dyes. The use of natural dyes is expected to minimize environmental pollution, increase the economic value of renewable natural materials, and the selling value of batik itself. In addition, the impact of the use of natural dyes on the sustainability of dye plants and the environment will be analysed. In the end, it will be used to determine the policy direction for the use of natural dyes in the batik industry.

In the 1990s, manufacturers and retailers performed perceived value as an imperative strategic that will continue to be important well into the twenty-first century. Sweeney and Soutar (2001) declared that from a retailing perspective, people-based needs could be satisfied by delivering value thus put them in a much stronger position in the long term. Another statement given by Burden (1998), in which to increase retails target, through customer who emphasis the value and customer who gives time pressure. The retailing value move seems to be a global phenomenon as the most compelling (Asian retail) opportunities those are at the value end of the market given that consumers in Asia today are much more value conscious than they were in the mid-1990s.

Perceived value can be interpreted as a customer's overall assessment of the product or service benefits by taking into account the paid price with the obtained value. It is therefore, perceived value is assessed based on a comparison between what is obtained from the product or service with the components provided. Value is commonly defined as ratio or trade-off between quality and price which is a value-for-money conceptualization. Considering the fact that retail customers are “value-driven” customer’s value should be deeply understood by managers thus could focus their attention to achieve the needed market place advantage.

This research is very prospective in contributing data regarding the behaviour of natural dye batik craftsmen. The use of natural dyes is very important to minimize waste pollution due to the use of synthetic dyes and their additive materials. The data obtained is expected to be used to make policies related to the use of natural dyes in the batik industry. This study objected to understanding the factors influencing producers’ intentions on natural dyes batik. Moreover, given the factors influencing the intention to produce natural dyes batik, a few recommendations sent to the state management to promote producers’ intentions to fabricate natural dyes batik in Indonesia.

## 2 Literature Review and Hypothesis

Figure 1 depicts conceptual model of the proposed framework. Totally, 10 hypotheses were drawn from seven constructs, i.e., social value, economic value, quality value, green value, attitude, satisfaction, and production intention of natural dyes batik.

Attitude is a concept that includes evaluation of people, problems, objects, or events. Attitudes could change as the development of people's experience and knowledge. It is the part that has a strong influence on behaviour. Behaviour could be reflected from experience or background. People's perspective can be learned and influenced by information and experiences. Furthermore, the fact that attitudes are predispositions to respond leads to their relationship with actual producer behaviour. Producers attitude strongly affect production behaviours. The mindset of the producer has a significant impact on production behaviour. In this context, one of the factors influenced the behaviour is attitude (Ruiz-Molina and Gil-Saura 2008) in which attitude consists of three components, i.e. affect that refers to people preferences level, cognition that refers to person's knowledge of the attitudinal object, and behaviour that refers to reactions and intention to the object (Mantle-Bromley 1995) either positive or negative behaviour to certain concept or subject (Hussein 2017). Moreover, attitude refers to psychological tendency that is expressed by assessing a particular system at certain degree of favourness and period of time that influences people to behave in a certain way regarding the matter. In a specific case, a single behaviour on a particular attitude object is strongly predicted by a specific attitude (Tan 2011).

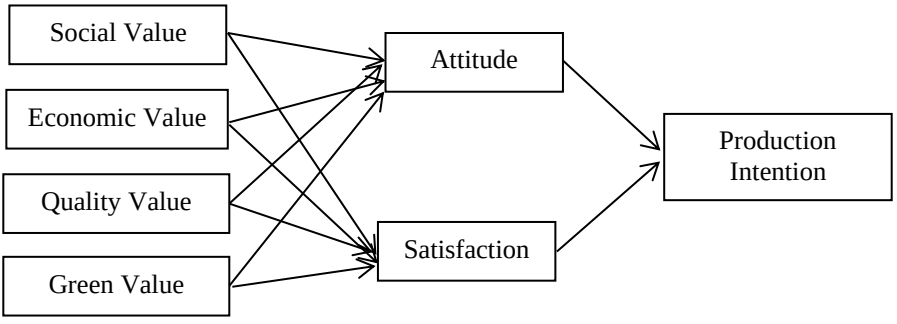


**Figure 1** Conceptual Model

Social value is the utility of a product or service in enhancing the producer's perceived self-concept related to a particular social, demographic, socioeconomic or cultural group. Social value relates to self-image. It is believed that an action of producing natural dyes batik could improve producers' social-status. In terms of green products, social value is a perceived net utility gained from green product production based on the insight regarding social pressure or status gain. Social value has a significant positive influence on sustainable production behaviour (Qasim et al. 2019). Emotional value is the value obtained after the producer delivers product or service and finds that the resulting product has higher

value thus cause emotional response. Social value could be determined as the emotional benefits acquired by the producers through the interaction with other producers in the community (Luna-Cortés et al. 2019). Producers are motivated by social affiliation to behave in the same way that of their social class. Producers tend to generate the products that represent their social status. Producers think their green production behaviour is a modern way of life. The production of natural dyes batik is important for their social identity in society. Hence, based on the above description, this study hypothesizes that:

Hypothesis 1a. Social value will positively affect producer attitude.

Producer satisfaction is the difference between the total benefits expected from a product/service and the total costs incurred to generate that product or service. Besides, producer satisfaction refers to the difference between the actual performance experienced and the expectation of the producer. Producer satisfaction refers to a person's subjective evaluation of the situation that result in a positive emotional response. Considering the intense competition, a successful response of producer satisfaction significantly defines the survival and long-term profitability of a business. Producers need to perform better thus resulting in higher service/product quality in order to establish and maintain a strong and long-term relationship with customers (Wu 2014). Previous study on producer satisfaction was done by Wagner (2001). They found that the average producer satisfaction was higher with flat and pit parlours over stall barns with pipeline systems for most areas surveyed. Kiss (2019) revealed that despite their higher consumer prices, producer satisfaction in terms of saleable products quantity, selling prices, and customers number were the highest thing in the case of producer markets. Govindasamy (2003) believed that producer's satisfaction is of important to appraise the future growth prospect of the markets as well as to define the potential of recruitment targets for both existing and new outlets. The readiness to shift marketing and production focuses need to be done to satisfy customer request thus leads to long-term profitability as well as satisfaction. In perspective of producer, perceived satisfaction can be defined as producer acceptance of natural dyes batik and the comfort degree involved in the production. Shee and Wang (2008) defined satisfaction as the pleasure or contentment in performing a compulsory or desirable action and experiences the result. In positive way, satisfaction is conceptualized as collection of feelings or attitudes against numerous factors that determine a particular situation. A higher degree of producer satisfaction signifies a higher degree of willingness to carry the process. A great deal of efforts has been carried out to estimate user satisfaction. It was revealed that user

satisfaction is a complex concept, the matter varies with the experience or case character (Liaw and Huang 2013). It is therefore, the following hypothesis was developed:

Hypothesis 1b. Social value will positively affect producer satisfaction.

In term of producer, economic value associates to profits generated by production as well as relationship with supplier and customer in relation to realised costs (Jelčić and Mabić 2020). Economic value refers to value that person gives on an economic good based on the advantage of the good. Economic value is commonly estimated based on the person's willingness to pay for the good, typically measured in units of currency. Production of natural dyes batik offers producers perceived economic value through tangible benefits, such as low materials and production costs as well as maximum price. Research analysis of Jelcic and Mabic (2020) showed that satisfaction was determined by economic value. However, the standardised coefficients beta revealed the higher contribution of emotional value in predicting client satisfaction than economic value. Wei et al. (2020) defined economic value in terms of more reasonable pricing of brand agricultural products, in line value of brand agricultural products with the price, more economical brand agricultural products. Economic value is believed to determine purchase intention. Thus, it is hypothesized that:

Hypothesis 2a. Economic value will positively affect producer attitude.
Hypothesis 2b. Economic value will positively affect producer satisfaction.

Perceived quality is another dimension of brand value that is very important for producers in choosing the materials for production. It is important to note that product quality is an important company resource to achieve competitive advantage. Perceived quality reveals assessment (perception) of overall product advantages compared to its alternative product/service. Based on this definition it is also known that perceived quality is product ability to be accepted in providing satisfaction compared relatively to the available alternatives' product. High perceived quality indicates that the differences and advantages of the product to those of similar products after a long period of time have been discovered. Perceived quality is a component of brand value, therefore high perceived quality will encourage consumers' preference to our brand over the competitors. Product quality significantly enhances purchase motivation thus in turn affects consumer's purchasing decisions (Li et al. 2012). They discovered that the eagerness of consumers to continue purchasing luxury fashion brands in the future was determined by perceived brand quality and customer service. Previous studies related perceived quality with

willingness to purchase, brand purchase intentions and brand choices (Netemeyer et al. 2004). Considering the importance of natural dyes batik quality in ensuring the business sustainability, the following hypothesis are developed:

Hypothesis 3a. Quality value will positively affect producer attitude.
Hypothesis 3b. Quality value will positively affect producer satisfaction.

Green value is the producer's overall assessment of the product or service benefits related to the balance of capital and earnings based on the producer's environmental desires, sustainable expectations, and environmentally friendly needs for producers (Wei and Jung 2017). While Hamzah and Tanwir (2021) defined perceived green value as an individual's moral sense in honouring pro-environmental actions that advantage them through the decrease of both environmental damage and energy costs. Demand increment of natural dyes batik is ignited due to natural dyes batik purchase may enhance social status. Wearing natural dyes batik indicates environmentally friendly manner thus give high contribution to society. This behaviour relates to the fact that wearing natural dyes batik signal to others that a person is pro-social rather than pro-self-individual. Due to the current prevalence of environmental consciousness is "green perceived value" was developed by Chen and Chang (2012) and defined as overall consumer's judgment of the net benefit of a product or service of the proper balance of expended capital towards the obtained results based on the consumer's environmental preference, sustainable expectations, and green requirement. Based on their study, Hur (2013) indicated that focus on value perception need to be increase by producer of green products by clarifying the physical and psychological advantages of green products. Despite the introduction of green attributes of green products to enhance green product consumption, greenness itself is insufficient to encourage consumer request for the products. Thus, importantly producers have to recognize the needs that boost the purchases. Green products purchase is associated to consumers' individual perceived values. Hur (2013) discovered that customer satisfaction, customer retention increment and price sensitivity decrease determine perceived value. The considerations lead to the following hypothesis:

Hypothesis 4a. Green value will positively affect producer attitude.
Hypothesis 4b. Green value will positively affect producer satisfaction.

Perceived intentions represent more normative beliefs leading to behavioural outcomes. Perceived intention is a context-specific perception that is derived from normative beliefs. Production intentions can be used

to verify the application of a new products in line with environmental concerns thus help managers define whether the concept worthy of further establishment and determine which geographic markets and consumer segments to target through the channel. Production intention is of important in predicting actual behaviour. To predict production intention, it is important to understand the social, economic, quality, and green values that ultimately generate the attitudes and satisfaction. It is therefore, the following hypothesis is proposed:

Hypothesis 5. Attitude will positively affect production intention.
Hypothesis 6. Satisfaction will positively affect production intention.

# 3 Methodology

## 3.1 Sample

Currently, data collection could be effectively carried out through web-based surveys. The empirical data for the present study were collected through Google form and paper-based questionnaire. A broadcast of the survey goals was posted for 1 week on WhatsApp groups of the batik community. Considering that most batik producers are not familiar with filling out online forms, paper-based questionnaire was also applied. The sample criteria in this study were selected based on the provisions of those who experienced at least 1 year as natural dye batik producer. There were 40 respondents filled out the online form and 169 respondents filled out the paper-based questionnaire. To avoid duplicate responses, a single IP address or email account was applied. The final sample included 209 valid responses.

Among the respondents, 32.5% were male; 90% were under the age of 50; 91% were high school graduates and 42% had experience in producing natural dyes batik for 1-5 years. Table 1 summarizes the demographics of the respondents. The demographic profile showed that producers are mostly in productive ages and well experienced.

**Table 1** Demographic Profile

| Measure | Items | Frequency | Precent |
|---|---|---|---|
| Gender | Male | 68 | 32.5 |
| | Female | 141 | 67.5 |
| Age | 20-24 | 24 | 11.5 |
| | 25-29 | 22 | 10.5 |
| | 30-34 | 38 | 18.2 |
| | 35-39 | 35 | 16.8 |
| | 40-44 | 51 | 24.4 |

| | | | |
|---|---|---|---|
| | 45-49 | 22 | 10.5 |
| | >50 | 17 | 8.1 |
| Domicile | Banten | 1 | 0.48 |
| | Jawa Barat | 9 | 4.3 |
| | Jawa Tengah | 197 | 94.26 |
| | Jawa Timur | 1 | 0.48 |
| | DIY | 1 | 0.48 |
| Education | High School | 190 | 90.91 |
| | College | 5 | 2.39 |
| | Undergraduate Degree | 14 | 6.7 |
| Experience | 1-5 years | 87 | 41.63 |
| | 6-10 years | 50 | 23.92 |
| | 11-15 years | 60 | 28.71 |
| | >16 years | 12 | 5.74 |
| Production Capacity/Month | < 100 pcs | 26 | 12.44 |
| | 101-200 pcs | 27 | 12.92 |
| | 201-300 pcs | 12 | 5.74 |
| | 301-400 pcs | 13 | 6.22 |
| | >401 pcs | 31 | 14.83 |

### 3.2 Measure

Measurement variables, as shown in Table 2, considered each construct used in this study. Variables were either selected or modified from previous studies. A total of seven constructs were applied. Social value was measured on four items and developed from previous study (Hamari et al. 2020). The validated four items were used to measure economic value. The quality was also measured on four items based on previous research (Hamari et al. 2020). Then, green value was measured by five different items. Subsequently, attitude was measured using two items based on previous studies (Hsu and Lin 2016; Paul et al. 2016). Satisfaction was then measured using four items based on previous study of Hsu and Lin (2016). Finally, production intention for natural dyes batik products was measured through four items taken from Paul et al. (2016) and Yadav and Pathak (2016). A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was applied in the questionnaire. This scale requests respondents to declare the level of strongly disagree or agree with a sequence of statements on a certain topic.

Furthermore, to find out the extent of the instrument's representation of the specific behaviour to be measured, content validity was carried out prior to data collection process. Content validity of an instrument is the extent to which the items in the instrument represent the components in the overall content area of the object to be measured and the extent to which the items reflect the behavioural characteristics to be measured (Fernandes

1984; Nunnally and Bernstein 1994). Content validity was determined using the agreement of 3 experts, 2 batik experts and 1 psychological measurement expert. To determine the content validity index based on expert agreement, the content validity index proposed by Aiken (Aiken 1980) was used. Questionnaire items that have been compiled based on indicator variables, was assessed by three experts by filling in a score (Score 1 = Not relevant; Score 2 = less relevant; Score 3 = quite relevant; Score 4 = relevant; Score 5= very relevant). The assessments results of the three experts as validators were then calculated using the Aiken V index formula, and the value was 0.89. It showed that the content validity index of the instrument used was very valid. Considering the respondents backgrounds, the questionnaire was given in Indonesian.

Descriptive statistics of the questionnaire items are available in Table 2, including the mean values of social value, economic value, quality, green value, attitude, satisfaction and production intention for natural dyes batik products were quite high and relatively favourable. The mean values of the lower costs of production of natural dye batik were low compared with the other constructs at 3.622 because most producers assume production of natural dyes batik is a long process thus requires higher costs. All data have standard deviation of almost 0, shows that no deviation found in the data distribution, no outlier exists in the data. The sample perception is uniform.

**Table 2** Descriptive Statistic Results

| Constructs/ Questionnaire Items | Mean | Standard Deviation |
|---|---|---|
| **Social Value (SCV)** | | |
| My friends would think producing natural dye batik is a good idea (Hamari et al. 2020) | 4.072 | 0.677 |
| Producing natural dye batik improves the way I am perceived (Hamari et al. 2020) | 3.967 | 0.473 |
| Producing natural dye batik makes a good impression (Hamari et al. 2020) | 4.043 | 0.482 |
| **Economic Value (ECV)** | | |
| Production of natural dye batik needs lower costs | 3.622 | 0.862 |
| Natural dye batik is more marketable | 3.746 | 0.617 |
| Selling natural dye batik increases my income as batik craftsman | 3.986 | 0.729 |
| Natural dyes are less expensive | 3.713 | 0.920 |
| **Quality (QV)** | | |

| | | |
|---|---|---|
| The natural dye batik is of good quality (Hamari et al. 2020) | 4.392 | 0.691 |
| The natural dye batik is of well-made (Hamari et al. 2020) | 4.273 | 0.632 |
| The natural dye batik is long lasting | 4.278 | 0.764 |
| Natural dye batik has excellent colour fastness | 4.364 | 0.808 |
| **Green Value (GV)** | | |
| Natural dyes for batik dyeing generate less wastewater | 4.522 | 0.619 |
| Natural dyes explore local materials | 4.263 | 0.628 |
| Natural dyes generate harmless wastewater | 4.301 | 0.570 |
| Natural dyes need simple wastewater treatment facility | 3.885 | 0.689 |
| **Attitude (ATT)** | | |
| I like the idea of producing natural dye batik (Paul et al. 2016) | 4.100 | 0.512 |
| I have favourable attitude towards producing natural dye batik (Paul et al. 2016) | 4.091 | 0.523 |
| My attitude toward producing natural dye batik is favourable (Hsu and Lin 2016) | 3.895 | 0.769 |
| **Satisfaction (STF)** | | |
| Producing natural dye batik makes me feel very satisfied (Hsu and Lin 2016) | 3.856 | 0.718 |
| Producing natural dye batik gives me a sense of enjoyment (Hsu and Lin 2016) | 3.995 | 0.786 |
| Producing natural dye batik makes me feel very contented (Hsu and Lin 2016) | 3.885 | 0.689 |
| Producing natural dye batik makes me feel very delighted (Hsu and Lin 2016) | 3.962 | 0.757 |
| **Production Intention (PDI)** | | |
| I'm willing to produce natural dye batik (Yadav and Pathak 2016) | 4.072 | 0.738 |
| I will make an effort to produce natural dye batik (Yadav and Pathak 2016) | 4.120 | 0.719 |
| I will consider switching to environmental friendly materials for ecological reasons (Paul et al. 2016) | 4.153 | 0.716 |
| I expect to produce natural dye batik for the positive environmental contribution (Paul et al. 2016) | 4.488 | 0.706 |

## 4 Tools for Analysis

Data analyses were conducted using the statistical package with graphical user interface for variance-based structural equation modelling using the partial least squares path modelling method (SmartPLS). The software was used to test hypotheses of this study. SmartPLS was used for descriptive analysis to analyse preliminary results.

### 4.1 Testing of Common Method Bias of the Measurement Model

Common Method Bias is an effort made to see the strength or size of gap between the observed correlation and the true correlation between constructs or variables. Therefore, Common Method Bias test in this study was objected to avoid the causes of errors in measuring or testing data. To show the issue of Common Method Bias or not, it can be analysed using the full collinearity test (Kock and Lynn 2012). Through this procedure, a construct model that may be contaminated by Common Method Bias can be seen based on variance inflation factors (VIFs). VIF > 3.3 indicates a pathological collinearity as well as contaminated model by Common Method Bias. On the other hand, VIF from the full collinearity test of greater than 3.3, the model is considered free from Common Method Bias. Table 3 describes full collinearity test results, reveals that latent variables have a VIF value greater than 3.3, that no Common Method Bias occurred in this study.

**Table 3** Result of Full Collinearity Test

| | ATT | ECV | GV | PDI | QV | SCV | STF |
|---|---|---|---|---|---|---|---|
| **ATT** | | | | 1.702 | | | |
| **ECV** | 1.487 | | | | | | 1.487 |
| **GV** | 1.609 | | | | | | 1.609 |
| **PDI** | | | | | | | |
| **QV** | 1.404 | | | | | | 1.404 |
| **SCV** | 1.491 | | | | | | 1.491 |
| **STF** | | | | 1.702 | | | |

### 4.2 Testing of Reliability and Validity of the Measurement Model

Confirmatory factor analysis (CFA) was applied to evaluate the measurement model. The measurement model confirms the factor loadings of the seven constructs; social value, economic value, quality value, green value, attitude, satisfaction and production intention for natural dyes batik products. Model validity and reliability verification

was carried out by analysing convergent and discriminant validities and the overall fit with data. The internal consistency of the indicators of each studied construct was examined using the most common method, by determining the coefficient alpha of a given construct (Maichum et al. 2016). The loading factor showed that all items used to measure the variable are valid.

Hair et al. (2009) determined that the factor loading should be higher than 0.700. It was found that all of standardized factor loadings were significant ranging from 0.608 to 0.922. Composite reliability measures were used to examine the construct reliability thus assess the extent to which items in the construct measure the latent concept. Composite reliability (CR) and the average variance extracted (AVE) contribute to convergent validity of the CFA results (Jr et al. 2009). It was determined that the approximation of CR and AVE, which measures the amount of variance explained by the given construct, should be higher than 0.700 and 0.500, respectively (Jr et al. 2009). Table 4 shows that the CR and AVE values ranged from 0.820 to 0.946 and 0.534 to 0.814, respectively, surpassing the respective recommended levels of 0.700 and 0.500. The AVE value describes the variance or diversity of the manifest variables posed by the latent construct. Thus, the greater the variance or diversity of the manifest variables that can be contained by the latent construct leads to greater representation of the manifest variable on the latent construct. The AVE value of 0.5 represents adequate convergent validity, which means that in average, one latent variable is able to explain more than half of the variance of its indicators. The CFA results shows that the measurement model had suitable convergent and discriminant validities. It was also revealed that the hypothesized measurement model was reliable and considerable to justify the structural associations among the constructs.

**Table 4** Reliability and Validity of the Constructs

| Constructs/ Questionnaire Items | Question Item | Standardized Factor Loading | Composite Reliability | Average Variance Extracted |
|---|---|---|---|---|
| **Social Value (SCV)** | | | | |
| | SCV1 | 0.796 | | |
| | SCV2 | 0.849 | **0.864** | **0.679** |
| | SCV3 | 0.827 | | |
| **Economic Value (ECV)** | | | | |
| | ECV1 | 0.656 | | |
| | ECV2 | 0.832 | **0.827** | **0.547** |
| | ECV3 | 0.792 | | |
| | ECV3 | 0.662 | | |

| | | | | |
|---|---|---|---|---|
| **Quality (QV)** | | | | |
| | QV1 | 0.808 | **0.847** | **0.581** |
| | QV2 | 0.717 | | |
| | QV3 | 0.812 | | |
| | QV4 | 0.707 | | |
| **Green Value (GV)** | | | | |
| | GV1 | 0.608 | **0.820** | **0.534** |
| | GV3 | 0.794 | | |
| | GV4 | 0.759 | | |
| | GV5 | 0.749 | | |
| **Attitude (ATT)** | | | | |
| | ATT1 | 0.847 | **0.844** | **0.646** |
| | ATT2 | 0.856 | | |
| | ATT3 | 0.698 | | |
| **Satisfaction (STF)** | | | | |
| | STF1 | 0.922 | **0.946** | **0.814** |
| | STF2 | 0.884 | | |
| | STF3 | 0.921 | | |
| | STF4 | 0.882 | | |
| **Production Intention (PDI)** | | | | |
| | PDI1 | 0.894 | **0.886** | **0.663** |
| | PDI2 | 0.919 | | |
| | PDI3 | 0.754 | | |
| | PDI4 | 0.663 | | |

Table 5 describes Heterotrait-Monotrait Ratio (HTMT), objected to determine the correlation level of an indicator with its construct. It was shown in the table that all HTMT values < 0.9, revealed that all constructs were valid with discriminant validity.

**Table 5** Heterotrait-Monotrait Ratio (HTMT)

| | ATT | ECV | GV | PDI | QV | SCV | STF |
|---|---|---|---|---|---|---|---|
| ATT | | | | | | | |
| ECV | 0.549 | | | | | | |
| GV | 0.704 | 0.497 | | | | | |
| PDI | 0.737 | 0.599 | 0.712 | | | | |
| QV | 0.503 | 0.721 | 0.521 | 0.733 | | | |
| SCV | 0.699 | 0.304 | 0.770 | 0.578 | 0.234 | | |
| STF | 0.795 | 0.366 | 0.757 | 0.751 | 0.345 | 0.644 | |

Structural Equation Model was arranged by smartPLS using a maximum likelihood parameter that assessed the hypothesized conceptual model of this study as given in Figure 2.

The results of the structural model and the standardized path coefficient represented positive effects among the constructs in the structural model are available in Table 6. Totally, eight of ten hypotheses were accepted. The positive relationship between social value towards attitude of natural dyes batik products ($\rho 1 = 0.343$, $t = 4.677$) indicated that H1 was accepted. According to H2, the positive estimate of coefficients of social value and satisfaction of natural dyes batik production had significant positive effects ($\rho 2 = 0.270$, $t = 3.878$), thus, H2 was accepted. The impact of economic value ($\rho 3 = 0.148$, $t = 1.811$) had insignificant positive effects on attitude of natural dyes batik production, rejected H3. Economic value had insignificant positive effect on satisfaction of natural dyes batik production ($\rho 4 = 0.024$, $t = 0.422$). Furthermore, quality value gave significant positive effect to attitude of producing natural dyes batik ($\rho 5 = 0.216$, $t = 3.331$) and satisfaction ($\rho 6 = 0.167$, $t = 2.537$). Green value significantly affected attitude ($\rho 7 = 0.209$, $t = 2.730$) and satisfaction ($\rho 8 = 0.422$, $t = 6.025$,) of natural dyes batik production. Finally, attitude ($\rho 9 = 0.256$, $t = 3.690$) and satisfaction ($\rho 10 = 0.541$, $t = 9.151$) of natural dyes batik production showed significant positive influences on production intention of natural dyes batik.

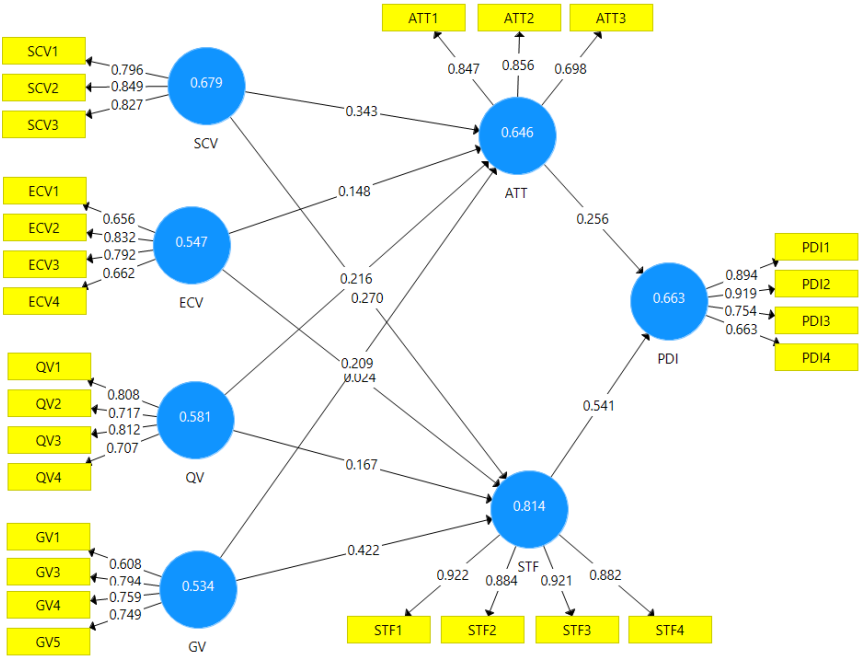


**Figure 2** Standardized Factor Loading

**Table 6** Hypotheses Result for the Structural Model

| | | Path Coefficient | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|
| H1 | SCV → ATT | 0.343 | 0.071 | 4.812 | 0.000 |
| H2 | SCV → STF | 0.270 | 0.066 | 4.075 | 0.000 |
| H3 | ECV → ATT | 0.148 | 0.078 | 1.896 | 0.059 |
| H4 | ECV → STF | 0.024 | 0.057 | 0.421 | 0.674 |
| H5 | QV → ATT | 0.216 | 0.063 | 3.455 | 0.001 |
| H6 | QV → STF | 0.167 | 0.066 | 2.528 | 0.012 |
| H7 | GV → ATT | 0.209 | 0.071 | 2.940 | 0.003 |
| H8 | GV → STF | 0.422 | 0.067 | 6.342 | 0.000 |
| H9 | ATT → PDI | 0.256 | 0.072 | 3.578 | 0.000 |
| H10 | STF → PDI | 0.541 | 0.063 | 8.587 | 0.000 |

## 5 Results and Discussion

This study investigated the extended framework of the perceived model, in which social value, economic value, quality value and green value are added as antecedents of attitude and satisfaction of natural dyes batik production. The purpose was to examine

Indonesian natural dyes batik producers on the production intention of natural dyes batik products. The result recommended that producers' intention for this group to produce natural dyes batik products can be predicted by attitude, satisfaction, social value, economic value, quality value and green value.

Attitude and satisfaction were found to give significant positive impacts on production intention of natural dyes batik products. Satisfaction had the most significant influence on producers' production intention, which reveals that satisfaction was the strongest predictor of production intention of natural dyes batik products followed attitude. The overall results assured that the perceived model and its behaviour were suitable for the investigated group. Ajzen (2015) revealed that higher positive attitude consumers have towards purchase behaviour, leads to stronger consumer's intentions to implement a behaviour under their control. Molina (2008) revealed that in the field of clothing and footwear, no exact association was found between the determinants of attitude and loyalty towards the sellers. Study of Tomasetti et al. (2018) showed the positive influence of attitude towards behavioural intention of restaurants consumers. Maichum (2016) determined positive correspondence between attitude of purchasing green products and purchase intention of green products. However, Hamzah and Tanwir (2021) revealed that no significant relationship was observed between green purchase attitude towards intention to purchase hybrid vehicles. They assumed that a positive attitude of having environmental-friendly products does not ignite consumers' motives towards pro-environmental attitude.

Equally, there were positive relationships between social value towards attitude and satisfaction of producers in producing natural dyes batik. Producers would have positive attitude and satisfaction towards producing natural dyes batik when they have high level of social value. Perceived impression of natural dyes batik production as well as the image as environmental care people are good motives in producing natural dyes batik. Producers would satisfy and enjoy the process of natural dyes batik production. Different trend was obtained by Hamzah and Tanwir (2021), in which subjective norms insignificantly affected purchase intention. This is due to the consumers' social network, involving co-workers and fellow as well as relatives gave insufficient effect in determining their compliance to purchase hybrid vehicles. Another reason is their social influencers are not entirely knowledgeable of the advantages of applying pro-environmental behaviour. No significant relationship was obtained between social value and behavioural intention to

consume organic food products. It was mean that no social recognition or social image enhancement was perceived by taking organic food products (Qasim et al. 2019).

Economic value significantly defined attitude of producing natural dyes batik. The belief of low production costs and more marketable products leads to the higher level of producing natural dyes batik attitude. Moreover, the exclusivity of natural dyes batik products may enhance the sales thus in turn increase the profits. The low production costs gave impact in lower selling price. As a result, producers have favourable attitude towards resulting the products. Producers are currently more environmentally aware about the hazard of textile dyes and chemical agents used in conventional dyeing process. Their awareness is able to increase their responsibility to protect the environment through the use of natural dyes to minimize environmental pollution. This is in accordance with the finding of Qasim (2019) that economic value is among the performance factors assessed by consumers. They tend to purchase premium costly products as long as the products provide high return. On the other hand, economic value insignificantly determined producer satisfaction. Despite their responsible attitude towards the environment, producers are not satisfied with the results obtained, especially during the pandemic. Basic daily necessities are more preferable rather than natural dyes batik product. It is therefore, the natural dyes batik sales tent to decrease during pandemic. This is supported to the fact that study of Yuniarti et al. (2021) recorded inflation in May 2020 of about 0.07% indicated the decrease of people's purchasing power. The lower purchasing power gave impact to the decrease of producers' profits.

Producers' attitude and satisfaction are also affected by quality value. Natural dyes batik products generated at premium quality could improve the favourable attitude of producers. They could get more idea to sustainably produce good batik products by maintaining superior quality. A confidence attitude leading to a better comprehension towards the utility of technology, thus inducing to a tendency to apply these technologies. Producers who exhibited conviction about applying and learning technologies and perceived a net gain from applying these technologies indicated higher trend to use accurate agriculture technologies (Adrian et al. 2005). Verbeke (2005) exhibited that every producer assured that his production method serves good quality products. Study in the meat producers was carried out towards 12 livestock producers. Based on the interviews results, it was obtained that good quality meat was achieved through about the same production details. Producers had

about the same attitude in resulting good quality meat. Producing excellent quality of natural dyes batik, in term of long lastness, good colour fastness, as well as well-made products enhance producers' satisfaction. Producer satisfaction plays an important role in determining the success of natural dyes batik production. Producers' satisfaction is also of important in determining the growth and future success of natural dyes batik industries. Thielemann (2018) suggested that quality and value directly affected customer satisfaction. Perceived value shows to certainly influence customer loyalty with satisfaction as a partial mediator. Govindasamy (2003) found that sustainable financial gain and satisfaction with returns from direct trading is associated to compliance to modify selling as well as production focus to satisfy customer requests. Mutonyi (2016) described that trust moderates price satisfaction and producer loyalty. Trust could affect the likeness of social values of producer and customer, which severally generates the increase of buyer bounding, the enhance of retaliation and the development of sustainable relationships.

The study found that green value significantly determined producer attitude and satisfaction. The facts that natural dyes batik production generate less and harmless wastewater lead to the positive attitude thus very helpful in achieving their goals. They could continue producing natural dyes batik without worrying about the negative impact on the environment. The negative impacts toward customer body as well as surrounding environment by the production of natural dyes batik are negligible. In term of satisfaction, the pro-environment facts of natural dyes batik induce producers' contentment. The other facts are the employment of unused natural resources and local material in the production of natural dyes batik. This selection causes an attitude of pride and satisfaction for producers.

### 5.1 Theoretical Implications

Application of natural dyes have been widely investigated. Indonesia as tropical country provides abundant types of natural resources having potential to be applied as natural dyes. However, research on producers' intention towards natural dyes batik has not been found yet. Previous research limited to the relationship exploration of green subjective standards, awareness of green products and attitudes towards green purchasing intentions through the Internal Environmental Control Locus (INELOC) between craft shopping tourists in the Batik town of Pekalongan (Sunarjo et al. 2021). This research was driven by curiosity and the desire to expand

knowledge in producers' intention area. It is believed that it gives a specific contribution to the academic body of knowledge in the research area of natural dyes batik producer intention.

In the field of natural dyes batik, studying producers' intentions, this research confirms the role of the theory of planned behaviour in the acceptance of natural dyes. This study confirms the appropriateness theory of planned behaviour in understanding producers' intention toward natural dyes batik production in Indonesia. This model has proven the suitability of the approaches, in which social value, quality value, economic value, and green value give a direct effect of 43.5% in increasing attitude. Those factors also simultaneously have an impact on satisfaction increment at about 47.3%. Meanwhile, production intention was directly affected by attitude and satisfaction of about 53.6%.

### 5.2 Practical Implications

Adopting natural dyes batik not only to increase producers' income but also to protect environmental pollution by avoiding harmful chemicals. In Indonesia, natural dyes batik is becoming a trend thus being promoted through many government policies. In order to increase the intention of adopting natural dyes batik production, the government needs to access to factors that influence the intentions and ethical aspects of producers. Based on the research results of factors affecting producers' intention toward natural dyes batik production in Indonesia, the following suggestions are given:

1. The raising values among producers about the role of natural dyes batik and the health and environmental impacts of not applying natural dyes. This research was developed based on the relationship between the factors in planned behaviour and the relationship between attitude and satisfaction with intentions of producers. Values of the consequences of natural dyes application were proven to have a direct and indirect positive effect through the belief of responsibility on the ethical perception of applying or not applying natural dyes. Satisfaction, will positively affect producers' intention toward natural dyes batik production in Indonesia. Besides, producers' intention would also be affected by attitude.
2. Communicating to producers through different means about the benefits of natural dyes compared to synthetic dyes on the health of producers themselves and customers. The study contributes to the satisfaction of producers, a factor that has been shown to have the strongest influence on the intention toward natural dyes batik production of Indonesian craftsmen.

3. Forming information spill over groups between craftsmen who have developed natural dyes batik and others who have not yet done so. Those who have not practiced natural dyes batik will be given precise and practical information on the benefits of natural dyes thus forming natural dyes intentions. Information exchange among these craftsmen will affect attitude.

## 6 Conclusion

Production intention of environmentally friendly fashion products has been evaluated successfully. This work focused on the natural dyes batik producers in Indonesia. The results showed that production intention was affected significantly by the producers' attitude and satisfaction. In the meantime, the attitude and satisfaction of the producer were highly influenced by social value, quality value, and green value parameter. Economic value, however, provided contribution on the producer's attitude, but insignificantly contributed to the producer's satisfaction. Overall, production intention of natural dyes batik was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

The current research has some limitations that need further investigation in the future. The study only focused on producers' intention toward natural dyes batik in some areas of Central Java; the findings are therefore not generalizable to all batik craftsmen in the country. Therefore, future studies should include producers from different areas. The use of intentions instead of actual behaviour is another limitation of this study, thus future studies need to investigate the impacts of factors in the model on natural dyes batik production implementations. The results on the difference and characterization of the demographic variables such as gender, age, domicile, education level, experience in batik production as well as the annual capacity of batik production should be taken into account that how they impact the intention toward natural dyes batik production in the next studies.

**Declarations**

**Ethical Approval**

This material is the authors' own original work, which has not been previously published elsewhere. This manuscript is not currently being considered for publication elsewhere. The manuscript reflects the authors' own research and analysis in a truthful and complete manner. All sources used are properly disclosed with correct citation and gave proper reference.

**Consent to Participate**

All panellists have read and understand the provided information and have had the opportunity to ask questions. All panellists understand that their participation is voluntary and that they are free to withdraw at any time, without giving a reason and without cost.

**Consent to Publish**

All panellists understand that in any report on the results of this research, their identities will remain anonymous

**Author Contributions**

Author Contributions: Conceptualization and methodology, A.K., T.A.A., K.P. and A.N.H.; data collection, A.K. and A.A..; data analysis, A.K., T.A.A. and A.N.H., writing—original draft preparation, A.K., K.P., and A.N.H.; writing—review and editing, A.K and A.A.; supervision, A.K., K.P. and A.N.H.; funding acquisition, A.K. All authors have read and agreed to the published version of the manuscript.

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**Conflicts of Interest**

The authors declare no conflict of interest

**Data Availability Statement**

Data sharing is not applicable to this article

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# ESPR: Your manuscript ESPR-D-22-02442R1 - [EMID:00af599a3625892d]

From: Philippe Garrigues (em@editorialmanager.com)

To: adhi_kusumastuti@mail.unnes.ac.id

Date: Saturday, 11 June 2022 at 02:24 am GMT+7

Ref.:
Ms. No. ESPR-D-22-02442R1
Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen
Environmental Science and Pollution Research

Dear Dr Kusumastuti,

Reviewers have now commented on your paper. You will see that there are a number of issues that need to be addressed before the paper can be accepted for publication by ESPR.

Please include continuous line numbers in your manuscript to facilitate editorial handling and reviewing.

We ask that you give the comments raised by the referees your careful consideration and that you submit a revised version of your manuscript as well as an itemized reply to each of the reviewers' comments. Please make sure to mark all changes in a different colour and to submit your editable source files (i. e. Word, TeX)

Your revision is due by 10 Jul 2022.

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

If you need extra time to revise your manuscript, please contact Mrs. Cayago + Carmina.Cayago@springernature.com

To submit a revision, go to https://www.editorialmanager.com/espr/ and log in as an Author. You will see a menu item called 'Submissions Needing Revision'. You will find your submission record there.

I am looking forward to receiving you revised manuscript!

Yours sincerely,

Dr. Philippe Garrigues
Managing Editor
Environmental Science and Pollution Research

Reviewers' comments:

Reviewer #1:
Thank you for revising your manuscript. However, there are many areas that needs further improvement.

1. The use of language remains an archilles heel of this paper. Some can be simplified. Others could have the sentences reworded as the choice of words is an issue.

There are too many of them, which I could only highlight some below:
(e.g. Line 157: This study objected to understanding the factors influencing producers' intentions on natural dyes batik.; Line 170: Attitudes could change as the development of people's experience and knowledge.; Line 174: Furthermore, the fact that attitudes are predispositions to respond leads to their relationship with actual producer behaviour.; Line 243 The readiness to shift marketing and production focuses need to be done to satisfy customer request thus leads to long-term profitability as well as satisfaction.; Line 592: It is therefore, the
natural dyes batik sales tent to decrease during pandemic).

Please hire a proofreader cum style-editor (native English language speaker is recommended). You can search using freelancing platforms for better deals.

2. I would appreciate if you can reorganize the structure of ideas, and remove the unnecessary sentences. At the moment, the 'laundry-list' problem has yet to be addressed. I noticed the widespread use of active-voiced statements (with citations in early part of the sentence) especially in the literature review section. To formulate an authoritative statement, citations need to be placed at the end of the statement (in passive form).

3. Line 122: Reword as follows: The intention of batik craftsmen in using natural dyes in their production process has not been widely studied.

4. For reporting beta coefficient, please use the B symbol (rather the p symbol). Its available in Ms Word. Not to be confused with the B alphabet, The symbol is sandwiched between the alpha & the inverted lamda symbols (subset:Greek & Coptic).

5. Its difficult for me to read the discussion section. The ideas are not flowing smoothly across subsequent paragraphs. Some sentences repeat the same ideas/keywords. Besides, there are many confusing statements. These are some of them:

Line 663-668- Please remove these sentences, as statistical figures should not be written in the discussion section,

Line 693: "The study contributes to the satisfaction of producers, ...". Literally, this is inaccurate.

Overall, there's much to be done in terms of language use. The writeup feels flat, excessively descriptive, and lack of argumentative points. Please address this issue.

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Environmental Science and Pollution Research

# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

--Manuscript Draft--

| | |
|---|---|
| **Manuscript Number:** | ESPR-D-22-02442R2 |
| **Full Title:** | Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen |
| **Article Type:** | Research Article |
| **Corresponding Author:** | Adhi Kusumastuti<br>Universitas Negeri Semarang Fakultas Teknik<br>INDONESIA |
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| **Corresponding Author's Institution:** | Universitas Negeri Semarang Fakultas Teknik |
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| **Funding Information:** | Universitas Negeri Semarang (DIPA-023.17.2.677507/2021) — Dr Adhi Kusumastuti |
| **Abstract:** | Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms. The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value, quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production. |
| **Response to Reviewers:** | 1The use of language remains an archilles heel of this paper. Some can be simplified. Others could have the sentences reworded as the choice of words is an issue<br>The language in the manuscript has been rechecked and revised. The above-mentioned part has been revised.<br>2I would appreciate if you can reorganize the structure of ideas, and remove the unnecessary sentences. At the moment, the 'laundry-list' problem has yet to be addressed. I noticed the widespread use of active-voiced statements (with citations in |

| | |
|---|---|
| | early part of the sentence) especially in the literature review section. To formulate an authoritative statement, citations need to be placed at the end of the statement (in passive form).<br>The structure of ideas has been reorganized, and the unnecessary sentences have been removed. The active-voice statements have been changed to be passive-voice with citations at the end of the statement (in passive form).<br>“Green product manufacturers should focus more on value perception by emphasising the physical and psychological benefits of green products (Hur et al. 2013).”<br>“This is due to the fact that the quality and focus of production in meeting customer demands have a direct impact on customer satisfaction, which in turn will form a long-term bond of mutual trust (Thielemann et al. (2018), Govindasamy et al. (2003), Mutonyi et al. (2016).”<br><br>3Line 122: Reword as follows: The intention of batik craftsmen in using natural dyes in their production process has not been widely studied.<br>The sentence has been reworded:<br>“…studies on the intentions of batik craftsmen in using natural dyes in the production process have not been widely investigated.”<br><br>4For reporting beta coefficient, please use the B symbol (rather the p symbol). Its available in Ms Word. Not to be confused with the B alphabet, The symbol is sandwiched between the alpha & the inverted lamda symbols (subset:Greek & Coptic).<br>Symbol of beta coefficient has been changed with β<br>5It’s difficult for me to read the discussion section. The ideas are not flowing smoothly across subsequent paragraphs. Some sentences repeat the same ideas/keywords. Besides, there are many confusing statements. These are some of them:<br><br>Line 663-668- Please remove these sentences, as statistical figures should not be written in the discussion section,<br><br>Line 693: "The study contributes to the satisfaction of producers, ...". Literally, this is inaccurate.<br>The part has been revised as suggested.<br>Line 663-668 has been removed.<br>Line 693 has been removed. |
| **Additional Information:** | |
| **Question** | **Response** |
| §Are you submitting to a Special Issue? | Yes |
| (If “yes”) Please select a Special Issue from the following list:<br>as follow-up to "§Are you submitting to a Special Issue?<br>" | SI: ICENV2021 |

20 July 2022

Chief Editor
Environmental Science and Pollution Research

Dear Professor Philippe Garrigues,

MS entitled: **"Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen"**

I am resubmitting a revised version of our manuscript for possible publication in Environmental Science and Pollution Research for Special Issue of Green Technology and Industrial Revolution 4.0 for a Greener Future. The revised parts are highlighted in yellow. The revisions are listed in the table below:

| No | Comments | Revision |
|---|---|---|
| 1 | The use of language remains an archilles heel of this paper. Some can be simplified. Others could have the sentences reworded as the choice of words is an issue | The language in the manuscript has been rechecked and revised. The above-mentioned part has been revised. |
| 2 | I would appreciate if you can reorganize the structure of ideas, and remove the unnecessary sentences. At the moment, the 'laundry-list' problem has yet to be addressed. I noticed the widespread use of active-voiced statements (with citations in early part of the sentence) especially in the literature review section. To formulate an authoritative statement, citations need to be placed at the end of the statement (in passive form). | The structure of ideas has been reorganized, and the unnecessary sentences have been removed. The active-voice statements have been changed to be passive-voice with citations at the end of the statement (in passive form).<br>"Green product manufacturers should focus more on value perception by emphasising the physical and psychological benefits of green products (Hur et al. 2013)."<br>"This is due to the fact that the quality and focus of production in meeting customer demands have a direct impact on customer satisfaction, which in turn will form a long-term bond of mutual trust (Thielemann et al. (2018), Govindasamy et al. (2003), Mutonyi et al. (2016)." |
| 3 | Line 122: Reword as follows: The intention of batik craftsmen in using natural dyes in their production process has not been widely studied. | The sentence has been reworded:<br>"…studies on the intentions of batik craftsmen in using natural dyes in the production process have not been widely investigated." |
| 4 | For reporting beta coefficient, please use the B symbol (rather the p | Symbol of beta coefficient has been changed with β |

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Please kindly acknowledge me for the receipt of the manuscript. If you have any inquiries, please do not hesitate to contact me through my email at adhi_kusumastuti@mail.unnes.ac.id. Your cooperation regarding this matter is very much appreciated.
Thank you and with kind regards.

Yours sincerely,

**Dr. Adhi Kusumastuti**

# Assessment of Producer's Perspective on the Production of Environmentally Friendly Fashion Products: A Case Study in Indonesian Natural Dyes Batik Craftsmen

Adhi Kusumastuti[1*], Atika[1], Taofan Ali Achmadi[1], Kongkiti Pushavat[2], and Achmad Nizar Hidayanto[3†]

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†These authors contributed equally to this work.

Abstract

Batik is well-known as intangible cultural heritage. In Indonesia, batik is produced in several areas, with its own characteristics. The batik production process goes through several stages, in which overall processes require the aid of chemicals. Conventionally, the batik production process results in environmental pollution due to direct waste disposal without any significant processing. Along with the increase of public awareness of environmental protection, batik dyeing process currently back to natural dyes. The study was conducted to examine the production intention of natural dyes batik. A total of 209 producers of natural dyed batik became respondents in this study. Data collection was carried out directly through filling out paper-based questionnaires as well as using online forms.

The findings of this study revealed that producers' attitude and satisfaction gave significant positive influences on the production intention of natural dyes batik products. Moreover, the findings exhibited the significant effects of social value, quality value, and green value on attitude and satisfaction of producer. Attitude was also determined by economic value, but satisfaction was insignificantly affected by economic value. Production intention was strongly predicted by satisfaction and also determined by attitude. The results of this study support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

Keywords: producer; natural dye, batik, perspective

## 1 Introduction

Batik is the Indonesian art masterpiece as a blend of art and technology inherited by the ancestors. Batik fabric is a variety of decorative fabrics produced by resist dyeing using wax as colour barrier. Batik production process included motif drawing, dyeing, and wax removal. The most common used dyes in the batik-production process include naphthol, indigosol, Procyon, and Remazol.

Batik is produced by various regions in Indonesia with regional characteristics. Among the regions in Indonesia whose economy is dominated by the batik industry is Pekalongan. In 2011, there were 1342 small industries in Pekalongan of which about 83.1% were batik industries (Fajri 2013). With a production capacity of around 300 to 1000 pieces of cloth per month (Nindita et al. 2012), each industry has the potential to generate 202.4 m3 of waste. Considering that only about 0.6% of the industry has a sewage treatment unit (Fajri 2013), while the rest discharges

wastewater directly into the environment, serious move should be applied. Textile wastewater generally contains heavy metals such as chromium, copper, and cadmium. This waste can contaminate soil and surface water which in turn contaminates ground water. As a pollutant, the accumulation of heavy metals results in various disorders of the body's organs because heavy metals cannot be degraded (Malarkodi et al. 2007).

In the last two decades, green technology has received more attention. Green technology refers to all environmentally friendly technologies that do not interfere with or damage the environment and natural resources. The overuse of chemicals and overexploitation of resources lead to a worsening greenhouse effect, disturbed ecosystems, and global warming. With regard to the hazard posed by the use of synthetic dyes, natural dyes are reused back commercially. The use of natural dyes has increased along with the increasing awareness of consumers to get environmentally friendly textiles and the need to preserve the environment. This is driven by the carcinogenic nature of some synthetic dyes (Bechtold et al. 2007, Saxena and Raja 2014, Hassan et al. 2015). In addition, Indonesia has many types and sources of natural dyes. However, many studies have shown that the potential benefits of natural dye batik are not always recognized in all areas and in all management systems. This is due to natural dyes have a complex chemical structure (Patel and Vashi 2010), long colouring process, inconsistent colour reproducibility, and relatively expensive costs (Makkar 2010, Comlekcioglu et al. 2015). At the same time, the implementation of natural dyes batik development policy depends on the willingness of craftsmen to participate and make changes on their batik products. As a result, it's critical to gain a better knowledge of how these artisans may be persuaded to use natural dyes in their batik production. In such endeavours, identification of socio-psychological conceptions and ideas that influence craftsmen's intention to use natural dyes in batik production can help build and adapt present policies. In these circumstances, research on producer behavioural intent must combine theories of rational and ethical approach in the development of research models (Valizadeh et al. 2018, Nguyen et al. 2021).

Studies indicated that rational and ethical approach parameter such as satisfaction, attitude, social atmosphere, and economic are the factors responsible for producers' perceptions in the agricultural sector (Govindasamy et al. 2003, Adrian et al. 2005, Kiss 2019, Valizadeh et al. 2018; Nguyen et al. 2021). Furthermore, environmental awareness and perceived quality have been identified as the primary factors influencing the producers' behaviour in the food sector (Bossle et al. 2015, Silva et al. 2020, De Canio et al. 2021). These factors have also been linked to consumer behaviour, as in the case of hybrid vehicles, organic food, and restaurants which determine the benefits and sustainability of the company

(Hamzah and Tanwir 2021, Qasim et al. 2019, Thielemann et al. (2018)). In the case of natural batik, some reports on customer behaviour in the selection of batik are also available. In addition, other studies were conducted on the general description of the batik industry (Rahayu 2012, Suryani 2013, Alamsyah 2018, Rhofur 2019, Martuti et al. 2020).

According to the above description, although studies on producers' intentions have been conducted, studies on the intentions of batik craftsmen in using natural dyes in the production process have not been widely investigated. To ascertain the factors influencing the intention to produce natural dyes batik, it is necessary to apply the rational approach and the ethical approach. This research is primarily needed to determine the behaviour and motivation of batik craftsmen to use natural dyes. Therefore, the goal of this study is to gain a better understanding of the factors influencing producers' intentions toward batik with natural dyes. The use of natural dyes is expected to minimize environmental pollution, increase the economic value of renewable natural materials, and the selling value of batik itself. Furthermore, recommendations are made for policy makers to promote the craftsmen intention to use natural dyes in the batik industry in Indonesia.

## 2 Review and Hypothesis

Figure 1 depicts conceptual model of the proposed framework. Totally, 10 hypotheses were drawn from seven constructs, i.e., social value, economic value, quality value, green value, attitude, satisfaction, and production intention of natural dyes batik. The proposed model as shown in the figure illustrates that it is possible attitude and satisfaction determine the production intentions. Both of these factors are related to social, economic, quality, and green values.

The concept of attitude includes making judgments about people, problems, or events. It's possible that people's perspectives will change as they gain information and experience. It is the region where conduct is most strongly influenced. The way someone behaves could reflect their experiences or background. People's perspective can be learned and shaped by information and experiences. Additionally, as attitudes are propensities to act, they are linked to actual producer behaviour. Previous studies have shown that producer attitudes have a significant impact on production behaviour (Ruiz-Molina and Gil-Saura 2008). In this context, attitudes are represented by affect, cognition, and behave our, both positive and negative, which refer to the person's level of preference, people's knowledge of the attitude object, and responses and intentions towards the object, respectively (Mantle-Bromley 1995, Hussein 2017). In addition, attitude describes a psychological inclination that is shown by rating a

certain system with a certain level of favourability over a certain amount of time, which prompts people to act in a particular manner in relation to the issue. In one instance, a certain attitude substantially predicts a single behaviour on a particular attitude object (Tan 2011).

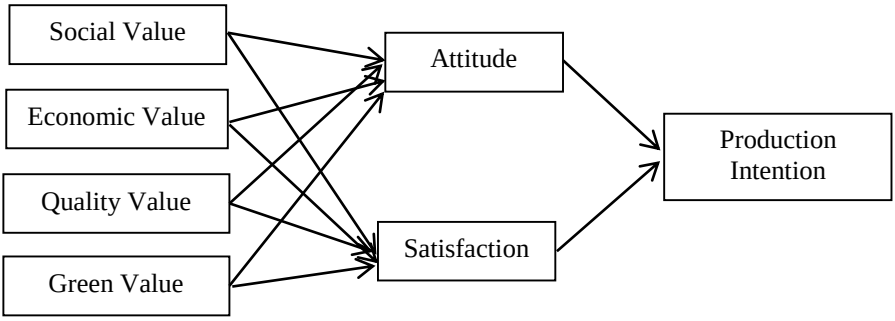


**Figure 1** Conceptual Model

The utility of a product or service in improving the producer's perceived self-concept in relation to a specific social, demographic, socioeconomic, or cultural group is referred to as social value. Self-image is related to social value. It is believed that producing natural dyes batik could improve the social status of the producers. In the context of green products, social value is a perceived net utility gained from green product production based on social pressure or status gain. Social value has a significant positive influence on the behaviour of sustainable producers (Qasim et al. 2019). Emotional value is the value obtained after a producer delivers a product or service and discovers that the resulting product has a higher value, resulting in an emotional response. The emotional benefits gained by producers through interaction with other producers in the community could be defined as social value (Luna-Cortés et al. 2019). Producers are motivated to behave in the same manner as their social class by social affiliation. Producers tend to create products that reflect their social standing. Producers believe that green production is a modern way of life. The production of natural dyes batik is critical to their social identity. Hence, based on the above description, this study hypothesizes that:

Hypothesis 1a. Social value will positively affect producer attitude.

Producer satisfaction is defined as the difference between the total benefits expected from a product/service and the total costs incurred in producing that product/service. Furthermore, producer satisfaction refers

to the difference between the actual performance experienced and the producer's expectation. A person's subjective evaluation of a situation that results in a positive emotional response is referred to as producer satisfaction. Given the intense competition, a successful response to producer satisfaction significantly defines a company's survival and long-term profitability. In order to establish and maintain a strong and long-term relationship with customers, producers must perform better, resulting in higher service/product quality (Wu 2014). A previous study on producer satisfaction discovered that in most areas surveyed, flat and pit parlours were preferred over stall barns with pipeline systems (Wagner (2001). Furthermore, despite higher consumer prices, producer satisfaction in terms of saleable product quantity, selling prices, and customer number was highest in producer markets (Kiss (2019). Producer satisfaction is critical in assessing market growth prospects and defining the potential of recruitment targets for both existing and new outlets (Govindasamy (2003). Therefore, the willingness to shift marketing and production priorities is required in order to meet customer demands, which leads to long-term profitability and satisfaction. In this study, perceived satisfaction can be defined as producer acceptance of natural dyes batik and the level of comfort involved in production. Satisfaction is defined as the pleasure or contentment that results from carrying out a necessary or desirable action and experiencing the result Shee and Wang (2008). In a positive sense, satisfaction is defined as a collection of feelings or attitudes toward a variety of factors that determine a specific situation. A higher level of producer satisfaction indicates a greater willingness to carry out the process. A great deal of effort has taken into estimating user satisfaction. It was revealed that user satisfaction is a complex concept that varies depending on the experience or case character (Liaw and Huang 2013). It is therefore, the following hypothesis was developed:

Hypothesis 1b. Social value will positively affect producer satisfaction.

In the case of the producer, economic value is associated with production profits as well as relationships with suppliers and customers in relation to realised costs (Jelčić and Mabić 2020). Economic value is the monetary value that a person assigns to an economic good based on its utility. Economic value is frequently estimated by measuring a person's willingness to pay for a good in currency units. It is characterised by more reasonable pricing, product value in line with price, and more cost-effective products (Wei et al. 2020). This case demonstrated that economic value determines satisfaction, though emotional value predicted client satisfaction more accurately than economic value (Jelcic and Mabic's 2020). In this work, natural dyes batik production provides perceived

economic value to producers through tangible benefits such as low material and production costs and maximum price. Economic value is believed to determine purchase intention. Thus, it is hypothesized that:

Hypothesis 2a. Economic value will positively affect producer attitude.
Hypothesis 2b. Economic value will positively affect producer satisfaction.

Perceived quality is another dimension of brand value that is very important for producers in choosing the materials for production. It is important to note that product quality is an important company resource to achieve competitive advantage. Perceived quality reveals assessment (perception) of overall product advantages compared to its alternative product/service. Based on this definition it is also known that perceived quality is product ability to be accepted in providing satisfaction compared relatively to the available alternatives' product. Because perceived quality is a component of brand value, high perceived quality will encourage consumers to prefer our brand over competitors. Product quality has a significant impact on purchase motivation, which influences consumer purchasing decisions (Li et al. 2012). They discovered that perceived brand quality and customer service influenced consumers' willingness to continue purchasing luxury fashion brands in the future. Another study found a link between perceived quality and willingness to purchase, brand purchase intentions, and brand choices (Netemeyer et al. 2004). Considering the importance of natural dyes batik quality in ensuring the business sustainability, the following hypothesis are developed:

Hypothesis 3a. Quality value will positively affect producer attitude.
Hypothesis 3b. Quality value will positively affect producer satisfaction.

Green value is the producer's overall assessment of the benefits of a product or service in terms of capital and earnings, based on the producer's environmental desires, sustainable expectations, and environmentally friendly needs (Wei and Jung 2017). Meanwhile, perceived green value is defined as a person's moral sense in honouring pro-environmental actions that benefit them by lowering both environmental damage and energy costs (Hamzah and Tanwir (2021). In the case of natural dyes batik, the increase in demand is ignited due to natural dyes batik purchase may enhance social status. Wearing natural dyes batik indicates environmentally friendly manner thus give high contribution to society. This behaviour relates to the fact that wearing natural dyes batik signal to others that a person is pro-social rather than pro-self-individual. The current prevalence of environmental consciousness is characterised by "green perceived value,"

which is based on the consumer's environmental preferences, sustainable expectations, and green requirement (Chen and Chang (2012). Green product manufacturers should focus more on value perception by emphasising the physical and psychological benefits of green products (Hur et al. 2013). Despite the addition of green attributes to green products in order to increase green product consumption, greenness is insufficient to encourage consumer demand for the products. As a result, it is critical for producers to recognise the needs that drive purchases. Green product purchases are linked to consumers' individual perceived values, such as increased customer satisfaction, increased customer retention, and decreased price sensitivity (Hur et al. 2013). The considerations lead to the following hypothesis:

Hypothesis 4a. Green value will positively affect producer attitude.
Hypothesis 4b. Green value will positively affect producer satisfaction.

Perceived intentions represent more normative beliefs leading to behavioural outcomes. Perceived intention is a context-specific perception that is derived from normative beliefs. Production intentions can be used to verify the application of a new products in line with environmental concerns thus help managers define whether the concept worthy of further establishment and determine which geographic markets and consumer segments to target through the channel. Production intention is of important in predicting actual behaviour. To predict production intention, it is important to understand the social, economic, quality, and green values that ultimately generate the attitudes and satisfaction. It is therefore, the following hypothesis is proposed:

Hypothesis 5. Attitude will positively affect production intention.
Hypothesis 6. Satisfaction will positively affect production intention.

# 3 Methodology

## 3.1 Sample

Currently, data collection could be effectively carried out through web-based surveys. The empirical data for the present study were collected through Google form and paper-based questionnaire. A broadcast of the survey goals was posted for 1 week on WhatsApp groups of the batik community. Considering that most batik producers are not familiar with filling out online forms, paper-based questionnaire was also applied. The sample criteria in this study were selected based on the provisions of those who experienced at least 1 year as natural dye batik producer. There were

40 respondents filled out the online form and 169 respondents filled out the paper-based questionnaire. To avoid duplicate responses, a single IP address or email account was applied. The final sample included 209 valid responses.

Among the respondents, 32.5% were male; 90% were under the age of 50; 91% were high school graduates and 42% had experience in producing natural dyes batik for 1-5 years. Table 1 summarizes the demographics of the respondents. The demographic profile showed that producers are mostly in productive ages and well experienced.

**Table 1** Demographic Profile

| Measure | Items | Frequency | Precent |
|---|---|---|---|
| Gender | Male | 68 | 32.5 |
| | Female | 141 | 67.5 |
| Age | 20-24 | 24 | 11.5 |
| | 25-29 | 22 | 10.5 |
| | 30-34 | 38 | 18.2 |
| | 35-39 | 35 | 16.8 |
| | 40-44 | 51 | 24.4 |
| | 45-49 | 22 | 10.5 |
| | >50 | 17 | 8.1 |
| Domicile | Banten | 1 | 0.48 |
| | Jawa Barat | 9 | 4.3 |
| | Jawa Tengah | 197 | 94.26 |
| | Jawa Timur | 1 | 0.48 |
| | DIY | 1 | 0.48 |
| Education | High School | 190 | 90.91 |
| | College | 5 | 2.39 |
| | Undergraduate Degree | 14 | 6.7 |
| Experience | 1-5 years | 87 | 41.63 |
| | 6-10 years | 50 | 23.92 |
| | 11-15 years | 60 | 28.71 |
| | >16 years | 12 | 5.74 |
| Production Capacity/Month | < 100 pcs | 26 | 12.44 |
| | 101-200 pcs | 27 | 12.92 |
| | 201-300 pcs | 12 | 5.74 |
| | 301-400 pcs | 13 | 6.22 |
| | >401 pcs | 31 | 14.83 |

## 3.2 Measure

Measurement variables, as shown in Table 2, considered each construct used in this study. Variables were either selected or modified from previous studies. A total of seven constructs were applied. Social value

was measured on four items and developed from previous study (Hamari et al. 2020). The validated four items were used to measure economic value. The quality was also measured on four items based on previous research (Hamari et al. 2020). Then, green value was measured by five different items. Subsequently, attitude was measured using two items based on previous studies (Hsu and Lin 2016, Paul et al. 2016). Satisfaction was then measured using four items based on previous study of Hsu and Lin (2016). Finally, production intention for natural dyes batik products was measured through four items taken from Paul et al. (2016) and Yadav and Pathak (2016). A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was applied in the questionnaire. This scale requests respondents to declare the level of strongly disagree or agree with a sequence of statements on a certain topic.

Furthermore, to find out the extent of the instrument's representation of the specific behaviour to be measured, content validity was carried out prior to data collection process. Content validity of an instrument is the extent to which the items in the instrument represent the components in the overall content area of the object to be measured and the extent to which the items reflect the behavioural characteristics to be measured (Fernandes 1984, Nunnally and Bernstein 1994). Content validity was determined using the agreement of 3 experts, 2 batik experts and 1 psychological measurement expert. To determine the content validity index based on expert agreement, the content validity index proposed by Aiken (1980) was used. Questionnaire items that have been compiled based on indicator variables, was assessed by three experts by filling in a score (Score 1 = Not relevant; Score 2 = less relevant; Score 3 = quite relevant; Score 4 = relevant; Score 5= very relevant). The assessments results of the three experts as validators were then calculated using the Aiken V index formula, and the value was 0.89. It showed that the content validity index of the instrument used was very valid. Considering the respondents backgrounds, the questionnaire was given in Indonesian.

Descriptive statistics of the questionnaire items are available in Table 2, including the mean values of social value, economic value, quality, green value, attitude, satisfaction and production intention for natural dyes batik products were quite high and relatively favourable. The mean values of the lower costs of production of natural dye batik were low compared with the other constructs at 3.622 because most producers assume production of natural dyes batik is a long process thus requires higher costs. All data have standard deviation of almost 0, shows that no deviation found in the data distribution, no outlier exists in the data. The sample perception is uniform.

**Table 2** Descriptive Statistic Results

| Constructs/ Questionnaire Items | Mean | Standard Deviation |
|---|---|---|
| **Social Value (SCV)** | | |
| My friends would think producing natural dye batik is a good idea (Hamari et al. 2020) | 4.072 | 0.677 |
| Producing natural dye batik improves the way I am perceived (Hamari et al. 2020) | 3.967 | 0.473 |
| Producing natural dye batik makes a good impression (Hamari et al. 2020) | 4.043 | 0.482 |
| **Economic Value (ECV)** | | |
| Production of natural dye batik needs lower costs | 3.622 | 0.862 |
| Natural dye batik is more marketable | 3.746 | 0.617 |
| Selling natural dye batik increases my income as batik craftsman | 3.986 | 0.729 |
| Natural dyes are less expensive | 3.713 | 0.920 |
| **Quality (QV)** | | |
| The natural dye batik is of good quality (Hamari et al. 2020) | 4.392 | 0.691 |
| The natural dye batik is of well-made (Hamari et al. 2020) | 4.273 | 0.632 |
| The natural dye batik is long lasting | 4.278 | 0.764 |
| Natural dye batik has excellent colour fastness | 4.364 | 0.808 |
| **Green Value (GV)** | | |
| Natural dyes for batik dyeing generate less wastewater | 4.522 | 0.619 |
| Natural dyes explore local materials | 4.263 | 0.628 |
| Natural dyes generate harmless wastewater | 4.301 | 0.570 |
| Natural dyes need simple wastewater treatment facility | 3.885 | 0.689 |
| **Attitude (ATT)** | | |
| I like the idea of producing natural dye batik (Paul et al. 2016) | 4.100 | 0.512 |
| I have favourable attitude towards producing natural dye batik (Paul et al. 2016) | 4.091 | 0.523 |
| My attitude toward producing natural dye batik is favourable (Hsu and Lin 2016) | 3.895 | 0.769 |
| **Satisfaction (STF)** | | |

| | | |
|---|---|---|
| Producing natural dye batik makes me feel very satisfied (Hsu and Lin 2016) | 3.856 | 0.718 |
| Producing natural dye batik gives me a sense of enjoyment (Hsu and Lin 2016) | 3.995 | 0.786 |
| Producing natural dye batik makes me feel very contented (Hsu and Lin 2016) | 3.885 | 0.689 |
| Producing natural dye batik makes me feel very delighted (Hsu and Lin 2016) | 3.962 | 0.757 |
| **Production Intention (PDI)** | | |
| I'm willing to produce natural dye batik (Yadav and Pathak 2016) | 4.072 | 0.738 |
| I will make an effort to produce natural dye batik (Yadav and Pathak 2016) | 4.120 | 0.719 |
| I will consider switching to environmental friendly materials for ecological reasons (Paul et al. 2016) | 4.153 | 0.716 |
| I expect to produce natural dye batik for the positive environmental contribution (Paul et al. 2016) | 4.488 | 0.706 |

## 4 Tools for Analysis

Data analyses were conducted using the statistical package with graphical user interface for variance-based structural equation modelling using the partial least squares path modelling method (SmartPLS). The software was used to test hypotheses of this study. SmartPLS was used for descriptive analysis to analyse preliminary results.

### 4.1 Testing of Common Method Bias of the Measurement Model

Common Method Bias is an effort made to see the strength or size of gap between the observed correlation and the true correlation between constructs or variables. Therefore, Common Method Bias test in this study was objected to avoid the causes of errors in measuring or testing data. To show the issue of Common Method Bias or not, it can be analysed using the full collinearity test (Kock and Lynn 2012). Through this procedure, a construct model that may be contaminated by Common Method Bias can be seen based on variance inflation factors (VIFs). VIF > 3.3 indicates a pathological collinearity as well as contaminated model by Common Method Bias. On the other hand, VIF from the full collinearity test of greater than 3.3, the model is considered free from Common Method Bias. Table 3 describes full collinearity test results, reveals that latent variables have a VIF value greater than 3.3, that no Common Method Bias occurred in this study.

**Table 3** Result of Full Collinearity Test

| | ATT | ECV | GV | PDI | QV | SCV | STF |
|---|---|---|---|---|---|---|---|
| **ATT** | | | | 1.702 | | | |
| **ECV** | 1.487 | | | | | | 1.487 |
| **GV** | 1.609 | | | | | | 1.609 |
| **PDI** | | | | | | | |
| **QV** | 1.404 | | | | | | 1.404 |
| **SCV** | 1.491 | | | | | | 1.491 |
| **STF** | | | | 1.702 | | | |

## 4.2 Testing of Reliability and Validity of the Measurement Model

Confirmatory factor analysis (CFA) was applied to evaluate the measurement model. The measurement model confirms the factor loadings of the seven constructs; social value, economic value, quality value, green value, attitude, satisfaction and production intention for natural dyes batik products. Model validity and reliability verification was carried out by analysing convergent and discriminant validities and the overall fit with data. The internal consistency of the indicators of each studied construct was examined using the most common method, by determining the coefficient alpha of a given construct (Maichum et al. 2016). The loading factor showed that all items used to measure the variable are valid.

The factor loading was determined to be higher than 0.700 (Hair et al. 2009). It was found that all of standardized factor loadings were significant ranging from 0.608 to 0.922. Composite reliability measures were used to examine the construct reliability thus assess the extent to which items in the construct measure the latent concept. Composite reliability (CR) and the average variance extracted (AVE) contribute to convergent validity of the CFA results (Hair et al. 2009). It was determined that the approximation of CR and AVE, which measures the amount of variance explained by the given construct, should be higher than 0.700 and 0.500, respectively (Hair et al. 2009). Table 4 shows that the CR and AVE values ranged from 0.820 to 0.946 and 0.534 to 0.814, respectively, surpassing the respective recommended levels of 0.700 and 0.500. The AVE value describes the variance or diversity of the manifest variables posed by the latent construct. Thus, the greater the variance or diversity of the manifest variables that can be contained by the latent construct leads to greater representation of the manifest variable on the latent construct. The AVE value of 0.5 represents adequate convergent validity, which means that in

average, one latent variable is able to explain more than half of the variance of its indicators. The CFA results shows that the measurement model had suitable convergent and discriminant validities. It was also revealed that the hypothesized measurement model was reliable and considerable to justify the structural associations among the constructs.

**Table 4** Reliability and Validity of the Constructs

| Constructs/ Questionnaire Items | Question Item | Standardized Factor Loading | Composite Reliability | Average Variance Extracted |
|---|---|---|---|---|
| **Social Value (SCV)** | | | | |
| | SCV1 | 0.796 | | |
| | SCV2 | 0.849 | **0.864** | **0.679** |
| | SCV3 | 0.827 | | |
| **Economic Value (ECV)** | | | | |
| | ECV1 | 0.656 | | |
| | ECV2 | 0.832 | **0.827** | **0.547** |
| | ECV3 | 0.792 | | |
| | ECV3 | 0.662 | | |
| **Quality (QV)** | | | | |
| | QV1 | 0.808 | | |
| | QV2 | 0.717 | **0.847** | **0.581** |
| | QV3 | 0.812 | | |
| | QV4 | 0.707 | | |
| **Green Value (GV)** | | | | |
| | GV1 | 0.608 | | |
| | GV3 | 0.794 | **0.820** | **0.534** |
| | GV4 | 0.759 | | |
| | GV5 | 0.749 | | |
| **Attitude (ATT)** | | | | |
| | ATT1 | 0.847 | | |
| | ATT2 | 0.856 | **0.844** | **0.646** |
| | ATT3 | 0.698 | | |
| **Satisfaction (STF)** | | | | |
| | STF1 | 0.922 | | |
| | STF2 | 0.884 | **0.946** | **0.814** |
| | STF3 | 0.921 | | |
| | STF4 | 0.882 | | |
| **Production Intention (PDI)** | | | | |
| | PDI1 | 0.894 | **0.886** | **0.663** |

| | |
|---|---|
| PDI2 | 0.919 |
| PDI3 | 0.754 |
| PDI4 | 0.663 |

Table 5 describes Heterotrait-Monotrait Ratio (HTMT), objected to determine the correlation level of an indicator with its construct. It was shown in the table that all HTMT values < 0.9, revealed that all constructs were valid with discriminant validity.

**Table 5** Heterotrait-Monotrait Ratio (HTMT)

| | ATT | ECV | GV | PDI | QV | SCV | STF |
|---|---|---|---|---|---|---|---|
| ATT | | | | | | | |
| ECV | 0.549 | | | | | | |
| GV | 0.704 | 0.497 | | | | | |
| PDI | 0.737 | 0.599 | 0.712 | | | | |
| QV | 0.503 | 0.721 | 0.521 | 0.733 | | | |
| SCV | 0.699 | 0.304 | 0.770 | 0.578 | 0.234 | | |
| STF | 0.795 | 0.366 | 0.757 | 0.751 | 0.345 | 0.644 | |

Structural Equation Model was arranged by smartPLS using a maximum likelihood parameter that assessed the hypothesized conceptual model of this study as given in Figure 2.

The results of the structural model and the standardized path coefficient represented positive effects among the constructs in the structural model are available in Table 6. Totally, eight of ten hypotheses were accepted. The positive relationship between social value towards attitude of natural dyes batik products ($\beta 1$= 0.343, t = 4.677) indicated that H1 was accepted. According to H2, the positive estimate of coefficients of social value and satisfaction of natural dyes batik production had significant positive effects ($\beta 2$ = 0.270, t = 3.878), thus, H2 was accepted. The impact of economic value ($\beta 3$ = 0.148, t = 1.811) had insignificant positive effects on attitude of natural dyes batik production, rejected H3. Economic value had insignificant positive effect on satisfaction of natural dyes batik production ($\beta 4$= 0.024, t = 0.422). Furthermore, quality value gave significant positive effect to attitude of producing natural dyes batik ($\beta 5$= 0.216, t = 3.331) and satisfaction ($\beta 6$ = 0.167, t = 2.537). Green value significantly affected attitude ($\beta 7$ = 0.209, t = 2.730) and satisfaction ($\beta 8$ = 0.422, t = 6.025,) of natural dyes batik production. Finally, attitude ($\beta 9$ = 0.256, t = 3.690) and satisfaction ($\beta 10$ = 0.541, t = 9.151) of natural dyes batik production showed significant positive influences on production intention of natural dyes batik.

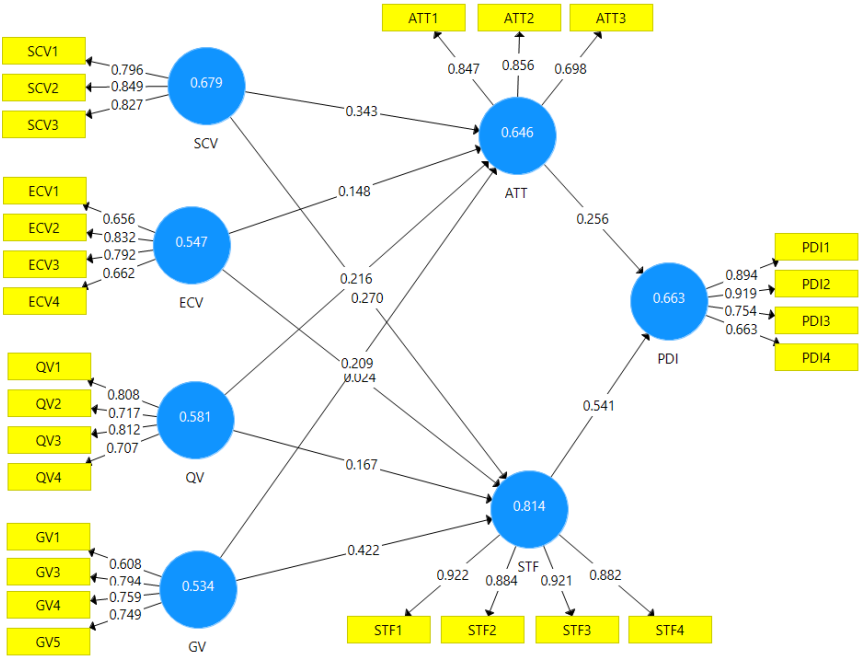


**Figure 2** Standardized Factor Loading

**Table 6** Hypotheses Result for the Structural Model

| | | Path Coefficient | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|
| H1 | SCV → ATT | 0.343 | 0.071 | 4.812 | 0.000 |
| H2 | SCV → STF | 0.270 | 0.066 | 4.075 | 0.000 |
| H3 | ECV → ATT | 0.148 | 0.078 | 1.896 | 0.059 |
| H4 | ECV → STF | 0.024 | 0.057 | 0.421 | 0.674 |
| H5 | QV → ATT | 0.216 | 0.063 | 3.455 | 0.001 |
| H6 | QV → STF | 0.167 | 0.066 | 2.528 | 0.012 |
| H7 | GV → ATT | 0.209 | 0.071 | 2.940 | 0.003 |
| H8 | GV → STF | 0.422 | 0.067 | 6.342 | 0.000 |
| H9 | ATT → PDI | 0.256 | 0.072 | 3.578 | 0.000 |
| H10 | STF → PDI | 0.541 | 0.063 | 8.587 | 0.000 |

## 5 Results and Discussion

This study investigated the extended framework of the perceived model, in which social value, economic value, quality value and green value are added as antecedents of attitude and satisfaction of natural dyes batik production. The purpose was to examine

Indonesian natural dyes batik producers on the production intention of natural dyes batik products. The result recommended that producers' intention for this group to produce natural dyes batik products can be predicted by social value, economic value, quality value, green value, attitude, and satisfaction. A detailed discussion of each factor is given below.

*First*, there were positive relationships between **social value towards attitude and satisfaction** of producers in producing natural dyes batik. Producers would have positive attitude and satisfaction towards producing natural dyes batik when they have high level of social value. Perceived impression of natural dyes batik production as well as the image as environmental care people are good motives in producing natural dyes batik. Producers would satisfy and enjoy the process of natural dyes batik production. Different trend was obtained by Hamzah and Tanwir (2021), in which subjective norms insignificantly affected purchase intention. This is due to the consumers' social network, involving co-workers and fellow as well as relatives gave insufficient effect in determining their compliance to purchase product. Another reason is their social influencers are not entirely knowledgeable of the advantages of applying pro-environmental behaviour. Similarly, no significant relationship between social value and behavioural intention to consume organic products was found. That is, taking organic products does not result in perceived social recognition or social image enhancement (Qasim et al. 2019).

*Second,* **economic value significantly defined attitude** but **insignificantly determined producer satisfaction** of producing natural dyes batik. The belief of low production costs and more marketable products leads to the higher level of producing natural dyes batik attitude. Moreover, the exclusivity of natural dyes batik products may enhance the sales thus in turn increase the profits. The low production costs gave impact in lower selling price. As a result, producers have favourable attitude towards resulting the products. Producers are currently more environmentally aware about the hazard of textile dyes and chemical agents used in conventional dyeing process. Their awareness is able to increase their responsibility to protect the environment through the use of natural dyes to minimize environmental pollution. This is in accordance with the finding of Qasim (2019) that economic value is among the performance factors assessed by consumers. They tend to purchase premium costly products as long as the products provide high return. On the other hand, despite their responsible attitude towards the environment, producers are not satisfied with the results obtained,

especially during the Covid-19 pandemic. Sales of natural dyes batik tend to fall during the pandemic because people prioritise daily necessities over natural dyes batik products. This is supported by the fact that inflation was around 0.07% in May 2020, indicating a decline in people's purchasing power (Yuniarti et al. (2021). Producer profits are affected by the decline in purchasing power.

*Third,* **producers' attitude and satisfaction are also affected by quality value**. Natural dyes batik products generated at premium quality could improve the favourable attitude of producers. They could get more idea to sustainably produce good batik products by maintaining superior quality. A confidence attitude leading to a better comprehension towards the utility of technology, thus inducing to a tendency to apply these technologies. Producers who exhibited conviction about applying and learning technologies and perceived a net gain from applying these technologies indicated higher trend to use accurate agriculture technologies (Adrian et al. 2005). According to a previous study, every producer has nearly the same attitude, believing that good production methods result in high-quality products (Verbeke et al. 2005). Furthermore, producing excellent quality of natural dyes batik, in term of long lastness, good colour fastness, as well as well-made products enhance producers' satisfaction. Producer satisfaction plays an important role in determining the success of natural dyes batik production. Producers' satisfaction is also of important in determining the growth and future success of natural dyes batik industries. This is due to the fact that the quality and focus of production in meeting customer demands have a direct impact on customer satisfaction, which in turn will form a long-term bond of mutual trust (Thielemann et al. (2018), Govindasamy et al. (2003), Mutonyi et al. (2016).

*Fourth,* the study found that **green value significantly determined producer attitude and satisfaction**. The facts that natural dyes batik production generate less and harmless wastewater lead to the positive attitude thus very helpful in achieving their goals. They could continue producing natural dyes batik without worrying about the negative impact on the environment. The negative impacts toward customer body as well as surrounding environment by the production of natural dyes batik are negligible. In term of satisfaction, the pro-environment facts of natural dyes batik induce producers' contentment. The other facts are the employment of unused natural resources and local material in the production of natural dyes batik. This selection causes an attitude of pride and satisfaction for producers.

*Finally*, **attitude and satisfaction were found to give significant positive impacts on production intention** of natural dyes batik products. Satisfaction had the most significant influence on producers' production intention, which reveals that satisfaction was the strongest predictor of production intention of natural dyes batik products followed attitude. The overall results assured that the perceived model and its behaviour were suitable for the investigated group. This study's findings support previous studies that higher positive consumer attitudes toward environmentally friendly product purchase behaviour result in stronger consumer intentions to implement a behaviour under their control (Ajzen (2015), Tomasetti et al. (2018), Maichum (2016). Although, in some cases, consumer motives for pro-environment attitudes and loyalty to sellers are not triggered by positive attitudes toward purchasing environmentally friendly products (Hamzah and Tanwir (2021) and Molina (2008)).

### 5.1 Theoretical Implications

Indonesia as tropical country provides abundant types of natural resources having potential to be applied as natural dyes. Although application of natural dyes has been widely investigated, research on producers' intention towards natural dyes batik has not been found yet. Previous research limited to the relationship exploration of green subjective standards, awareness of green products and attitudes towards green purchasing intentions through the Internal Environmental Control Locus (INELOC) between craft shopping tourists in the Batik town of Pekalongan (Sunarjo et al. 2021). This research was driven by curiosity and the desire to expand knowledge in producers' intention area. It is believed that it gives a specific contribution to the academic body of knowledge in the research area of natural dyes batik producer intention.

In the field of natural dyes batik, studying producers' intentions, this research confirms the role of the theory of planned behaviour in the acceptance of natural dyes. This study confirms the appropriateness theory of planned behaviour in understanding producers' intention toward natural dyes batik production in Indonesia. This model has demonstrated the applicability of the approaches, in which social value, quality value, economic value, and green value all have a direct effect on attitude and satisfaction. Meanwhile, attitude and satisfaction have a direct impact on production intention.

### 5.2 Practical Implications

Adopting natural dyes batik not only increases producers' income but also protects environment by avoiding harmful chemicals. Natural dyes batik is becoming popular in Indonesia, and many government policies are promoting it. To increase the intention of adopting natural dyes batik production, the government must gain access to factors that influence producers' intentions and ethical aspects. Based on the research results of factors affecting producers' intention toward natural dyes batik production in Indonesia, the following suggestions are given:

1. Raising awareness among producers about the importance of natural dyes in batik, as well as the health and environmental consequences of not using natural dyes. This study was based on the relationship between the factors in planned behaviour and the relationship between producer attitude and satisfaction with their intentions. The values of the consequences of natural dyes application were shown to have a direct and indirect positive effect on the ethical perception of applying or not applying natural dyes through the belief of responsibility.
   Satisfaction will positively affect producers' intention toward natural dyes batik production in Indonesia. Besides, producers' intention would also be affected by attitude.
2. Communicating to producers via various means about the benefits of natural dyes over synthetic dyes on the health of producers and customers.
3. Forming information spill over groups between craftsmen who have developed natural dyes batik and those who have not. Those who have not previously practiced natural dyes batik will be given precise and practical information on the benefits of natural dyes, forming natural dyes intentions. The exchange of information among these craftsmen will influence their attitudes.

## 6 Conclusion

Production intention of environmentally friendly fashion products has been evaluated successfully. This work focused on the natural dyes batik producers in Indonesia. The results showed that production intention was affected significantly by the producers' attitude and satisfaction. In the meantime, the attitude and satisfaction of the producer were highly influenced by social value, quality value, and green value parameter. Economic value, however, provided contribution on the producer's attitude, but insignificantly contributed to the producer's satisfaction. Overall, production intention of natural dyes batik was strongly predicted by satisfaction and also determined by attitude. The results of this study

support in enhancing the concept of natural dyes batik production, which also provide an important role towards sustainable production.

The current research has some limitations that need further investigation in the future. The study only focused on producers' intention toward natural dyes batik in some areas of Central Java; the findings are therefore not generalizable to all batik craftsmen in the country. Therefore, future studies should include producers from different areas. The use of intentions instead of actual behaviour is another limitation of this study, thus future studies need to investigate the impacts of factors in the model on natural dyes batik production implementations. The results on the difference and characterization of the demographic variables such as gender, age, domicile, education level, experience in batik production as well as the annual capacity of batik production should be taken into account that how they impact the intention toward natural dyes batik production in the next studies.

## Declarations

### Ethical Approval

This material is the authors' own original work, which has not been previously published elsewhere. This manuscript is not currently being considered for publication elsewhere. The manuscript reflects the authors' own research and analysis in a truthful and complete manner. All sources used are properly disclosed with correct citation and gave proper reference.

### Consent to Participate

All panellists have read and understand the provided information and have had the opportunity to ask questions. All panellists understand that their participation is voluntary and that they are free to withdraw at any time, without giving a reason and without cost.

### Consent to Publish

All panellists understand that in any report on the results of this research, their identities will remain anonymous

### Author Contributions

Author Contributions: Conceptualization and methodology, A.K., T.A.A., K.P. and A.N.H.; data collection, A.K. and A.A..; data analysis, A.K., T.A.A. and A.N.H., writing—original draft preparation, A.K., K.P., and A.N.H.; writing—review and editing, A.K and A.A.; supervision, A.K., K.P. and A.N.H.; funding acquisition, A.K. All authors have read and agreed to the published version of the manuscript.

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**Conflicts of Interest**

The authors declare no conflict of interest

**Data Availability Statement**

Data sharing is not applicable to this article

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