EXPLORING INNOVATION SUSTAINABILITY IN THE DEVELOPMENT HISTORICAL CITY BATIK MOTIFS AND PEOPLE'S PURCHASING POWER

Indarti

ABSTRACT

Objective: This study aims to explore the relationship between the development of Surabaya's distinctive historical batik motifs and people's purchasing power as a basis for sustainable innovation transformation.

Theoretical Framework: The research explores the relationship between the development of Historical City Batik Motifs, People's Purchasing Power, and Sustainability Innovation, utilizing concepts such as stakeholder analysis, business model canvas, and life cycle assessment to assess the impact of these variables on sustainable innovation.

Method: The research sample was conducted on batik craftsmen, batik designers, and the general public as many as 90 respondents. This study used mixed methods. Qualitative research is used to determine the phenomena that occur in the community in the form of the development of historical city batik motifs. While quantitative studies to test innovations can continue based on which variables.

Results and Discussion: The results showed that the development of batik motifs in this study illustrates themes such as the theme of Red Bridge, Jalesveva Jayamahe, Heroes Monument and Pointed Bamboo, Monkasel, Remo Dance, Distance and Butterfly, and Jalan Tunjungan. The historical city batik motifs development variable has a very small or insignificant effect on sustainability innovation, while people's purchasing power has a large effect on the Sustainability Innovation variable.

Research Implications: This research makes a positive contribution in promoting the richness of local culture and creating added value for the batik industry in Surabaya. The implications of this research can be an inspiration for local batik craftsmen to develop new motifs that depict the identity of a particular city, as well as show indicators that need to be improved to create sustainable innovation.

Originality/Value: This study contributes to producing new designs inspired by the history and uniqueness of the city and provides an impact on what indicators must be improved to maintain Sustainability Innovation.

Keywords: Batik Motif Development, Historical City Batik Motifs, People's Purchasing Power, Sustainability Innovation, Surabaya Cultural Heritage.

EXPLORANDO A SUSTENTABILIDADE DA INOVAÇÃO NA CIDADE HISTÓRICA DO DESENVOLVIMENTO MOTIVOS BATIK E O PODER DE COMPRA DAS PESSOAS

RESUMO

Objetivo: Este estudo visa explorar a relação entre o desenvolvimento dos motivos históricos distintivos do batik de Surabaya e o poder de compra das pessoas como base para a transformação da inovação sustentável.

Referencial Teórico: A pesquisa explora a relação entre o desenvolvimento dos Motivos Batik da Cidade Histórica, o Poder de Compra das Pessoas e a Inovação Sustentável, utilizando conceitos como análise das partes interessadas, tela do modelo de negócios e avaliação do ciclo de vida para avaliar o impacto dessas variáveis na inovação sustentável.

Método: A amostra da pesquisa foi conduzida com artesãos de batik, designers de batik e o público em geral com até 90 entrevistados. Este estudo utilizou métodos mistos. A pesquisa qualitativa é utilizada para determinar os
fenômenos que ocorrem na comunidade na forma do desenvolvimento de motivos históricos de batik da cidade. Embora os estudos quantitativos para testar inovações possam continuar com base em quais variáveis.

**Resultados e Discussão:** Os resultados mostraram que o desenvolvimento de motivos de batik neste estudo ilustra temas como o tema da Ponte Vermelha, Jalesveva Jayamahe, Monumento aos Heróis e Bambú Pontudo, Monkasel, Dança Remo, Distância e Borboleta, e Jalan Tunjungan. A variável de desenvolvimento de motivos históricos de batik da cidade tem um efeito muito pequeno ou insignificante na inovação em sustentabilidade, enquanto o poder de compra das pessoas tem um grande efeito na variável Inovação em Sustentabilidade.

**Implicações da pesquisa:** Esta pesquisa dá uma contribuição positiva na promoção da riqueza da cultura local e na criação de valor agregado para a indústria do batik em Surabaya. As implicações desta investigação podem servir de inspiração para os artesãos locais de batik desenvolverem novos motivos que representem a identidade de uma determinada cidade, bem como mostrar indicadores que precisam de ser melhorados para criar inovação sustentável.

**Originalidade/Valor:** Este estudo contribui para a produção de novos designs inspirados na história e singularidade da cidade e proporciona impacto sobre quais indicadores devem ser melhorados para manter a Inovação em Sustentabilidade.

**Palavras-chave:** Desenvolvimento do Motivo Batik, Motivos Batik da Cidade Histórica, Poder de Compra das Pessoas, Inovação em Sustentabilidade, Patrimônio Cultural de Surabaya.

**EXPLORANDO LA INNOVACIÓN, LA SOSTENIBILIDAD EN EL DESARROLLO DE LA CIUDAD HISTÓRICA MOTIVOS BATIK Y EL PODER ADQUISITIVO DE LA GENTE**

**RESUMEN**

**Objetivo:** Este estudio tiene como objetivo explorar la relación entre el desarrollo de los motivos históricos distintivos del batik de Surabaya y el poder adquisitivo de las personas como base para una transformación de la innovación sostenible.

**Marco teórico:** la investigación explora la relación entre el desarrollo de los motivos Batik de la ciudad histórica, el poder adquisitivo de las personas y la innovación sostenible, utilizando conceptos como el análisis de las partes interesadas, el modelo de negocio y la evaluación del ciclo de vida para evaluar el impacto de estas variables en la innovación sostenible.

**Método:** La muestra de la investigación se llevó a cabo entre artesanos y diseñadores de batik y el público en general, hasta 90 encuestados. Este estudio utilizó métodos mixtos. La investigación cualitativa se utiliza para determinar los fenómenos que ocurren en la comunidad en forma de desarrollo de motivos históricos de batik de la ciudad. Mientras que los estudios cuantitativos para probar las innovaciones pueden continuar en función de qué variables.

**Resultados y discusión:** Los resultados mostraron que el desarrollo de motivos batik en este estudio ilustra temas como el tema del Puente Rojo, Jalesveva Jayamahe, Monumento a los Héroes y Bambú Puntiagudo, Monkasel, Remo Dance, Distancia y Mariposa, y Jalan Tunjungan. La variable de desarrollo de motivos históricos de batik de la ciudad tiene un efecto muy pequeño o insignificante en la innovación en sostenibilidad, mientras que el poder adquisitivo de las personas tiene un efecto grande en la variable de Innovación en sostenibilidad.

**Implicaciones de la investigación:** Esta investigación hace una contribución positiva a la promoción de la riqueza de la cultura local y la creación de valor agregado para la industria del batik en Surabaya. Las implicaciones de esta investigación pueden ser una inspiración para que los artesanos locales de batik desarrollen nuevos motivos que representen la identidad de una ciudad en particular, así como también muestren indicadores que deben mejorarse para crear innovación sostenible.

**Originalidad/Valor:** Este estudio contribuye a producir nuevos diseños inspirados en la historia y la singularidad de la ciudad y proporciona un impacto sobre qué indicadores se deben mejorar para mantener la Innovación en Sostenibilidad.

**Palabras clave:** Desarrollo de Motivos Batik, Motivos Batik de Ciudades Históricas, Poder Adquisitivo del Pueblo, Innovación Sostenible, Patrimonio Cultural de Surabaya.
1 INTRODUCTION

Batik is an Indonesian cultural heritage that is rich in meaning and beauty. As one of the traditional textile art forms, batik has become an important part of the cultural identity of the Indonesian nation. Batik motifs have a very significant role in determining the uniqueness and beauty of a batik fabric. Surabaya batik motifs have their uniqueness that reflects the history, culture, and identity of the city of Surabaya. As one of the largest cities in Indonesia, Surabaya has a variety of symbols and icons that serve as inspiration in the development of batik motifs (Atmaja et al., 2023).

In research (Nuringsih et al., 2020), it was found that there is limited knowledge in explaining the meaning of Batik patterns, so cultural education is needed to promote these products. In addition, the commercialization of "Geblek Renteng" is in line with the four sustainable development goals so as to increase economic growth and serve social welfare for rural communities. This research also produces information related to the meaning of traditional patterns such as "Sido Mukti, Sido Luhur, Sido Mulyo, Sido Asih, Gurdho Latar Kembang, Sekar Jagad, Kawung, Truntum, Parang, and Cuwiri" which can be used to promote cultural products by embedding them in packaging or displaying on online systems. The implications of this research are the importance of cultural education in understanding and appreciating cultural heritage such as Batik, as well as the potential commercialization of traditional patterns to improve the welfare of rural communities. This study highlights the importance of reintroduction of Batik philosophy, cultural education, and commercialization of traditional patterns to promote and preserve cultural heritage in the Batik entrepreneurship sector. The identified gaps indicate the need for artisan training, consumer engagement, and cooperation with related parties to strengthen the sustainability of the Batik sector.

In the research (Setyawan &; Studyanto, 2018), the results include several things as follows: Research Implications: the development of Majapahit batik design through Digital-Based Creativity Management provides a new dimension in the development of Majapahit batik designs that are more innovative, effective, and following the context of the times, the use of computer technology in the batik design process can create batik motif designs that combine traditional values Majapahit with the development of science and technology, as well as aspects
Exploring Innovation Sustainability in the Development Historical City Batik Motifs and People's Purchasing Power

of creativity. Then the research gap: shows that there is stagnation in batik design creativity that influences the innovation of batik motifs. This is due to the weak creative management of Majapahit batik craftsmen in the creative design process, as well as the Majapahit batik craftsmen being open to changes and external influences on the batik motifs they work on, but they are not aware of how the creation of such motifs leads Majapahit Batik to be more similar to batik from other regions.

Based on several previous studies presented, it is an opportunity in this study to develop motifs based on the history of a city, as well as explore the development of history-based batik motifs of a city with people's purchasing power towards batik itself to determine whether sustainable innovation exists in this research.

Research on Surabaya batik motifs is still limited, so there are still many things that need to be explored and studied further. Some of Surabaya's batik motifs that have been known include Monkasel, Distance and Butterfly motifs, Red Bridge, Jalesveva Jayamahe, Heroes Monument, and Pointed Bamboo. Each motif has its meaning and philosophy that reflects the cultural and historical values of the city of Surabaya. These motifs have become part of Surabaya's artistic and cultural wealth that should be preserved and developed. Although Surabaya's typical batik motifs are well known, there is still a void of information related to the development and trial of these motifs. There has been no in-depth research on the potential development of Surabaya batik motifs and trials of the quality and market acceptance of these motifs. Therefore, this research is expected to fill the knowledge gap and make a valuable contribution in the development of Surabaya batik art.

In this context, the batik motifs studied are motifs inspired by various symbols and icons typical of Surabaya, such as Monkasel, Distance and Butterfly, Red Bridge, Jalesveva Jayamahe, Heroes Monument, and Pointed Bamboo. Based on the explanation above, this study aims to describe the finished results of the development of typical Surabaya batik motifs and the results of testing motifs as the basis for innovation transformation.
2 THEORETICAL FRAMEWORK

Furthermore, after the development of batik design, the process is in the form of comparing with other variables to obtain information about Sustainability Innovation. Some of the variables analyzed with Structural Equation Modeling (SEM) include the results of the development of Historical Batik Motifs, and People's Purchasing Power, which will then be able to know information about the influence between variables.

Variable Historical City Batik Motifs (HC), Aspects of historical batik motifs can be seen in several ways: (1) Linkage with Culture (HC1): Indonesian batik motifs have a strong connection with local culture. Factors such as geographical location, nature and livelihood of the region, beliefs and customs in an area, as well as the surrounding natural conditions including flora and fauna, influence the birth of unique and different batik motifs between regions (Nunn, 2012) (Nordgren, 2016); (2) Use of Natural Dyes (HC2): The creation of batik in this study uses natural dyes, which are environmentally friendly and do not pollute the environment. This shows concern for the environment and conservation of natural resources (Křížová, 2013) (Samantaa & Agarwal, 2009); (3) Creativity and Innovation (HC3): The development of new batik motif designs can show a sense of interest in batik culture and thinking skills using existing knowledge sources. This allows the development of higher skills and increases educational power (Mothiram, 2019) (Cascini et al., 2022); (4) Integration with Tradition (HC4): Batik as Indonesia’s cultural heritage has been recognized by global citizens and designated as a humanitarian heritage for oral and intangible culture. The development of batik motifs based on tradition and culture can maintain aesthetic and cultural values related to batik (Erisen et al., 2022) (Andries, 2018); (5) Use of the Power of Story (HC5): Communication strategies used in the development of new batik motifs through the technique of the power of stories about the uniqueness or originality of works can expand networks and partners, as well as increase public awareness of the beauty and cultural value of batik (Groves, 2009) (Wahida et al., 2020); and (6) Meaning and Symbolism (HC6): Javanese Batik has deep meaning and symbolism, with each motif and pattern having a story and cultural value that has been passed down through generations. The meaning and symbolism of Javanese batik motifs such as the machete motif that symbolizes strength and courage, and the kawung motif that symbolizes beauty and perfection, show how batik motifs can be more than just beautiful works of art (Akter, 2016) (Viensen, 2020).

While the variables of assessing people's purchasing power include: Aspects of assessing people's purchasing power on batik can be seen in several ways: (1) Income (PP1):
People's income has a positive and significant effect on purchasing power. The higher the income, the ability of purchasing power will increase, so the demand for a good will increase as well (Ahmed et al., 2016) (Triwijayati et al., 2019); (2) Price (PP2): Price has a positive and significant effect on purchasing power. Prices that are affordable by purchasing power or consumer ability influence buying decisions (Ariyuni & Suhardi, 2020) (Wibowo et al., 2022); (3) Quality (PP3): Quality has a positive and significant effect on purchasing power. Good product quality influences consumer buying decisions (Kim & Huruta, 2021) (Halim et al., 2022); (4) Position (PP4): Position has a positive effect on purchasing power. Strategic location influences consumers' buying decisions (Shebl et al., 2021) (Qiao, 2024); and (5) Cultural Linkage (PP5): Batik has a strong connection with local culture. Factors such as geographical location, nature and livelihood of the region, beliefs and customs in an area, as well as the surrounding natural conditions including flora and fauna, influence the birth of unique and different batik motifs between regions (Musrif’an & Hariyanto, 2020) (Nyamukapa & Kurebwa, 2022).

Furthermore, the variables of Sustainability Innovation (SI) include: Aspects of sustainable innovation assessment can be seen in several ways: (1) Linkage with Sustainable Development Goals (SDGs) (SI01): Sustainable innovation must meet sustainable development goals set by the United Nations, such as reducing waste and costs, and creating entirely new market segments (Liu et al., 2023); (2) Alignment with Selected Categories and Criteria (SI02): Innovation must meet the selected criteria and be relevant to the objectives to be achieved. These criteria may include aspects such as efficiency, effectiveness, and sustainability (Woollacott et al., 2023); (3) Significance (SI03): Innovation must have a positive impact on a group or population group, especially vulnerable groups such as children, women, the elderly, people with disabilities, and other vulnerable groups (Albay, 2019) (Sarango-Lalangui et al., 2023); (4) Innovative SI04): Novelty or Uniqueness or Authenticity: Innovation must have an innovative side that is different from what has existed before, as well as have significant novelty or uniqueness. Innovation must also consider whether the innovation is original or whether it is an adaptation/replication of another innovation/place (Del-Aguila-Arcentales et al., 2022); (5) Transferability (SI05): Nature Can Be Applied to Other Contexts/Places: Innovation must be applicable to other contexts/places and have the potential to be widely applied, so as to increase its impact (Putro et al., 2019) (Heru Wiwoho et al., 2019); (6) Efficiency and Effectiveness (SI06): Innovation must maintain efficiency and effectiveness in the use of resources, and have the potential to improve the quality and quantity of results (Pardalis et al., 2022) (Pramudyastuti et al., 2023);
(7) Rewards and Support (SI07): Continuous innovation should receive ongoing rewards and support, such as program and budget support, to sustain and enhance innovation (Mahmud et al., 2021) (Putri Rabbani et al., 2023); (8) Collaboration and Cooperation (SI08): Sustainable innovation should involve cross-disciplinary and cross-industry collaboration and cooperation to achieve broader goals and increase their impact (Bhatnagar et al., 2022) (Schlüter et al., 2023); (9) Use of Technology and Information (SI09): Continuous innovation should utilize available technology and information to improve efficiency and effectiveness in the use of resources (Calik & Bardudeen, 2016) (Resende et al., 2020); (10) Waste and Cost Reduction (SI10): Sustainable innovation should aim to reduce waste and costs, as well as improve the quality and quantity of results (Motta et al., 2018) (Schlüter et al., 2023).

3 METHODOLOGY

This study used mixed methods. Qualitative research is used to determine the phenomena that occur in the community in the form of the development of historical city batik motifs. While quantitative studies to test innovations can continue based on which variables. The qualitative approach is used to explore the meaning and philosophy behind each batik motif, while the quantitative approach is used to test the sustainability innovation after the developed motifs. This approach is expected to provide a comprehensive understanding of Surabaya's typical batik motifs from various points of view. Design research in this study involves the development of typical Historical city batik motifs based on predetermined themes, such as Monkasel, Distance and Butterfly, Red Bridge, Jalesveva Jayamahe, Heroes Monument, and Pointed Bamboo. Each theme will be developed into several batik designs that reflect the cultural and historical values of the city of Surabaya. The designs will then be tested to measure the level of market acceptance of these motifs and then will be tested to measure what indicators can affect sustainability innovation.

The population in this study is batik craftsmen, batik designers, and the general public who have an interest in Surabaya batik totaling 90 people. Batik craftsmen and batik designers will be the main source of data in the development of batik motifs, while the general public will be respondents in trials of the motifs developed. The Random Sampling technique carried out with the procedure to obtain samples in this study involves several steps as follows, as in Figure 1: (1) Selection of Batik Craftsmen and Batik Designers: Batik craftsmen and batik designers who have experience and expertise in making typical Surabaya batik will be selected as the main sample. They will be invited to participate in the development of batik motif. (2) Trial
**Respondent Selection:** Trial respondents will be randomly selected from the general public who have an interest in Surabaya batik, as Table 1 lists the distribution of respondents such as age, status, profession, and location of residence.

**Figure 1**

*Steps to Develop Motif*

They will be given information about the purpose of the research and asked to provide feedback on the batik motifs developed; (3) **Data Collection:** Data will be collected through interviews, observations, and questionnaires. Interviews will be conducted with batik craftsmen and batik designers to gain insight into the development of batik motifs. Observations were made to see the process of making batik and get information directly from batik practitioners. Questionnaires will be distributed to trial respondents to measure the level of market acceptance of batik motifs; (4) **Data Analysis:** The collected data will be analyzed qualitatively and quantitatively. Qualitative analysis explores the meaning and philosophy behind batik motifs, while quantitative analysis measures the level of market acceptance of the developed motifs. By using comprehensive research methods and structured procedures, it is hoped that this research can provide valid and reliable results in the development of typical Historical city batik motifs.
Table 1

Respondent demography

<table>
<thead>
<tr>
<th>Construct</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>53</td>
<td>58.9%</td>
</tr>
<tr>
<td>25-29</td>
<td>25</td>
<td>27.8%</td>
</tr>
<tr>
<td>30-39</td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td>40-50</td>
<td>3</td>
<td>3.3%</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>53</td>
<td>58.9%</td>
</tr>
<tr>
<td>Man</td>
<td>47</td>
<td>51.1%</td>
</tr>
<tr>
<td>Single</td>
<td>59</td>
<td>65.6%</td>
</tr>
<tr>
<td>Married</td>
<td>31</td>
<td>34.4%</td>
</tr>
<tr>
<td>Profession</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General public</td>
<td>61</td>
<td>68.3%</td>
</tr>
<tr>
<td>Batik designer</td>
<td>19</td>
<td>21.1%</td>
</tr>
<tr>
<td>Batik craftsman</td>
<td>14</td>
<td>15.6%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gubeng District</td>
<td>19</td>
<td>21.1%</td>
</tr>
<tr>
<td>Kenjeran District</td>
<td>40</td>
<td>44.4%</td>
</tr>
<tr>
<td>Genteng District</td>
<td>2</td>
<td>2.2%</td>
</tr>
<tr>
<td>Wonokromo District</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Pabean cantikan District</td>
<td>14</td>
<td>15.6%</td>
</tr>
<tr>
<td>Krembangan District</td>
<td>5</td>
<td>5.6%</td>
</tr>
<tr>
<td>Sukolilo District</td>
<td>8</td>
<td>8.9%</td>
</tr>
<tr>
<td>Gununganyar District</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Tegalsari District</td>
<td>4</td>
<td>5%</td>
</tr>
</tbody>
</table>

Furthermore, the method used to test the typical Historical city batik motifs involves several steps as follows: (1) Theme Selection: The theme of the batik motif to be tested is chosen first, such as the theme of Jembatan Merah, Jalesveva Jaya Mahe, Tugu Pahlawan, and Bamboo Runcing; (2) Design Making: The research team made batik motif designs based on the chosen theme. These designs will then be trialed to evaluate their quality; (3) Aspects Assessed: There are several aspects assessed in the trial, such as originality, color, technical making, motifs, and message/meaning of batik motif design; Collect respondent fields based on items described from research variable indicators. Mapping variables and indicators as shown in Figure 2.
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Figure 2
The mapping of variables and indicators

(4) **Data Collection:** Data from the trial results were obtained through data collection from respondents who assessed batik motif designs and people's purchasing power based on predetermined aspects. The elaboration of the indicators of each variable in this study. Variable Historical City Batik Motifs (HC), The aspect of assessing the originality of historical batik motifs can be seen in several ways: (1) Linkage with Culture (HC1), (2) Use of Natural Dyes (HC2), (3) Creativity and Innovation (HC3), (4) Integration with Tradition (HC4), (5) Use of Story Power (HC5), and (6) Meaning and Symbolism (HC6). The variables of assessing people's purchasing power include: Aspects of assessing people's purchasing power on batik can be seen in several ways: (1) Income (PP1), (2) Price (PP2), (3) Quality (PP3), (4) Position (PP4), and (5) Linkage with Culture (PP5). Furthermore, the variables of Sustainability Innovation (SI) include: Aspects of sustainable innovation assessment can be seen in several ways: (1) Linkage with the Sustainable Development Goals (SDGs) (SI01), (2) Alignment with Selected Categories and Criteria (SI02), (3) Significance or Significance (SI03), (4) Innovative SI04), (5) Transferability (SI05), (6) Efficiency and Effectiveness (SI06), (7) Awards and Support (SI07), (8) Collaboration and Cooperation (SI08), (9) Use of Technology and Information (SI09), and (10) Waste and Cost Reduction (SI10). The above indicators will be tested for validity, to check whether they can be continued in the next process, (5) **Data Analysis:** The data obtained from data collection is then analyzed to evaluate the Historical City Batik Motifs, People's Purchasing Power, and Sustainability Innovation based on the aspects.
assessed, calculated using the formula. Data analysis techniques are an important stage in research conducted after data collection and carried out to facilitate the research process and avoid errors, so the author makes efforts to manage the data that has been obtained (Prasetyo, 2012). The data collection instruments used in this study are:

Mean Provisions:
Mean 4.2 – 5.0 = Excellent
Mean 3.3 – 4.0 = Good
Mean 2.4 – 3.2 = Enough
Mean 1.7 – 2.5 = Not Good
Mean <1.7 = Very unkind

\[ X : \frac{\sum x_i}{n} \] (1)

When:

\[ X = \text{Average} \]
\[ \sum x_i = \text{Number of observer values} \]
\[ n = \text{Number of observers} \]

(6) Assessment and Conclusion: Based on the results of data analysis, batik motif designs are assessed, and their quality in every aspect that has been assessed; (7) Recommendations: Based on the results of the trial, recommendations can be given for improvement or further development of batik motif designs that have been tested

4 RESULTS AND DISCUSSIONS

Figure 3
Jalesveva Jayamahe theme motif design
Figure 3 shows an assessment of the originality aspect, which obtained the highest score on the Jalesveva Jayamahe theme, with design 3 obtaining a mean/average value of 4.7 (very good). Design 3 in the Jalesveva Jayamahe theme is considered very original because it is able to illustrate uniquely and creatively the meaning of the theme, which is about the majesty of Jalesveva Jayamahe. The success of this design in conveying the theme message originally gives a high value to the originality aspect. The motif aspect, which obtained the highest score was the Jalesveva Jayamahe theme, with design 3 obtaining a mean/average score of 4.47 (Excellent).

Figure 4
Aspects of originality, pattern motifs, color, message/meaning, and technical aspects in the theme Jalesveva Jayamahe

Figure 4 shows an assessment of the originality aspect, which obtained the highest score on the Jalesveva Jayamahe theme, with design 3 obtaining a mean/average value of 4.7 (very good). Design 3 in the Jalesveva Jayamahe theme is considered very original because it is able to illustrate uniquely and creatively the meaning of the theme, which is about the majesty of Jalesveva Jayamahe. The success of this design in conveying the theme message originally gives a high value to the originality aspect. The motif aspect, which obtained the highest score was the Jalesveva Jayamahe theme, with design 3 obtaining a mean/average score of 4.47 (Excellent).

Meanwhile, the originality aspect that obtained the lowest score was the theme of Tugu Pahlawan and Bambu Runcing as shown in Figure 4, with design 1 obtaining a mean/average score of 3.5.
value of 3.7 (Good). Design 1 in the theme of Tugu Pahlawan and Bambu Runcing is considered to have a lower level of originality compared to other designs. This may be due to the lack of innovation and creativity in presenting unique and original concepts related to the theme. Weaknesses in the originality aspect of design 1 cause lower values compared to other designs in the theme.

**Figure 5**

*Design of Tugu Pahlawan and Bambu Runcing theme motifs*

![Design of Tugu Pahlawan and Bambu Runcing theme motifs](image)

The color aspect that obtained the lowest score was the Red Bridge theme as shown in Figure 6, with design 2 obtaining a mean/average value of 4.15 (Very Good). While design 1 in the Red Bridge theme is considered to have a lower level of color quality compared to other designs. This may be caused by the use of colors that are less attractive or less suitable with the theme carried. The lack of color aspect in design 2 causes lower value compared to other designs in the theme. The aspect of message/meaning that obtained the lowest score was the Red Bridge theme with Design 3 obtaining a mean/average value of 3.93 (Good). Design 3 in the Red Bridge theme is considered to have a lower level of message clarity / meaning compared to other designs.

This may be caused by the lack of depth of meaning conveyed, the incompatibility of the message with the theme carried, or the lack of clarity in conveying the message/meaning to be conveyed through batik design. Weaknesses in the message/meaning aspect of design 3 cause lower scores compared to other designs in the theme. The technical aspect that obtained the lowest score was the theme of Tugu Pahlawan and Bamboo Pointed in Figure 4, with design 1 obtaining a mean/average value of 4.1 (Good). Design 1 in the theme of Tugu Pahlawan and Bambu Runcing is considered to have a lower level of technical quality compared to other designs. This may be due to a lack of expertise in the technicalities of batik making, imperfections in technical details, or a lack of precision in the manufacturing process. Weaknesses in technical aspects of design 1 cause lower scores compared to other designs in the theme.
The aspect of the motif that obtained the lowest score was the theme of Tugu Pahlawan and Bamboo Pointed as in Figure 5, with design 3 obtaining a mean/average value of 4.3 (Good). Design 3 in the theme of Tugu Pahlawan and Bambu Runcing is considered to have a lower level of motif quality compared to other designs.

**Figure 6**  
*Red Bridge theme motif design*

![Designs 1, 2, and 3](image)

This may be due to the lack of diversity of motifs, incompatibility of motifs with themes, or lack of innovation in the development of batik motifs. Weaknesses in the motif aspect in design 3 cause lower values compared to other designs in the theme.

**Research Implications of Development of Historical City Batik Motifs**

The use of the outer model aims to measure construct validity, that is, the extent to which latent variables represented by measurement indicators are observed. The outer model serves to evaluate the quality of measurement of variables that cannot be observed directly by utilizing observational variables that can be measured directly (Josep F Hair et al., 2018). The significance of this function in SEM analysis is crucial because it supports the understanding and validation of latent variable constructs which is an important aspect in research (Joseph F. Hair et al., 2019). Outer model analysis in smartPLS involves three main aspects, namely outer loading, construct validity and reliability, and discriminant validity.

Outer loading refers to a coefficient that measures the extent to which measurement indicators (observation variables) represent latent variables (constructs) associated in partial path analysis. This describes the strength of the relationship between the indicator and the latent variable being measured. Outer loading is calculated as the regression coefficient between the indicator and the latent variable, and its value ranges between 0 and 1. Higher values indicate that the indicator has a greater contribution in measuring latent variables. The outer loading value is considered good if it has a value above 0.5. Then, indicators that have an outer loading...
value of less than 0.5 should be removed from the framework of the research model (Hair et al., 2017). The outer loading value of each indicator in this study is shown in the following Table 2:

**Table 2**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Outer Loading</th>
<th>Information</th>
<th>Indicator</th>
<th>Outer Loading</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC1</td>
<td>0.516</td>
<td>Valid</td>
<td>SI01</td>
<td>0.580</td>
<td>Valid</td>
</tr>
<tr>
<td>HC2</td>
<td>0.784</td>
<td>Valid</td>
<td>SI02</td>
<td>0.727</td>
<td>Valid</td>
</tr>
<tr>
<td>HC3</td>
<td>0.743</td>
<td>Valid</td>
<td>SI03</td>
<td>0.690</td>
<td>Valid</td>
</tr>
<tr>
<td>HC4</td>
<td>0.539</td>
<td>Valid</td>
<td>SI04</td>
<td>0.714</td>
<td>Valid</td>
</tr>
<tr>
<td>HC5</td>
<td>0.445</td>
<td>Invalid</td>
<td>SI05</td>
<td>0.646</td>
<td>Valid</td>
</tr>
<tr>
<td>HC6</td>
<td>0.804</td>
<td>Valid</td>
<td>SI06</td>
<td>0.754</td>
<td>Valid</td>
</tr>
<tr>
<td>PP1</td>
<td>0.432</td>
<td>Invalid</td>
<td>SI07</td>
<td>0.807</td>
<td>Valid</td>
</tr>
<tr>
<td>PP2</td>
<td>0.824</td>
<td>Valid</td>
<td>SI08</td>
<td>0.600</td>
<td>Valid</td>
</tr>
<tr>
<td>PP3</td>
<td>0.727</td>
<td>Valid</td>
<td>SI09</td>
<td>0.384</td>
<td>Invalid</td>
</tr>
<tr>
<td>PP4</td>
<td>0.670</td>
<td>Valid</td>
<td>SI10</td>
<td>0.658</td>
<td>Valid</td>
</tr>
<tr>
<td>PP5</td>
<td>0.825</td>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It turns out that there are indicators that can qualify for research, which then these indicators are not included in subsequent tests.

Construct validity measures the extent to which the indicators used truly represent the construct referred to in the analysis. This reflects the extent to which the measurement actually reflects the concept or nature of the latent variable to be measured. Construct validity has an important role in ensuring that the resulting model is able to correctly reflect latent variables in accordance with the theory used. (Josep F Hair et al., 2018). Meanwhile, reliability refers to the consistency of measurement results from the same indicator to measure the same construct. If an indicator has high reliability, the measurement results will tend to be consistent when repeated measurements are made in the same population. (Hair et al., 2017). In SmartPLS, Construct Validity and Reliability can be assessed through Cronbach's Alpha, Composite Reliability.

Cronbach's alpha in Smartpls is an indicator coefficient used to measure the internal reliability or consistency of an indicator measured to describe a latent construct or variable in partial path analysis. Cronbach's alpha coefficient usually ranges between 0 and 1, where higher values indicate a better level of reliability. Cronbach's alpha is used to test whether the indicators used to measure constructs have sufficient consistency. A higher alpha value indicates that the indicators have a better degree of uniformity in measuring the same construct. Cronbach's alpha is one of the common methods used in quantitative analysis to measure the
reliability of questionnaires or measurement instruments (Joseph F. Hair et al., 2019). Decisions regarding the Cronbach's Alpha test are taken by examining the value of Cronbach's Alpha itself. If the value exceeds 0.7, then the variable is considered to meet the test reliability requirements, so it can be used in the research being carried out (Garson, 2016). The value of Cronbach's Alpha for each variable in this study is shown in the following Table 4:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical City Batik Motifs (HC)</td>
<td>0.725</td>
</tr>
<tr>
<td>People's Purchasing Power (PP)</td>
<td>0.745</td>
</tr>
<tr>
<td>Sustainability Innovation (SI)</td>
<td>0.855</td>
</tr>
</tbody>
</table>

Table 3 above shows that all variables Historical City Batik Motifs, People's Purchasing Power, and Sustainability Innovation listed have values above 0.7. Therefore, all variables applied in this study showed a consistent level of consistency in each measurement. Thus, all indicators can be incorporated into the study and need not be excluded from the research process.

Composite reliability refers to the extent to which indicators measuring a variable are significantly related and interconnected with each other. (Garson, 2016). Decisions regarding Composite Reliability are taken by checking whether a variable has a Composite Reliability value of less than 0.7. If so, this indicates that the variable has a low correlation between the indicators and needs improvement. In some cases, reconsideration of the use of such variables in research models may be necessary (Hair et al., 2017). The Composite Reliability value of each variable in this study is shown in the following Table 4:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical City Batik Motifs (HC)</td>
<td>0.811</td>
</tr>
<tr>
<td>People's Purchasing Power (PP)</td>
<td>0.830</td>
</tr>
<tr>
<td>Sustainability Innovation (SI)</td>
<td>0.885</td>
</tr>
</tbody>
</table>

Based on the Composite Reliability value all variables have values above 0.700, this indicates that each variable used in this study meets the standard. Thus, all indicators can be incorporated into the study and do not need to be excluded from the research process.
Collinearity Statistics, better known as Variance Inflation Factor (VIF), is a method used to identify the degree of multicollinearity between variables in a measurement or structural model developed using SMARTPLS. Multicollinearity occurs when two or more variables in a model have a significant correlation between them. This situation can result in difficulties in interpreting the results, reduce the reliability of the regression coefficient, and cause instability in the model.

VIF values are in the range from 1 to 10. A VIF with a low value, around 1 to 5, indicates that the variable has relatively minimal influence on multicollinearity and is acceptable in the model. VIF values between 3 and less than 3 are considered the recommended standards in research (Hair et al., 2018). However, if the VIF value exceeds 5 or even 10, this indicates that the variable is affected by multicollinearity and needs to be addressed.

Table 5
Collinearity Statistics (VIF) Test Results

<table>
<thead>
<tr>
<th>Indicator</th>
<th>VIF</th>
<th>Information</th>
<th>Indicator</th>
<th>VIF</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC1</td>
<td>1.797</td>
<td>Valid</td>
<td>SI01</td>
<td>2.388</td>
<td>Valid</td>
</tr>
<tr>
<td>HC2</td>
<td>5.296</td>
<td>Invalid</td>
<td>SI02</td>
<td>5.872</td>
<td>Invalid</td>
</tr>
<tr>
<td>HC3</td>
<td>2.111</td>
<td>Valid</td>
<td>SI03</td>
<td>1.704</td>
<td>Valid</td>
</tr>
<tr>
<td>HC4</td>
<td>1.365</td>
<td>Valid</td>
<td>SI04</td>
<td>3.097</td>
<td>Valid</td>
</tr>
<tr>
<td>HC6</td>
<td>5.420</td>
<td>Invalid</td>
<td>SI05</td>
<td>6.916</td>
<td>Invalid</td>
</tr>
<tr>
<td>PP2</td>
<td>27.660</td>
<td>Invalid</td>
<td>SI06</td>
<td>6.237</td>
<td>Invalid</td>
</tr>
<tr>
<td>PP3</td>
<td>1.389</td>
<td>Valid</td>
<td>SI07</td>
<td>3.394</td>
<td>Valid</td>
</tr>
<tr>
<td>PP4</td>
<td>1.367</td>
<td>Valid</td>
<td>SI08</td>
<td>6.388</td>
<td>Invalid</td>
</tr>
<tr>
<td>PP5</td>
<td>27.628</td>
<td>Invalid</td>
<td>SI10</td>
<td>2.827</td>
<td>Valid</td>
</tr>
</tbody>
</table>

It can be explained from the test results in Table 5 above that, the indicator "Use of Natural Dyes" (HC2) is considered invalid because it has a high Variance Inflation Factor (VIF) value, which is 5.296, which indicates a significant multicollinearity between HC2 variables and other variables in the model. In addition, a high VIF value can also decrease the reliability of the regression coefficient and interfere with the interpretation of the analysis results. Therefore, in order to maintain the validity of the analysis, variables with high VIF values such as HC2 need to be addressed or even eliminated from the model. Just like other invalid indicators: HC6, PP2, PP5, SI02, SI05, SI06, SI08. The indicators HC6, PP2, PP5, SI02, SI05, SI06, and SI08 are considered invalid in the context of this study. HC6 refers to one of the indicators of Historical City Batik Motifs, while PP2 and PP5 refer to the People's Purchasing Power indicator, and SI02, SI05, SI06, and SI08 refer to the Sustainability Innovation indicator. These indicators are considered invalid because they have a high Variance Inflation Factor (VIF) value, indicating a significant multicollinearity between that variable and other variables.
in the model. Multicollinearity occurs when two or more variables in a model have a significant correlation between them, which can result in difficulties in interpreting results, reduce the reliability of regression coefficients, and cause instability in the model. Therefore, these indicators need to be addressed or even removed from the model to maintain the validity of the analysis.

Furthermore, F Square (\(f^2\)) is a measure used in the context of Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis to measure the extent to which structural or exogenous variables affect dependent or endogenous variables in research models. The explanation of the value of F Square (\(f^2\)) according to (Garson, 2016) is as follows:

\[ f^2 \leq 0.02: \text{Minimal effect or no significant effect.} \]
\[ 0.02 < f^2 \leq 0.15: \text{Small effect.} \]
\[ 0.15 < f^2 \leq 0.35: \text{Moderate effect.} \]
\[ f^2 > 0.35: \text{Large effect.} \]

The value of Effect size (\(f^2\)) in this study is explained in the following table:

**Table 6**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sustainability Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical City Batik Motifs (HC)</td>
<td>0.065</td>
</tr>
<tr>
<td>People's Purchasing Power (PP)</td>
<td>1.071</td>
</tr>
</tbody>
</table>

Based on Table 6 above, the variable Historical City Batik Motifs (HC) has an F Square (\(f^2\)) value against the variable Sustainability innovation of 0.065, which is a very small or insignificant effect. Furthermore, the People's Purchasing Power (PP) variable has an F Square (\(f^2\)) value against the Sustainability Innovation variable of 1.071, which is a large effect.

R Square measures the extent to which variation in the dependent variable can be explained by the independent variable in a research model (Hair et al., 2017). The range of R Square values is between 0 and 1, where the value of 1 indicates that the independent variable is able to predict the dependent variable perfectly. Table 8 below summarizes the R Square values for each dependent variable in this study:
Table 7
R Square Test Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>R Square</th>
<th>R Square Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability innovation</td>
<td>0.659</td>
<td>0.651</td>
</tr>
</tbody>
</table>

Based on the results of Table 7 the R Square test above, it can be concluded that the dependent variable of Sustainability Innovation is influenced by the independent variable as much as 0.659 or 65.9%. Meanwhile, the remaining 34.1% were influenced by other factors that were not included in the scope of this study.

5 CONCLUSION

The conclusion of the research on the development of Historical City Batik Motifs and People's Purchasing Power indicates that the study has resulted in the creation of new batik designs inspired by the history and uniqueness of the city. The research has also identified areas for improvement to maintain Sustainability Innovation. The study has made a positive contribution to promoting local cultural heritage, creating added value for the batik industry in Surabaya, and inspiring local batik artisans to develop new motifs reflecting the identity of specific cities. Additionally, the research has implications for the development of local creative industries, collaboration and networking opportunities, increased tourism, and the creative economy. The findings also suggest that the development of Historical City Batik Motifs has a small or insignificant effect on Sustainability Innovation, while People's Purchasing Power significantly affects Sustainability Innovation. The study has provided valuable insights into the relationship between these variables and their implications for sustainable innovation and cultural preservation. This research contributes to producing unique batik design innovations by exploring the cultural and historical values of the city of Surabaya, this research encourages batik craftsmen and batik designers to create new motifs that can attract market interest. The resulting design innovation can be an added value in increasing the competitiveness of Surabaya's typical batik products in the local and international markets. In addition, it provides a description of sustainability innovation if it is related to people's purchasing power towards historical batik motifs.
ACKNOWLEDGEMENTS

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REFERENCES


