

Digital Transformation and Batik Design Innovation: Improving the Quality and Market Expansion of MSME Borobudur Batik Houses

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Abstract

The challenges faced by the MSMEs of the Borobudur Batik House, which produce distinctive batik with motifs inspired by the reliefs of Borobudur Temple. Despite having great potential, these MSMEs face problems related to lack of design innovation, suboptimal production quality, and limited marketing to traditional methods. The purpose of this research is to develop batik design innovations, improve product quality, and introduce digital-based marketing strategies to expand market reach. The method used in this study is a community empowerment approach that involves training, mentoring, and the application of technology. The training was carried out in the form of workshops on contemporary batik design, environmentally friendly coloring techniques, and the use of digital marketing through social media and e-commerce. The results of the study show that after the training, Borobudur Batik House MSMEs succeeded in producing more innovative batik designs, improving product quality, and optimizing product marketing through digital platforms. The implication of this research is that the development of culture- and technology-based MSMEs can be a model of sustainable empowerment.

Keywords: Batik, Culture, Innovation, Training, Mentoring.

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BACKGROUND

Indonesia is a country rich in cultural heritage, and one of the most famous cultural riches in the world is Borobudur Temple, located in Magelang, Central Java (Syaifullah et al., 2021). The temple is recognized by UNESCO as a World Heritage Site and is the largest Buddhist monument in the world built in the 8th and 9th centuries AD (Munandar et al., 2025). The reliefs that adorn Borobudur Temple have a very high historical and cultural value, telling religious and philosophical stories that are spiritual heritage for the Indonesian people (Mick et al., 2024). In addition to being an important place in cultural preservation, Borobudur also has great potential to support local economic development, especially through the tourism sector (Bruce et al., 2023).

The existence of Borobudur Temple as one of the main tourist destinations in Indonesia has a significant impact on the economy of the surrounding area (Sharabati et al., 2024). Every year, Borobudur Temple attracts millions of domestic and foreign tourists, which in turn has a positive impact on MSMEs around the area (Bradač Hojnik et al., 2023). One



example of MSMEs that is growing rapidly is the Borobudur Batik House, which produces distinctive batik with motifs inspired by the reliefs of Borobudur temple and surrounding temples, such as Mendut Temple and Pawon Temple (Chatterjee et al., 2021). The resulting batik not only reflects the creativity and beauty of local art, but also plays a role in cultural preservation through designs that adapt historical reliefs (Pellegrino et al., 2023).

However, although the Borobudur Batik House has great potential to grow, there are some challenges they face. One of the main challenges is the innovation of batik product design (Bening et al., 2023). Although the batik motifs produced come from temple reliefs that are very rich in historical meaning, the designs tend to be limited and underdeveloped. Many designs still rely on existing traditional motifs, so they are less able to attract the interest of a wider and more diverse market (Tama et al., 2022). This causes consumers to feel bored with monotonous design variations. Innovation in terms of batik design is essential for these products to remain relevant to the ever-evolving market trends (Nugraha et al., 2022).

In addition, other problems lie in production capacity and product quality. Many managers of Borobudur Batik Houses have limited time because they also run other professions, such as traders and farmers (Kilay et al., 2022). This prevents them from being able to focus entirely on batik production, which ultimately has an impact on low productivity and product quality (Del Vecchio et al., 2025). Some of the products produced still have poor quality, both in terms of batik and dyeing techniques. In fact, the coloring techniques used are still classified as traditional, so they do not produce sharp and bright colors as the modern market wants (Sasongko et al., 2025).

In addition to the production aspect, marketing is also a big challenge for these MSMEs. Currently, Rumah Batik Borobudur still relies on offline marketing, such as selling products in local markets and through exhibitions (Daud S., 2023). Although they have several promotional channels through social media, the use of digital marketing is still very limited. Currently, they only use Instagram to promote their products, but this is not effective enough to reach a wider range of consumers (Phang., 2022). Many potential markets, both domestic and international, have not been touched due to the absence of an adequate website or e-commerce platform (Pratama et al., 2023).

The importance of digital marketing in today's business world cannot be underestimated. Based on research conducted by Pratama et al. (2024) the use of digital marketing can increase the competitiveness and visibility of products, thus allowing businesses to significantly expand their market reach. Through digital platforms, Borobudur's typical batik products can be sold to various regions, even other countries, which will help increase sales turnover and provide opportunities for MSME managers to develop more rapidly (Gao et al., 2023). Digital marketing also allows MSMEs to build a strong brand and manage relationships with customers more effectively, as well as promote their products more creatively (An-Nizām et al., 2022).

However, even though digital marketing has a lot of potential, its implementation among MSMEs in Indonesia is still very limited (Kilay et al., 2022). Many small business owners do not fully understand how to leverage digital platforms to market their products. This is largely due to a lack of knowledge and skills in using existing digital marketing tools, such as websites, social media, and e-commerce platforms. Training and assistance related to digital marketing are needed so that MSMEs can take advantage of this potential to develop (Bening

et al., 2023).

To face these challenges, the first step that needs to be taken is to provide training and assistance in terms of batik design innovation (Kilay et al., 2022). Given the great potential possessed by Borobudur batik motifs, training on contemporary batik design that combines traditional and modern elements is essential to create products that are more attractive to today's consumers. Training on contemporary batik techniques, such as the use of brighter colors and mixing techniques of different types of batik, can open up new opportunities for these MSMEs to produce more varied products and in accordance with the tastes of a wider market (An-Nizām et al., 2022).

In addition, Borobudur Batik House MSMEs also need to improve in terms of production, especially in the use of technology that can increase production efficiency (Gao et al., 2023). One solution that can be applied is to introduce a more efficient and aesthetically pleasing batik canting technique, as well as the use of more modern production tools to increase production capacity without compromising quality. The application of technology in the production process will speed up production time, improve product quality, and allow MSMEs to produce more products with a more diverse variety (Gefen & Straub, 2004).

On the marketing side, website development and the implementation of digital marketing that are more structured and professional are needed. The creation of the Borobudur Batik House MSME website that not only displays products, but also provides more complete information about the history, motifs, and process of making batik, will provide more value for consumers and increase business credibility. By having a good website, MSMEs can market their products globally, provide an easier purchasing platform for consumers, and build long-term relationships with customers through an effective customer management system.

Given the importance of cultural preservation and local economic empowerment, this research is very urgent to be carried out (Utami, 2020). Digital transformation in Rumah Batik Borobudur MSMEs will not only provide benefits for local economic development, but will also become a model of community empowerment that can be replicated by other MSMEs in Indonesia. Therefore, this study aims to formulate an effective strategy in improving batik design and introduce digital marketing as a tool to increase the competitiveness of MSMEs in the global market (Sutisna, 2023a).

Through this research, it is hoped that concrete steps can be found that can overcome the problems faced by Borobudur Batik House MSMEs, so that they can develop and contribute more to the preservation of Borobudur culture and the development of the creative economy in Indonesia (Redi et al., 2022). With innovations in product design and improvements in digital marketing, these MSMEs can increase production capacity, expand the market, and improve the welfare of MSME members. In addition, training in terms of financial management and digital marketing will strengthen the ability of MSME managers to manage their businesses more professionally and efficiently (Mikkelsen, 2011).

Overall, this research is not only important for the development of MSMEs of Rumah Batik Borobudur, but also for the empowerment of other MSMEs in Indonesia that face similar challenges. Innovation in batik design, product quality improvement, and the implementation of digital marketing will open up great opportunities for MSMEs to develop and compete in the global market, while preserving a rich and unique culture in Indonesia.

IMPLEMENTATION METHOD

The method used in this service activity refers to a community-based empowerment approach that aims to increase the capacity and ability of MSMEs of Rumah Batik Borobudur. This approach involves the active participation of local communities in every stage of the activity, from planning, implementation, to evaluation. This activity is designed to empower MSME managers in two main aspects, namely increasing innovation in batik production and implementing digital marketing as an effective marketing strategy. The methods applied include training, mentoring, and the application of technology that aims to create sustainability in the batik business and product marketing.

Before starting the service activity, an initial identification was carried out regarding the existing condition of MSMEs of the Borobudur Batik House. This process involves data collection through direct observation, interviews with MSME managers, and surveys of the ongoing production and marketing processes. The purpose of this stage is to identify existing problems, both in terms of product design, production, and marketing, as well as determine training needs that are in accordance with the conditions and abilities of the managers. From the results of this identification, the service team prepared a targeted activity plan, including the determination of training materials and implementation schedules that can be followed by all MSME members.

The flow of this service activity began with socialization and orientation to the MSME managers of the Borobudur Batik House, which aims to provide an understanding of the importance of innovation in batik product design and the use of digital marketing. After that, the activity continued with intensive training on contemporary batik design techniques that focused on the application of typical Borobudur motifs with a modern approach. This training includes teaching more varied dyeing techniques, the use of new tools such as canting batik stamps, and how to recycle batik waste into products with selling value.

Furthermore, training was carried out on the implementation of digital marketing, which includes website creation, social media account management, and e-commerce-based marketing strategies. Participants are trained to understand and manage digital platforms that can expand the market and increase product sales. Each activity is equipped with a mentoring session to ensure that each manager can implement the knowledge gained appropriately.

The evaluation was carried out to measure the impact of the application of batik design innovations and digital marketing on product quality and sales volume. Success is measured through improving the quality and quantity of batik products produced by Borobudur Batik House MSMEs, which are compared before and after the training. Success is also seen from the effectiveness of digital marketing, which is measured by the increase in the number of website visitors, social media followers, and transaction volume on online sales platforms. In addition, feedback from consumers is an important indicator in assessing the success of a marketing strategy. Success measurement also includes sustainability aspects, which are measured by follow-up plans prepared by MSME managers to independently manage digital marketing and design innovation after the program is completed, as well as regular business development monitoring.

RESULTS AND DISCUSSION

PKM Activity Strategy for the Development of Creative Incubator and Innovative Design of Borobudur Batik Based on Digital Marketing at MSMEs Borobudur Batik House, Magelang, consists of 2 activities, namely providing knowledge, training and assistance on production aspects, namely innovation of batik motifs and products, increasing productivity and product quality by creating contemporary batik works, creating batik stamps from used goods, improving dyeing technique skills, upcycling batik patchwork waste and regulation of trademark registration of batik products., Marketing management aspects are holding training and assistance to MSMEs of Borobudur Batik House to maximize marketing management, governance of *batik education* workshop events through *digital marketing*, the results of each of these activities, namely:

1. PKM socialization activities

This activity is an activity at the beginning of the meeting, namely the socialization of the activity program that will be carried out in this PKM for approximately 6 months. This activity was attended by the MSME manager of the Borobudur Batik House, the people of Sabrangowo village, Borobudur, and also attended by village officials. In this activity, the entire community welcomes and will always support activities that focus on the development of soft and hard skill human resources, here is an overview of the socialization of this PKM activity program.



Fig. 1. Socialization of PKM Activities



Fig. 2. Socialization of Activities and Discussions

2. Results of activities on the Production Aspect

The production aspect activities in the PKM activity of the Strategy for the Development of Creative Incubators and Innovative Design of Borobudur Batik Based on Digital Marketing at MSMEs of the Borobudur Batik House, Magelang consist of several activities, namely innovation in the design of motifs and batik products, improving the quality and quantity of batik products, the result of each activity is the manager of the Borobudur Batik House MSMEs has succeeded in creating the design works of kinara and kinari batik motifs, as well as several *isen isen motifs* in the form of stylization of lotus flowers, birds, stupas etc., reaching 85%, improving the quality and quantity of batik products of MSMEs Rumah Batik Borobudur has succeeded in creating contemporary batik works of 85%, and the manager has the ability in coloring techniques to reach 80%, the results are described in several stages, namely:

a. Innovation in the design of batik motifs and batik products

This activity provides opportunities for MSMEs to continue to develop and at the same time will add to the diversification of aesthetic and highly competitive products. This activity also helps to preserve and promote cultural heritage tourism, especially Borobudur Temple. The MSME manager of the Borobudur Batik House was given training and assistance on how to innovate to design unique batik motifs as an identity as well as a characteristic of Borobudur motifs. In the process of making batik motif designs, participants will be faced with the process of making a work design based on their ideas. As well as an overview of the application of ideas and their application to batik products. This stage is one of the important parts and requires precision and precision because the design must be in accordance with the idea that characterizes the unique characteristics of a product.



Fig. 3. Innovation Training in The Design of Batik Motifs and Batik Products.

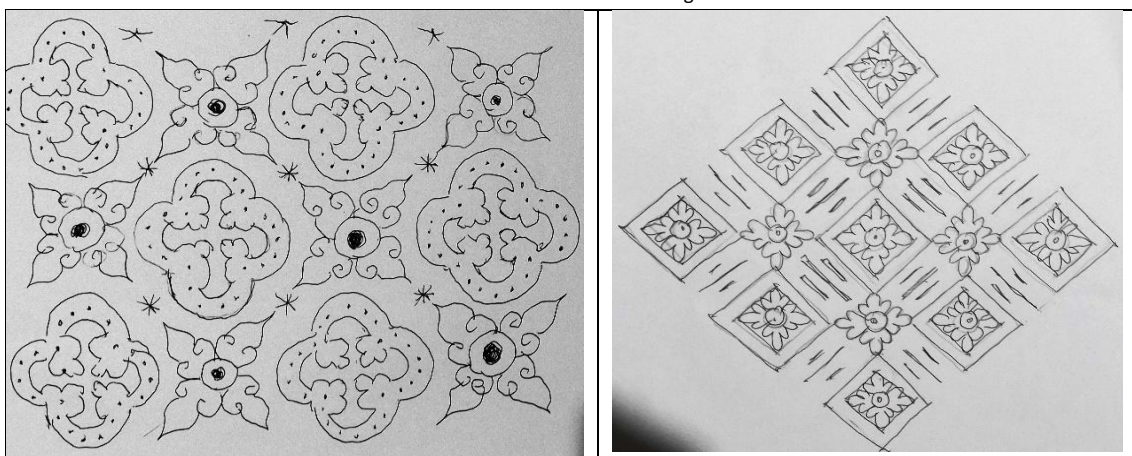


Fig. 4. The Atmosphere of Batik Motif Design Innovation Training

The next stage after the MSMEs of the Borobudur Batik House know and understand how to innovate about batik motifs that are sourced from regional potential, such as folklore, or those that are sourced from temples around Borobudur, in addition to that in this activity examples of innovative works of batik motifs and contemporary batik are given. In this stage, the team and the manager discussed together regarding the potential that exists in the region, especially in Borobudur. After there is an initial design idea agreement, then brainstorming and sketching the design sketch. Of course, the sketch is in accordance with the ideas and ideas sourced from the temple reliefs, and has been discussed and agreed upon together with several considerations that the ideas and ideas are the stupa, the jataka story, the geometric motif of the temple, and the kinara kinari story. The selection of *subject matter* from the idea was chosen because it is an important character and part of Borobudur Temple. All of these ideas will be *deformed* and *laid out* with several considerations of the principles of organizing fine art elements, namely composition, *unity* and *balance*, *dominance*, and rhythm. We will later select the most approved design sketches and we will make them together with the design of the motif. The following is a sketch of the batik motif design from the MSME manager of the Borobudur Batik House:

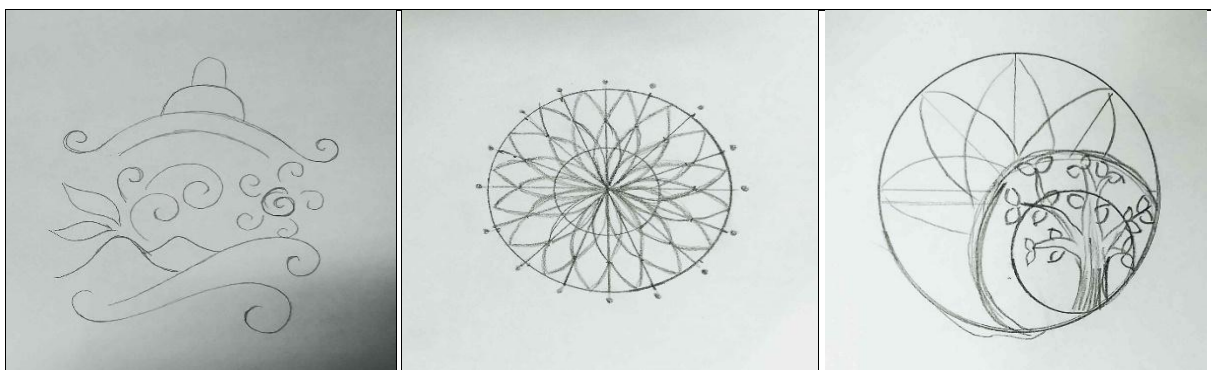


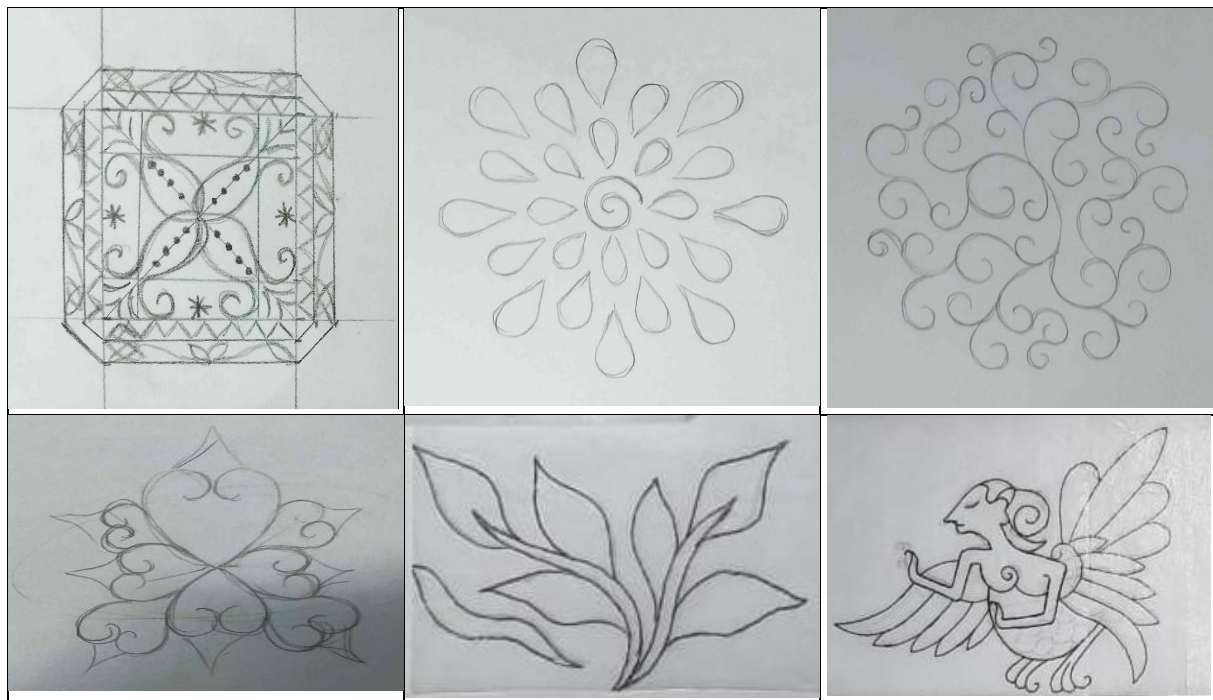
Kinara kinari batik motif design



Geometric batik motif design

Fig 5. The Results of The Training in Making The Main Design of Batik Motifs





The design of the batik motif

Fig 6. The Results of The Training in Making The Main Design of Batik Motifs

From some of the results of these motif design innovations, they will be developed and processed digitally using *the corel draw application, photoshop or Adobe Illustrator*, even with these applications it can help to design and make batik products that will be made quickly and precisely. With this digital application, it is very helpful in batik design innovation and of course will accelerate production and increase the capacity of batik products in MSMEs of Borobudur Batik House.

b. Training and assistance in making batik stamp canting from used materials

In the production aspect related to improving the quality and quantity of batik products, knowledge, training and assistance in making batik canting stamps derived from used materials are provided. This activity is an advanced stage after successfully understanding the innovation knowledge of batik motif design and being able to create batik motif designs, and then applying the motif design innovation to canting batik stamps from used materials. This activity is very important in increasing the number of batik products, because with the innovation of making batik canting stamps, MSME managers will easily explore and apply their ideas about batik motif design innovations to the batik production process quickly and aesthetically. The MSME Manager of the Borobudur Batik House was given knowledge related to various tools and materials that can be used in making installation works. This knowledge of tools and materials intends that participants have knowledge of the uses of each tool and the character of the material before making the process of making batik stamp canting, so that it will make it easier at the stage of the manufacturing process. In addition, the knowledge of these materials provides opportunities for the potential of natural resources around, namely food waste paper, used sandpaper, or used aluminum, which is very abundant, so that it can be used, processed and created as a material in making batik stamp canting. The following is the knowledge of tools and materials that must be prepared

for the manufacture of batik stamp canting as described in table 2.

Table 1. Tools and Materials for Making Alternative Canting Caps

Yes	Tool	material
1	 Cuts, cuttr, pencil, then with	 Used cardboard
2	 Glue G/Korean Glue	 Cardboard Paper
3	 Saw	 Plywood Thickness 10mm-1cm

After understanding the knowledge of the tools and materials used in making alternative batik canting stamps from used materials, the next step is the process of making canting stamps from used materials. The used items used are actually biased in various ways, ranging from used cardboard, *sandpaper*/paper sandpaper, used aluminum, etc. But on this occasion we use used food cardboard. The first stage is to cut the used cardboard about 1.5cm lengthwise. Then after that the piece of paper is rolled up using a round material such as a pencil or marker, this serves to flex the paper, so that when it is pasted on the cardboard it does not break or tear.



Fig. 7. Formation of Canting Stamps With Scrap Cardboard

The next stage after the cardboard is flexed and curved, then prepare the design to be made canting stamp, and after that the design is transferred on thick cardboard using carbon paper. The thick cardboard serves to attach cardboard that has been cut and flexed. The process of attaching the cardboard with G glue starts from the middle of the most complicated part to the surrounding area. This makes it easier to paste the process.



Fig. 8. Cardboard Design Transfer and Attachment Process

After the pasting process is complete and in accordance with the design of the motif, the next step is to level the surface with sandpaper until it is smooth, and the canting cap is ready. After the canting cap is ready, the next process is to make the handle from plywood with a thickness between 10mm to 1 cm, which is adjusted to the size of the motif. After the completion of the plywood handle, the finished canting cap is attached to the handle that has been made, and the canting cap from paper waste material is ready to be used.

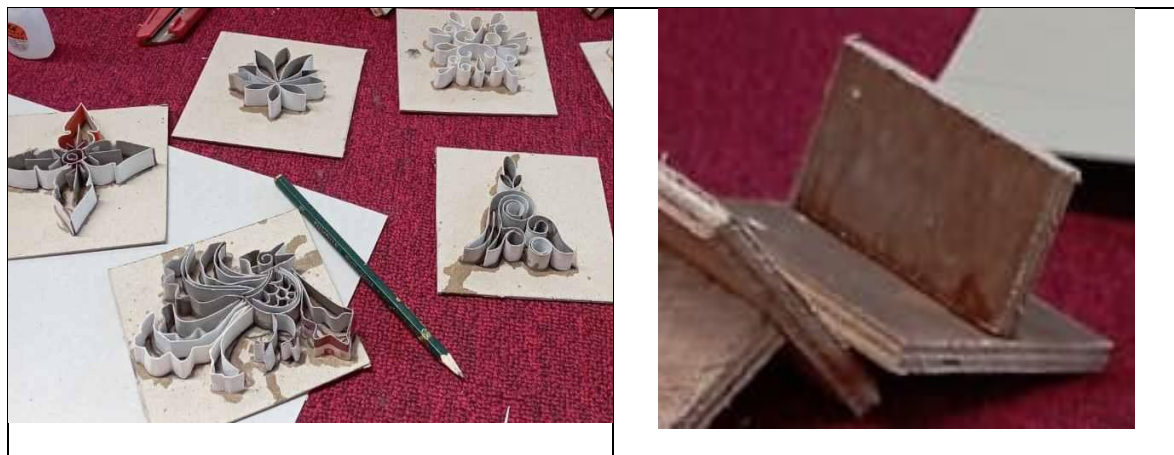


Fig. 9. Canting Cap Handle Manufacturing Process

Before use, it is necessary to soak the canting cap surface at night for a few 10-15 seconds and repeat several times until the paper is completely stiff. After that, canting stamps can be used to produce batik according to your wishes quickly and aesthetically.



Fig. 10. The Process of Soaking Canting Stamps Over The Night

c. Training in contemporary batik making techniques

Contemporary is defined as modern and contemporary. The work or products produced are different from before. These differences involve a series of considerations, processes, needs, tastes, and materials used. Based on this description, contemporary art is art that contains elements of new creations that vary with imitative, expressive, realist, nonrealist, and even abstract properties. Boundaries or rules are broken in this contemporary concept. Likewise with contemporary batik designs (Nurcahyanti & Bina Affanti, 2018). Contemporary batik is batik with the concept of novelty of creation that emerges with the aim of meeting the tastes of the public, connoisseurs, and consumers. Contemporary batik is very loved by the people today, because of its use of bright colors and freer visualization, not bound by certain rules like classical batik (Istiqomah & Amboro, 2024). It is this contemporary batik that can finally answer the challenges of today's market tastes, and when the limited edition contemporary batik designs are released, they will definitely be sought after by collectors.

Likewise, the development of contemporary batik sourced from local wisdom is a solution in developing highly competitive batik as revealed that the development of batik designs sourced from superior potential and local wisdom is able to survive to face the global or international market crossing. From several descriptions of contemporary batik, it is necessary to provide knowledge related to contemporary batik and of course how the process of designing and making contemporary batik is sourced from local wisdom or from the cultural heritage of Borobudur temple. The contemporary batik technique this time is the kinara kinari motif pattern combined with contemporary techniques such as mastering night/paraffin directly on the fabric, and the thousand cracking technique. (Istiqomah & Amboro, 2024).

In this service activity, the first step is to provide knowledge and descriptions related to contemporary batik accompanied by several examples of contemporary batik motifs to MSMEs of the Borobudur Batik House.

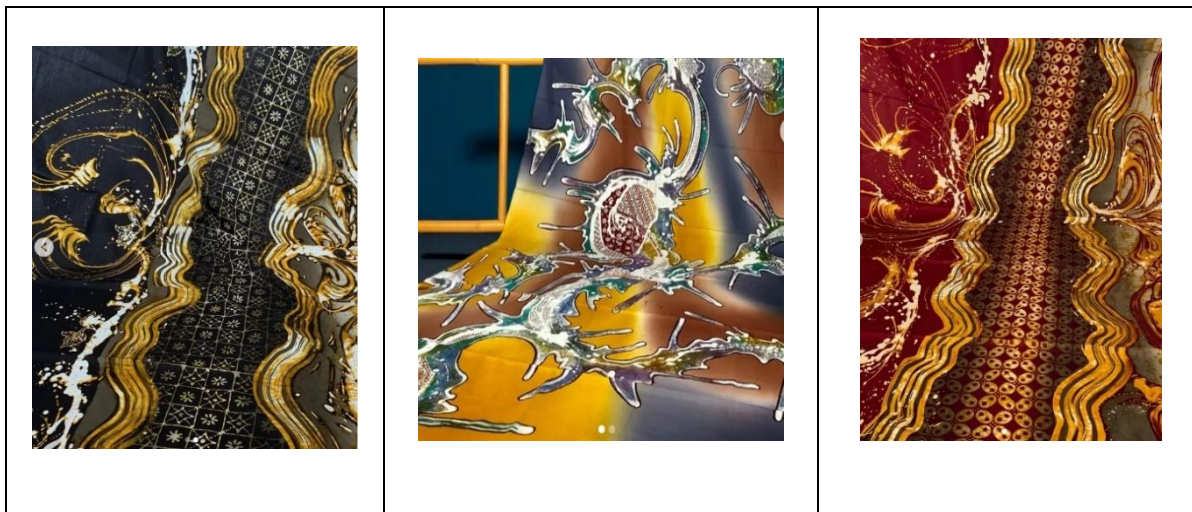


Fig. 11. Examples of Contemporary Batik Works

After being given knowledge and several examples, MSME members were given knowledge and demonstration of the process of making contemporary batik based on the character of the Borobudur temple with designs that have been made at the design innovation stage. The following is an overview of the training process for contemporary batik making.



Fig. 12. Create an Overall Pattern Design

The first stage is to make the overall design pattern, so that later the pattern motifs are balanced and remain aesthetically pleasing, between the part for the main motif and the part for the isen isen pattern and the contemporary engineering part. After making the overall design pattern, then make a separation pattern between the parts with a tool in the form of cardboard so that later the canting stamp stamping process time will have a limiter.



Fig. 13. Batik Stamping Process

After the process of tasting the batik motif on the desired part of the fabric, the next stage is to fill the other blank parts with the isen isen motif and combine it with the line motif with a brush technique.



Fig. 14. Contemporary Batik Process With Brush Technique

After the completion of the process of making this contemporary batik, it means that the process of making this contemporary batik is completed, then the evaluation stage of the results and the coloring stage continues to be continued at night . If you want more than one color, just give it coloring with the colet process or by filling the part of the color that you want to keep.

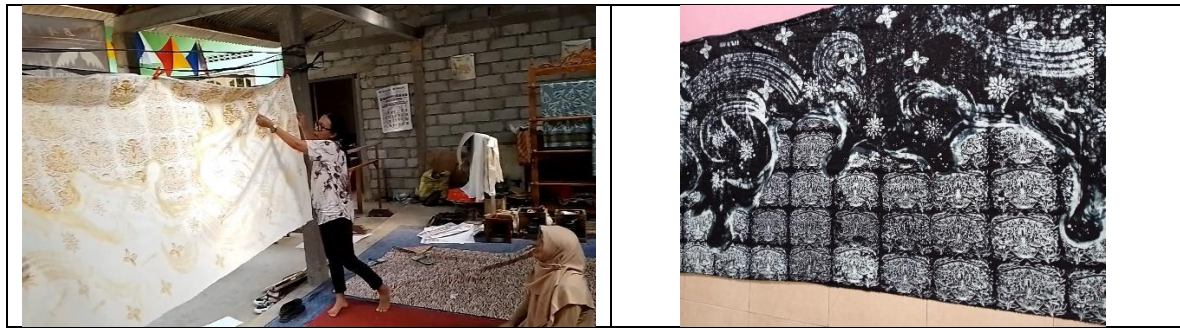


Fig. 15. The Process of Contemporary Batik Finishes

d. Training and assistance in Contemporary batik Dyeing techniques.

MSMEs of the Borobudur Batik House in Magelang have a unique strength, namely the processing of motifs inspired by the majesty of Borobudur Temple and the surrounding natural landscape. However, fierce market competition and changing consumer tastes demand creativity in design innovation, improvement of batik technical skills, and improvement of skills in dyeing techniques. In this activity, improving skills in dyeing techniques is a strategic step to present batik products that are modern, artistic, and have high economic value. Through training and assistance in contemporary batik dyeing techniques, this Community Service (PkM) activity is designed to:

1. Hone craftsmen's skills in applying innovative dyeing techniques, such as gradation, modern colet, and natural–chemical color blends.
2. Encouraging the birth of Borobudur's signature batik designs that are fresh and in accordance with global color trends.

Coloring in this activity uses several materials, including; Remasol, Indigosol, Naphthol and Rapid. Of course, the character of the coloring is also different, on this occasion we use remasol material, with easy consideration in its use and bright color. The following is an overview of the process of activities carried out in coloring technique training. The first stage provides knowledge to partners, types and materials in the dyeing process along with the characteristics of the dye. And then prepare the tools and materials to be used; There are plastic containers, brushes and sponges, most of the materials use remasol and solvents.



Fig. 16. Provide Coloring Technique Materials and Prepare Coloring Material Tools

The next stage is to prepare the fabric material that has been baked on a fabric stretcher. And then it is colored by coelling using cut foam.



Fig. 17. Stretching The Fabric, and Begin The Dyeing Technique by Coletteing

The next step is to mix colors with each other so that the desired color gradation appears. After the color and gradation are finished, wait a few hours to dry, and you can add paraffin on top until it can cause a break/crack effect, and then add another color on top of the paraffin.



Fig. 18. Create a Color Gradient, and Start The Thousand-Fold Cracking Technique by Covering With Paraffin

After covering the desired part of the paraffin, wait for the paraffin to dry completely then continue the process of making cracks, by means of a cloth in the kucel until there is a crack effect.



Fig. 19. Thousand Cracking Technique by Twisting Fabric

After seeing the crack effect on the fabric, the next step is to color the cracked part again with a dark color. After the coloring of the dark color, then wait for it to dry, and be given a color enhancer or waterglass, and then the process of coloring and the work is finished.



Fig. 20. Seal The Cracks With Dark Colors, and The Finished Artwork Image

3. Results of marketing management activities

The result of each of these activities is that the MSME managers of the Borobudur Batik House have gained knowledge about digital marketing, how the role of *social media* and *websites* in promoting products and activities. In this activity, MSME managers have mapped and collected materials for the website, and have built a website domain rumahbatikmbudur.com reached 80%, the results are described in several stages, namely:

1. Marketing management through *digital marketing*

Training and assistance to tourism managers to maximize marketing management through *digital marketing*. Training and assistance to tourism managers to maximize marketing management through *digital marketing*, The first stage is to provide knowledge about *branding and digital marketing*, to provide understanding to partners about the importance of branding and digital marketing as an effort to improve and better marketing management. Namely providing knowledge about *digital marketing*, examples of *digital marketing*, *digital marketing coverage*, etc.





Fig . 21. The Atmosphere of Digital Marketing Training and Assistance

The second stage is by providing training and assistance to utilize and maximize marketing through *tik tok* with a *marketplace business model*, *instagram business model*. The third stage is by providing training and assistance by building and managing the *Borobudur Batik House MSME* website which provides information on the profile of Borobudur Batik House MSMEs, information on batik motifs and products as well as information on all batik workshop activities or exhibitions, as well as testimonials of customers and tourists, so that the *audience* will be more confident by looking at the activity of the website and of course will be able to reach a wider market. Then the fourth stage is the *Launching of the Borobudur Batik House MSME* website, this activity aims to build an intelligent marketing system. Marketing through *online* media based on *Digital marketing* with the use of *marketplace business model technology*, *Instagram business model*.

2. Aspects of management of the governance of batik education workshop events and batik exhibitions.

From the aspect of event governance management, further observation and in the brainstorming stage with the MSME managers of the Borobudur Batik House, so that it is more effective and more appropriate considering that the batik education workshop and batik exhibition events that are usually held are based on thematic requests.

3. Financial management aspects

The stage of observation and data collection of all turnover and income of MSMEs of Rumah Batik Borobudur, so that training and mentoring will be more effective. The aspect of intellectual property protection (IPR) has not been implemented, and the plan will be implemented after the production aspect is completed, so that it can be immediately practiced for the registration of intellectual property rights (IPR) of batik products and batik motifs at the Borobudur Batik House MSMEs.

DISCUSSION

The development of MSMEs in Indonesia, especially in the handicraft sector such as batik, plays an important role in supporting local economic growth and cultural preservation. Batik is one of Indonesia's cultural heritage that not only has aesthetic value, but also contains a deep meaning that reflects the nation's cultural identity (Oginawati., 2022). As part of the creative industry, batik has grown rapidly in recent decades, but many MSMEs still face major challenges, especially in terms of product innovation, quality, and marketing (Oginawati.,

2022). One interesting example is the Borobudur Batik House MSMEs which produce batik with distinctive motifs inspired by the reliefs of Borobudur Temple. Borobudur Temple, as a world heritage site, has beauty and cultural richness that has the potential to be an infinite source of inspiration in the art world, especially in the development of batik design (Zakaria., 2023).

There are several limitations that need to be overcome. The designs produced still tend to be limited to existing traditional motifs, so consumers feel bored with limited variety. This hinders the ability of Borobudur Batik House MSMEs to reach a wider and more diverse market (Taylor & Pereznieta, 2014). Therefore, it is very important to develop innovations in batik design that not only maintain traditional values, but also include modern elements that can appeal to today's consumers (Hazelzet et al., 2019). Combining traditional design with a modern touch will open up great opportunities for these MSMEs to expand their market reach, both domestically and internationally (Campo & Yagüe, 2007).

Product quality issues are also a significant challenge. Many MSME managers are still limited in skills and knowledge about good batik techniques, so the quality of the products produced is not optimal (Turner & Lapan, 2013). Some members of the Borobudur Batik House MSMEs do not have good enough batik skills, which causes irregularities in production results. In addition, the coloring techniques used are still very traditional, resulting in unstable and fading colors (Liu et al., 2024). This has an impact on the competitiveness of products in an increasingly competitive market. Therefore, specialized training is needed that focuses on modern coloring techniques that are more environmentally friendly and attractive to consumers who care about sustainability. The use of safer and more sustainable natural dyes can also provide added value to batik products, making them more in demand by markets that care about environmental issues (Martinsone et al., 2023).

Product marketing is also one of the main problems faced by MSMEs of Borobudur Batik House. Most marketing activities still rely on traditional methods, such as exhibitions and cooperation with shops around the Borobudur tourist area (Nangin et al., 2020). Although this strategy provides access to visitors who come in person, it is not effective enough to reach a wider range of consumers (Sudirjo et al., 2023). Marketing digitalization is an urgent need in facing this challenge. With the development of information technology, marketing through social media such as Instagram and Facebook can help Rumah Batik Borobudur MSMEs to introduce their products to a wider audience, even international (Bruce et al., 2023). In addition, creating a website that can display products professionally and provide a platform for online purchases will speed up transactions and expand the market (Mick et al., 2024).

Research by Sharabati et al. (2024) shows that digital marketing has a significant impact on increasing the competitiveness of MSMEs, especially in the creative industry sector. Marketing through digital platforms allows products to be better known by a wider range of consumers and speeds up buying and selling transactions. In the context of Borobudur Batik House MSMEs, digital marketing integration can introduce Borobudur's typical batik products not only to local tourists, but also to the larger global market. Social media-based marketing allows these batik products to reach a wider audience, while e-commerce websites can facilitate the purchase of products online, expanding the market of these MSMEs beyond the local area (Chatterjee et al., 2021).

The integration of digital marketing in Rumah Batik Borobudur MSMEs must be done carefully, considering that many MSMEs still do not take advantage of the potential of digital

marketing to the fullest (Nur et al., 2021). Knowledge of how to manage social media and websites for product marketing is very important. In this case, digital marketing training is needed so that MSME managers understand how to create attractive visual content, manage social media accounts, and optimize the use of digital platforms (Fourqoniah et al., 2021; Handayani et al., 2024). Proper marketing through social media will introduce more products to consumers, increase brand awareness, and establish more intense communication with customers. Training on SEO (Search Engine Optimization) will also help Rumah Batik Borobudur batik products appear in internet searches, increase product visibility and make it easier for consumers to find their products (Boer et al., 2019).

The use of digital marketing is not only limited to social media and websites. E-commerce platforms should also be considered as part of a marketing strategy. By having an online sales platform, Rumah Batik Borobudur MSMEs can manage product sales more efficiently. E-commerce allows consumers to view products, place orders, and make payments online easily (Sanjaya et al., 2021). This will expand the market reach and make buying and selling transactions easier, both for domestic and international consumers. In today's era of globalization and technological advancement, online platforms are one of the most effective ways to grow your business and increase competitiveness in the global market (Hamim et al., 2022). Digital marketing management is not an easy task, as it requires in-depth knowledge of social media algorithms, SEO, and data-driven marketing strategies. In addition, the manager of Rumah Batik Borobudur MSMEs also needs to understand how to manage and analyze data obtained from interactions on social media and websites (Sahni & Chintagunta, 2016). This will help them to better understand customer preferences and needs, as well as adapt their marketing strategies to evolving trends. Therefore, digital marketing training that includes both technical and analytical aspects is very important for the success of this empowerment program (Kumar & Shah, 2010).

The success of the implementation of digital marketing is highly dependent on business sustainability. One of the success indicators that needs to be measured is the extent to which Rumah Batik Borobudur MSMEs can manage digital marketing independently after training (Kumar et al., 2021). This empowerment program aims to provide knowledge and skills that enable MSME managers to manage their businesses more efficiently and independently. This sustainability includes the ability to adapt to market changes and evolving technological trends (Trusov et al., 2009). Therefore, after the training is completed, the managers of Rumah Batik Borobudur MSMEs will continue to be accompanied in the evaluation and monitoring stages to ensure that they can implement the knowledge gained well and maintain the continuity of their business (de Matos & Rossi, 2008).

MSME empowerment is not only about providing new knowledge, but also about creating an ecosystem that supports sustainable business development. This program will open opportunities for Borobudur Batik House MSMEs to expand the market, increase income, and create new jobs (Hidayati & Muslikh, 2023). In addition, the success of Rumah Batik Borobudur MSMEs in developing their business will have a positive impact on the local economy and cultural preservation, especially related to Borobudur Temple. With the innovations applied to batik products, they not only maintain cultural heritage, but also introduce the beauty and historical meaning of Borobudur Temple to the world (Zhao, 2018).

Rumah Batik Borobudur MSMEs can be an example for other MSMEs in Indonesia who are struggling to develop amid the challenges of globalization and digitalization. Through the

development of creativity, improving product quality, and the application of digital marketing technology, these MSMEs can transform to become more competitive and able to adapt to increasingly global market dynamics (Ernantyo & Febry T., 2022). This empowerment program also has the potential to create greater social change in the community around Borobudur Temple, by improving the welfare of families involved in these MSMEs (Morgan & Hunt, 2019). The development of Borobudur Batik House MSMEs through design innovation, product quality improvement, and the implementation of digital marketing will have a significant impact not only on the MSMEs themselves, but also on the local community and the preservation of Indonesian culture (Chang & Lee, 2022). The innovations implemented are expected to bring sustainable change, making the Borobudur Batik House MSMEs an example of the success of cultural and technology-based community empowerment (Silviani & Darus, 2021).

CONCLUSIONS AND SUGGESTIONS

The empowerment activities carried out at the Borobudur Batik House, through batik design innovations, production quality improvement, and the implementation of digital marketing, have had a positive impact on the development of their business. What distinguishes this program from similar initiatives in other batik MSMEs is the integration of traditional batik motifs with modern design elements and eco-friendly coloring techniques. This combination successfully improves product quality and expands market reach. In addition, the implementation of digital marketing, including social media management and e-commerce platforms, allows these MSMEs to introduce their products to a wider market, both domestic and international. This program contributes to the development of a theory or model of MSME empowerment based on culture and digital technology by showing how MSMEs can thrive in the global market while preserving cultural heritage, providing a valuable example for other MSMEs in Indonesia to adapt to global market challenges.

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