Management Studies and Entrepreneurship Journal
Vol 7(3) 2026: 1633-1646

Quality Ready to wear fashion with QR Code Technology Innovation Using the Mandala Batik Technique Modification

Della Nurfadhilah[1], Irmayanti[2*]
Pendidikan Tata Busana Fakultas Teknik Universitas Negeri Semarang
Email: dellanurfadhilah15@students.unnes.ac.id[1], irmayanti@mail.unnes.ac.id[2]

**Coresponding Author: irmayanti@mail.unnes.ac.id*

ABSTRACT
The development of digital technology encourages innovation in the fashion industry, especially in ready-to-wear clothing, which involves not only aesthetic aspects but also functional values. This study aims to examine the quality of ready-to-wear clothing incorporating QR Code technology and contemporary batik with the Teknika Mandala motif. The Research method used is the method of creation of works with a design approach, which includes the stages of exploration, design, and embodiment. The resulting clothing products are then tested for quality using descriptive percentages based on assessments from expert panelists and trained panelists. The assessment indicators for product quality include design, size, aesthetics, sewing techniques, clothing performance, and product features. The results show that ready-to-wear clothing with QR Code technology innovation and Teknika Mandala batik modifications obtained an average score of 85% and is included in the very decent category. The sewing technique and product features received the highest scores, while the size aspect received the lowest score, although it is still in the decent category. These results indicate that applying QR Code technology to contemporary batik-based ready-to-wear clothing can improve product quality and provide functional and innovative value relevant to the development of digital technology.
Keywords *: Ready to wear, QR Code technology, Teknika mandala batik, Quality*

1. Introduction

Ready-to-wear in the fashion industry comes from the French phrase "prêt-à-porter," which means ready to wear. This term refers to clothing and accessories designed and produced in large quantities for direct sale to consumers. Ready-to-wear clothing is in high demand among the public, which makes fashion business owners interested in producing it because the production process is relatively fast. Ready-to-wear clothing is ready-made clothing produced in standard or common sizes, making products ready for marketing (Kharimah & Nursari, n.d.). To survive in the fashion industry, fashion business owners must continue to innovate and stay up to date with clothing development trends. The diversity of ready-to-wear clothing by use includes casual, formal, and semi-formal wear. Ready-to-wear clothing designs also vary widely, from simple to luxurious. Ready-to-wear clothing design involves not only aesthetic aspects but also considers comfort, function, and production efficiency. Ready-to-wear clothing is adapted to market needs, making it continually innovative. Thus, ready-to-wear clothing is not only a basic necessity but also a means of self-expression and identity for its users.

Humans cannot avoid technology in this modern era. Technology has made rapid, sophisticated progress. In the era of globalization, technology has become a sign of a country's progress. Currently, we are in the modern era, with the development of communication and information technology. The information revolution is produced by technology. In the era of all-digital development, society is closely dependent on technological advances. Entering the digital era, technology plays a crucial role in facilitating human activities, especially in the management, delivery, and access to information. The strategic role of technology has driven major changes in community life patterns toward the digital era (Al-kansa et al., 2023). All fields closely related to technology are considered creative industries. The creative industry sector needs technology to support the development of works and the creation of innovations. The fashion industry is part of the creative industry and must keep pace with technological developments to respond

to rapidly changing fashion trends. Fashion ranks first among creative economy exports in Indonesia. Increasing information also affects the fashion industry. The fashion industry is undergoing a very significant transformation. The development of digital technology has had a considerable impact on the world of fashion. Digital transformation also affects the growth of the global fashion industry.

A QR Code is a two-dimensional barcode that encodes written information for more practical, concise storage. This technology was first introduced by the Japanese company Denso Wave in 1994 (Dedy Irawan & Adriantantri, 2018). Barcodes were first used to record vehicle component inventories, and QR Codes are now widely used across various fields. QR stands for "Quick Response." QR Codes can be read through a mobile phone camera, enabling efficient information transfer (Dedy Irawan & Adriantantri, 2018). QR Codes can store various types of information, including numerical, binary, alphanumeric, kanji/kana, and video data. This data is arranged vertically and horizontally (Mohamad Ali Murtadho, 2016). Meanwhile, square-shaped patterns in each corner help scanning so the code can still be read from various angles.

QR Code technology is not only used for logistics tracking but has also become an innovation in the digital era. Along with the times, the use of QR Codes is not limited to commercial purposes but can be applied in various fields, including as an innovation in the world of fashion. The innovation applied to this clothing is the use of a QR Code (Quick Response) in embroidery. The QR Code on clothing serves as a medium for conveying information about the clothing, such as its origin and materials.

Batik is one of the cultural heritages that has developed and is well known in Indonesian society. Batik is a form of high-quality ancient art. Batik itself comes from the Javanese language: "amba," meaning "to write," and "nitik," meaning "dot." This word indicates the process of writing or drawing batik patterns. Initially, batik-making was a tradition passed down from generation to generation that showed a person's position in society. Over time, batik has developed various patterns and motifs, each with a meaning that reflects the cultural values and philosophy of its region of origin. Batik motifs are symbolic, containing values and life philosophies; artists produce works of art with hopes for each motif (Maulana Hakim, 2018). Batik must continue to be preserved, especially in this modern era. One effort to develop batik is by developing contemporary batik.

Contemporary batik is batik that has undergone development and renewal in design, motifs, colors, and techniques. The younger generation is interested in batik not only for its aesthetic aspects but also for its cultural values and philosophy (Mahala Adjani, 2023). Contemporary batik is a blend of local cultural elements and modern touches, making it more relevant to developments in the modern era. Traditional conventions do not entirely bind contemporary batik. Thus, batik is more popular among young people, and its use extends beyond cultural heritage to include modern fashion trends.

Based on the background described above, the Author is interested in developing ready-to-wear clothing that not only follows trends but also has functional value and innovation. Therefore, the Author is inspired to create ready-to-wear clothing by applying QR Code technology in combination with Teknika Mandala batik, aiming to serve as a digital information medium relevant to the digital era.

2. Literature Review

Ready-to-Wear Clothing

Ready-to-wear clothing is clothing designed for mass production in various sizes, produced quickly and efficiently (Krisnayadi & Prihatin, 2021), and marketed at relatively affordable prices, making it quite popular among the public. Ready-to-wear clothing is designed to provide convenience and is available in various sizes, with designs that consider fashion trends, functional use, and production process efficiency; thus, it is called ready-to-wear clothing

when marketed. Ready-to-wear clothing is ready-made clothing produced in standard sizes, without consideration of individual measurements (Anggraini et al., n.d.).

Ready-to-wear clothing is a type of ready-made clothing produced on a large scale in standard sizes while paying attention to fashion trends and production efficiency. Along with the development of the fashion industry and market suitability, ready-to-wear is evolving not only in terms of production quantity but also in design and functionality. The development of ready-to-wear clothing can be achieved through design innovation without eliminating the main function of clothing as a practical, ready-to-use product. This development shows that ready-to-wear clothing is designed not only as a mass product but also as clothing that considers comfort, function, and aesthetic value (Tanzil et al., 2021).

According to (Soehartono et al., 2025), ready-to-wear clothing is divided into two categories: regular ready-to-wear (mass-market ready-to-wear) and deluxe ready-to-wear. Mass-produced, ready-to-wear clothing is ready-made clothing produced in large quantities in standard sizes to meet broad market needs (Pratiwi & Yuningsih, 2022). Mass-produced, ready-to-wear clothing is designed without going through a special design process for the wearer's body measurements. This clothing uses minimalist cuts and patterns that are not too complicated. This ready-to-wear is mass-produced with systematic planning processes, from design planning to production techniques. This clothing is made from readily available materials, facilitating production and expanding the marketing reach. This ready-to-wear prioritizes production efficiency and price affordability.

Deluxe ready-to-wear clothing is made with special techniques, using high-quality materials and more complex artistry. Deluxe ready-to-wear clothing is generally produced in limited quantities while maintaining aesthetic value. Therefore, deluxe ready-to-wear clothing has a higher selling price than regular ready-to-wear (Kadek et al., 2021). Deluxe ready-to-wear clothing often features material engineering, such as artistic embroidery or certain silhouettes. It has a distinctive style inspired by trends or ideas from the designers who create the clothing. Deluxe ready-to-wear clothing designs are more varied and complex than mass-market ready-to-wear. Deluxe ready-to-wear also typically comes in standard sizes, making this clothing practical to wear.

The creation of clothing in this Research falls into the deluxe ready-to-wear category because the production process is tailored, with innovation expressed through QR Codes that convey information about the clothing's identity, such as design, fabric, and product philosophy. The selection of unusual materials, such as contemporary batik combined with Arabella fabric, which has a shiny texture, strengthens the character of deluxe ready-to-wear clothing that prioritizes quality and innovation in the design process.

QR Code Technology

Along with the development of digital technology, QR Codes are not only used as a technical means to access information but have also become visual design elements with both aesthetic and functional value. The geometric visual of QR Codes enables diverse design exploration without compromising the scanning function. QR Codes can be integrated into design compositions as interactive visual elements. Through QR Code scanning, users can access and connect directly with digital information, making it not only visual but also informative about the product (Vorobchuk et al., 2024).

QR codes are a two-dimensional technology that connects to digital information when scanned with a smartphone (Novitasari & Nurmasitah, 2025). QR Codes serve as information media that enhance consumer interaction; they can convey more information than conventional labels (Prasad, 2008). QR Codes serve as a bridge between producers and consumers and also support the development of modern concepts and current technological innovations.

The application of QR Codes to clothing design serves as a means of delivering digital information that connects fashion products with digital content. QR Codes also add visual value

to clothing and enhance its aesthetic appeal. The use of this technology is also an innovative medium aligned with the development of digital technology (Sherif Abd Elaziz Mustafa et al., 2025).

The development of digital technology has driven innovation in information delivery systems, including QR Code technology. QR Codes are a two-dimensional technology accessible through smartphones. QR Codes serve as physical media that can connect with digital information. QR Codes were initially developed for tracking manufacturing components (Tiwari, 2017). This technology has developed rapidly and is now applied across various fields and widely used as a medium for information delivery, an educational tool, and digital information support, thanks to its ability to present data in an easily accessible format. In addition, QR Codes also have quite large storage and are equipped with a system that can correct errors even if part of the code is damaged. QR Codes have flexible, adaptive characteristics; their ability to integrate physical and digital products makes them viewed as sophisticated modern technology.

QR Code technology is a form of digital innovation that serves as a two-dimensional medium for storing and delivering digital information, providing aesthetic value and enhancing product functionality. This innovation facilitates interaction between producers and consumers and enables the conveyance of information about clothing products more quickly and practically. Therefore, QR Codes are viewed as innovations in modern clothing design, providing information, interactivity, and relevance to current digital technology development.

The application of QR Codes to ready-to-wear clothing aims to increase transparency about clothing products. Information is presented digitally to provide insight into product quality. QR Codes on ready-to-wear clothing function as information media about the product. Through scanning QR Codes on clothing, one can access information about the clothing, such as design concepts and product philosophy. In this clothing design, QR Codes are realized through manual embroidery techniques. They can be scanned with smartphones, serving not only as information media about the product but also as part of the clothing's aesthetic value.

Figure 1. Example Of QR Code

Batik Teknika Mandala

Contemporary batik is the development of traditional batik toward modern directions that adapt to fashion trends (Widya Kartika, 2024). Contemporary batik is a new concept that features abstract forms or motifs that reflect local culture. Contemporary batik motifs tend to be free and show the maker's self-expression (Atika Sari et al., 2025). Contemporary batik has developed into a form of visual expression not entirely bound by traditional conventions. This development opens new exploration spaces as new sources of inspiration, including the environment and modern objects (Anggorojati et al., 2025).

Visual elements are the main components of batik, as motifs are formed by the arrangement of these elements within fields. These visual elements include lines, fields, shapes, rhythm, and composition that give batik its visual character. In contemporary batik, visual exploration is broader, encompassing themes, techniques, and motif development. Visual approaches can arise from the interpretation of certain objects or phenomena, resulting in batik motifs that are visually novel and relevant to the present context.

Patterns are elements arranged regularly and repeatedly, forming regularity in visual works (Hidayat et al., 2025). Decorative patterns fall into two types: geometric and natural. Geometric patterns are visual designs or motif arrangements that form fields or follow fields and have clear forms, such as squares, trapezoids, circles, polygons, or stars. Dashed lines in Teknika Mandala motifs are interpreted as visual representations of circuit patterns. These lines form winding, interconnected, rhythmic paths, resembling circuit tracks with direction and repetition. Line patterns do not stand alone as elements but function as binders between geometric motifs. Visually, the squares in the Teknika Mandala batik motif are arranged in a regular pattern. These rectangles are interpreted as the meeting of directions and motif flows. This meaning relates to the circuit track concept found in certain parts, which serve as segments of the overall path.

Teknika Mandala batik is contemporary stamped batik created as a form of visual innovation, inspired by the Mandalika circuit track. This batik work, named Teknika Mandala, was made by its craftsman from the Sleman area, Special Region of Yogyakarta. Developed through stamping techniques, this batik is produced custom with attention to motif details and visual composition balance. Teknika Mandala batik is a visual expression that combines art, philosophy, and culture within contemporary batik.

Figure 2. Mandala Teknika Batik

Product Quality

Product quality can be defined as the level of product performance in fulfilling functions and delivering benefits to the maximum, assessed through several indicators (Najib et al., 2022). In a product, visual aspects play an important role in the resulting clothing. A product needs to meet certain standards to be produced.

Product quality is the level of excellence in specifications, characteristics, and the product's ability to fulfill consumer satisfaction through the characteristics it possesses (Sugiyono, 2019). Product quality is an important aspect in determining product sustainability. In an increasingly competitive industry, product quality is an important factor. Consumers not only consider price and product appearance but also assess product benefits and use value that align with consumer expectations. Therefore, consumer satisfaction with a product is an important factor.

Product quality is the ability of a product, based on its function, processes, and value, to meet consumer needs and expectations (Ridha Alfia Zachra et al., 2024). In clothing products, product quality has complex properties because it covers functional and aesthetic aspects. Consumers will be satisfied if the clothing product is the right size, made of comfortable material, and has an attractive design. Satisfaction with a product shapes consumers' perceptions of the product and its brand. This shows that consumer satisfaction not only impacts the short term but also influences long-term relationships.

The factor that influences consumer satisfaction with a product is the quality of the resulting clothing product. The quality of clothing is determined by consumer satisfaction while wearing it. Product success is determined by whether it meets consumer expectations and

delivers consumer satisfaction. Product quality includes performance, conformity to product specifications, aesthetic value, and comfort, which make consumers more likely to use the product again. Clothing quality includes design conformity, sewing techniques, texture, shape balance, and finished clothing results (Anggraini et al., n.d.). Factors that Influence consumer loyalty to products are determined by the decision to wear a product (Rahayu et al., 2024).

Product quality is a product's ability to perform its functions and deliver benefits in line with consumer expectations. Product quality is not only seen in its visual appearance but also in its conformity to product specifications, comfort, and the use value consumers perceive.

3. Research Methods

This Research uses a work creation design approach, as described by Gustami (2007) and (Karina, 2024). This approach emphasizes the systematic product creation process. According to Gustami, there are three stages of work creation: exploration, design, and embodiment. Exploration is the stage of identifying ideas, concepts, materials, data, and techniques. Based on this exploration, the Author applies QR Code technology to ready-to-wear clothing, combined with contemporary Teknika Mandala batik. This clothing combines cultural elements with modern technology without sacrificing its aesthetic value. Next, in the design stage, there are designs and moodboards. Design is the visual presentation of an object, formed through the arrangement of line elements, shapes, colors, and textures (Prianka, 2023). Moodboards are collections of visual elements, such as photos, sketch images, magazine clippings, and color samples, arranged in collage form (Ghurub Bestari, 2016).

In the embodiment stage, this is the stage of design realization, from concepts and the design stage to real products. This process is carried out through appropriate stages, taking emerging trends into account to produce products that reflect current tastes.

This Research was conducted in the Fashion Design laboratory of building E-10, Faculty of Engineering, Universitas Negeri Semarang. This process took place from October 2025 to November 2025. Data were collected through observation, using observation sheets in the form of product quality assessment instruments comprising 6 assessment indicators. Assessment data were then analyzed using descriptive percentages to determine clothing quality. The Research object in the form of clothing was assessed by 3 expert panelists and 10 trained panelists.

3. Results and Discussion

Moodboad

The moodboard theme from this Research is "Tech-Integrated Ready to Wear." This theme combines digital QR Code elements displayed in augmented reality (AR) when scanned with a mobile application with a futuristic design.

In the initial stage of moodboard preparation, determining a theme that aligns with the idea to be applied, the application of QR Code technology to this ready-to-wear clothing emphasizes the integration of digital technology innovation and modern clothing aesthetics. The concept of Lunixa clothing is oriented toward minimalist, functional styles and includes identity elements to facilitate access to information via QR Codes. Moodboards are arranged to clarify the design direction. The concept behind this clothing design is futuristic, closely related to technological development. This futuristic design also emphasizes innovative visual aesthetics and depicts modern progress. This is realized through design, material selection, and technology used. The moodboard also features strong geometric shapes that represent circuits and QR Code technology. The color palette used has metallic accents that give a modern, elegant impression.

This moodboard is inspired by the Mandalika circuit concept, which combines technology and modern aesthetics. Visual characteristics of circuits, such as firm track lines, geometric shapes, and futuristic values, serve as the basic concept for moodboard development, to be realized in clothing products.

Figure 3. Moodboard

Design

The ready-to-wear clothing design, featuring QR Code technology and Teknika Mandala batik, is inspired by the visual character of the Mandalika circuit, blending dynamics with modern concepts. This ready-to-wear clothing includes several elements and principles, including lines, direction, shapes, sizes, and light-dark values. In the cargo pocket section, strings are hanging down, representing circuit tracks.

This clothing is categorized as three-piece, consisting of an outer, a shirt, and cargo pants. This clothing design forms a unified appearance that complements each other visually and functionally. The outer garment functions to strengthen the visual character of the clothing by using metallic material, and on the back of the clothing is a QR Code that serves as the clothing's character and functional element. This QR Code functions as a design identity. Therefore, this outer has strong visual value. The shirt in this outfit is a basic, comfortable shirt suitable for pairing with the outer. The shirt uses batik fabric with a Teknika Mandala motif. This shirt is an inner garment combined with the outer. The pants in this clothing design use cargo pants with straight cuts. The selection of these pants emphasizes a sporty character that prioritizes function and comfort.

This clothing design features an H silhouette with balanced shapes from the shoulders to the bottom of the pants. The design of this clothing has balanced proportions. The H silhouette of this clothing creates a simple yet elegant impression. The clothing is paired with straight-cut cargo pants, creating a vertical impression.

The color selection consists of gray, inspired by the track color on circuits. This color gives a neutral impression and dominates the design's appearance. The metallic gray exterior gives a futuristic impression. The dominant gray in this design balances the color composition. The navy blue in this clothing design is inspired by the blue sky element from the circuit area, which is then darkened. This color choice not only represents natural elements but also reinforces a sense of stability and dynamism.

This ready-to-wear clothing design is a futuristic concept inspired by technological elements; it has a modern, elegant, and innovative visual nuance. The distinctive feature of this clothing is the application of QR Codes on the back. This QR Code provides access to digital information about the clothing's product details. This QR Code is applied by hand, preserving the clothing's visual beauty. Clothing with QR Code technology innovation uses the Teknika Mandala batik modification. This clothing has a circuit idea source that connects physical and digital elements. In the Teknika Mandala batik design, cables and circuits are interpreted and realized in patterns or interconnected lines. This clothing combines batik and digital innovation.

Figure 4. Presentation Design

Clothing Production Process

Ready-to-wear clothing consisting of 3 components: Outer, shirt, and cargo pants. The clothing production process involves several stages: from body measurements to finishing to product photography.

The initial stage is the model's body measurement process. The body measurement process is carried out directly to obtain accurate body measurement data, including body circumference, arm circumference, neck circumference, body length, shoulder width, sleeve length, waist circumference, hip circumference, crotch circumference, and pants length. This body measurement process aims to adjust the clothing size to the model's body so that the resulting clothing is comfortable and well-proportioned when worn.

After taking body measurements, the next stage is clothing pattern-making. The pattern used to make this clothing is a body-mapped construction pattern. There are 3 pattern makings: outer pattern, shirt pattern, and cargo pants pattern, paying attention to design details, silhouettes, and cutting lines.

The next stage is fabric layout, the process of placing patterns on fabric before cutting. This fabric layout is done by paying attention to the grain direction. Fabric layout aims to minimize fabric waste and achieve neat, precise cuts. After the fabric layout, the next step is cutting the fabric according to the patterns arranged on it.

Figure 5. Material Design

The next stage is the sewing process, which involves joining clothing parts. In the first sewing, namely shirt-making, the shirt is sewn in the following sequence: joining the sides, then buttonholes, sleeve installation, collar, and finishing, namely attaching buttons. Then, the outer

sewing stage begins with lining installation, sewing outer variations, and sewing the side and shoulder parts; this outer sewing is done from the inside so that stitches are not visible on the outside. The next stage is sewing cargo pants. This pant sewing starts with installing the cargo pockets, then sewing the side and crotch panels, then installing the belt loops, buttons, and the waistband

Figure 6. Manufacturing Process

The final stage is to conduct a thorough product inspection of the sewing results to ensure there are no defects in the clothing. The finishing stage also includes the pressing process to tidy the clothing.

Figure 7. Final Product Photo

The final stage is product photography. Product photography aims to document the embodiment of the design results. Product photography is a presentation medium for the work that has been made.

Quality Testing

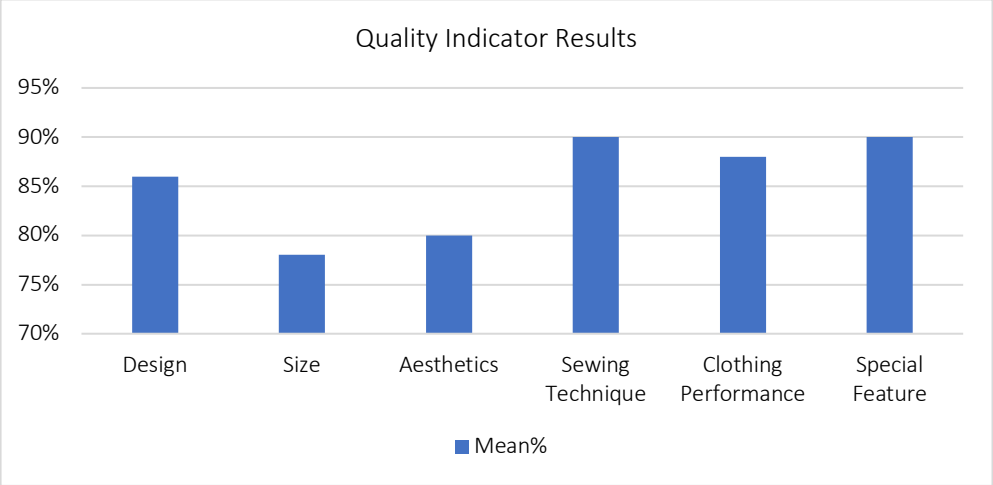
Based on assessments by 3 expert panelists and 10 trained panelists, this ready-to-wear clothing has the highest value in terms of sewing techniques and special features. An instrument is a tool used to measure Research variables. An instrument is valid if it accurately measures the variables under investigation. Product quality testing is conducted to determine the quality level of clothing through panelist assessment using Research instruments. The resulting data are quantitative, in the form of scores and percentages, and are analyzed

descriptively. Sugiyono (2019) states that data used in Research must meet validity, reliability, and objectivity criteria so that Research results can be accounted for.

Table 1. Percentage Criteria

No	Percentage Interval	Category
1.	81% - 100%	Very Feasible
2.	61% - 80%	Feasible
3.	41% - 60%	Fairly Feasible
4.	21% - 40%	Less Feasible
5.	0% - 20%	Not Feasible

Table 2. Bar Graph of Clothing Quality Indicators



Based on these indicators, the sewing technique quality received a 90% score, indicating that neat, strong sewing results affect clothing durability. This aligns with Research by (Kayalvizhi & Gokarneshan, 2021) and (Rahmanda et al., 2023), which show that neatness and stitching strength play a role in determining clothing quality because they affect clothing durability, and that sewing results also affect wearing comfort.

The Special Features indicator received a 90% score, indicating that the clothing product is unique and innovative, enhancing its attractiveness and differentiating it from other products. This aligns with Research by (Yunitasari & Anwar, 2022) and (Prabawanti & Ramawati, 2024), which state that innovation and the uniqueness of clothing increase product value and attractiveness; product uniqueness is one factor that influences consumer attractiveness. Thus, the special features aspect can be categorized as having good quality.

The design indicator received an 86% score, indicating that design not only displays visual elements but also demonstrates conformity in shape and function. This aligns with

Research by (Amelia, 2025) and (Aprianto et al., 2023), which explain that clothing design is not only a visual aspect but must also be appropriate for functional use; this Research also explains that design has aesthetic aspects.

The size indicator received a 78% score, indicating that product size conformity is a key factor in comfort. This aligns with Research by (Putrianto & Suryawijaya, 2023) and (Laily & Pratiwi, 2025), which mentions that clothing size conformity greatly affects clothing comfort when used. Clothing in comfortable sizes enhances freedom of movement during activities.

The aesthetics indicator received an 80% score, noting that aesthetics in clothing components include the conformity of colors, motifs, and clothing proportions. This aligns with Research by (Khomariah et al., 2022) and (Febriyanti et al., 2025), which explains that the aesthetic aspects of color harmony, proportion, and motif play an important role in clothing's aesthetic value. Harmony of visual elements strengthens the clothing's character when worn.

Clothing performance indicator 88%; clothing performance is a measure of overall clothing, from wearing comfort to function. This aligns with Research by (Abul et al., 2017) and (Wakes et al., 2020), which explains that performance shows that product function and comfort must be balanced. Good clothing performance is not only about functional aspects; it also considers the materials used and their intended functions. Thus, the performance indicator indicates that the resulting clothing performs well.

Based on assessment results from expert panelists and trained panelists, the sewing technique and clothing special features quality indicators have the same high value, receiving a 90% score with a very feasible category. On the other hand, size has the lowest value, 78%, among the indicators, indicating that size conformity still needs improvement. Meanwhile, design and aesthetics are assessed as quite good, supporting the overall appearance and clothing quality. Based on quality test results, ready-to-wear clothing obtained an average score of 85% and is included in the very feasible category.

4. Conclusion

This Research concludes that the creation of ready-to-wear clothing using QR Code technology, combined with Teknika Mandala batik, can produce designs appropriate to technological development without neglecting cultural and aesthetic values. QR Codes are integrated through manual embroidery techniques that become part of the visual. Quality test results show that this ready-to-wear clothing ranks highest in the following categories: sewing technique (90%), special features (90%), clothing performance (88%), design (86%), aesthetics (80%), and size (78%). Based on this, Research results show that this clothing is of high quality. This clothing demonstrates that technology in clothing is not only a supporting element but also a form of modern clothing development that is innovative, informative, functional, and retains clothing value.

References

Abul, M., Shibly, H., Tammana, T. A., & Rahman, M. (2017). Seam performance evaluation of plain fabric using different dyes in garments dyeing. *Journal of Textile, 6*(5), 119–127. https://doi.org/10.5923/j.textile.20170605.01

Al-kansa, B. B., Iswanda, M. L., Kamilah, N., & Herlambang, Y. T. (2023). Pola hidup manusia. Pengaruh Kemajuan Teknologi Terhadap Pola Hidup Manusia, 4(3), 2966–2975.

Amelia, D. (2025). Application of upcycled jeans and macramé techniques in edgy balatara ṅ g menswear designs. *8*(2), 309–320.

Anggorojati, A., Romadhon, A. G., Handayani, E. F., Jahroo, W. L., & Mukti, P. U. (2025). Eksplorasi nilai estetika batik kontemporer sebagai identitas budaya lokal dalam industri kreatif global. *RIGGS: Journal of Artificial Intelligence and Digital Business*, *4*(3), 6909–6922. https://doi.org/10.31004/riggs.v4i3.3036

Anggraini, R., Ketut Widiartini, N., Mayuni, P. A., Kunci, K., Pengembangan, /, Pesta, K., & Recycie, K. P. (n.d.). Pengembangan hiasan busana pesta anak dengan recyle kain perca. https://doi.org/10.23887/jppkk.v13i3.53278

Aprianto, R., Putri, V. R. S., & Suryawati, S. (2023). Penilaian estetika busana pesta berbahan denim dengan teknik draping. *Practice of Fashion and Textile Education Journal*, *3*(2), 87–98. https://doi.org/10.21009/pftej.v3i2.24823

Atika Sari, A., Nurani Sulistyati, A., Studi Kriya Seni, P., Seni Rupa dan Desain, F., & Sebelas Maret Surakarta, U. (2025). Perancangan motif batik kontemporer untuk tekstil pakaian (Vol. 22, Issue 1). https://jurnal.isi-ska.ac.id/index.php/ornamen/78

Dedy Irawan, J., & Adriantantri, E. (2018). Pemanfaatan QR-Code sebagai media promosi Toko. In *Jurnal MNEMONIC* (Vol. 1, Issue 2).

Febriyanti, Putri, V. R. S., & Prabawati, M. (2025). Estetika jaket thrifting dengan hiasan sulaman bebas. *Practice of Fashion and Textile Education Journal*, *5*(2), 24–31. https://doi.org/10.21009/pftj.v5i2.58744

Ghurub Bestari, A. (2016). Pengaruh penggunaan media mood board terhadap pengetahuan desain busana pada mahasiswa pendidikan teknik busana. *Jurnal Inovasi Teknologi Pendidikan*, *3*(2), 121–137.

Hidayat, S. R., Sunarmi, S., & Setiyono, B. (2025). Analisis struktur visual ragam hias batik abstrakan. *Jurnal Penelitian Inovatif*, *5*(1), 615–624. https://doi.org/10.54082/jupin.1280

Kadek, N., Sonya, G., Dewa, I., Suasmini, A. S., Kade, I. A., & Sukmadewi, S. (2021). Badama cakra: Metafora sosio kultural dalam busana gaya exotic dramatic. *Bhumidevi: Journal of Fashion Design*, *1*(1), 58–67. https://jurnal2.isi-dps.ac. id/index. php/ bhumidevi/ article/view/288

Karina, A. W. (2024). *Journal of Fashion & Textile Design Unesa. Fashion*, *1*(2023), 128–137.

Kayalvizhi, C., & Gokarneshan, N. (2021). Evaluation of the seam quality in garments. *International Journal of Research in Engineering and Science (IJRES) ISSN*, *9*(6), 1–09. www.ijres.org

Kharimah, S. A., & Nursari, F. (n.d.). Perancangan busana redy to wear menggunakan metode zero waste dengan kobinasi tenun baduy.

Khomariah, S., Prabawati, M., & Lubis, H. (2022). Penilaian estetika surface textile design dengan pasta puff secara non-Industrial. *Prosiding PTBB*, *17*(1). https: //journal.uny.ac.id/index. php/ptbb/article/view/59338

Krisnayadi, F. D., & Prihatin, P. T. (2021). Penerapan bahan tweed pada pembuatan busana ready to wear. *Teknobuga: Jurnal Teknologi Busana Dan Boga*, *9*(2), 112–120. https://doi.org/10.15294/teknobuga.v9i2.28359

Laily, T. N., & Pratiwi, N. (2025). Klasifikasi ukuran baju berdasarkan pengukuran tubuh menggunakan mediapipe dan support Vector Machine. *Metik Jurnal*, *9*, 2025. https: //doi.org/10.47002/metik.v9i2.1069

Mahala Adjani, S. (2023). Wastra batik as A fashion Interest among generation. 8(1). https://doi.org/10.36526/js.v3i2.3447

Maulana Hakim, L. (2018). Batik sebagai warisan budaya bangsa dan nation brand Indonesia. In *Nation State: Journal of International Studies* (Vol. 1, Issue 1).

Mohamad Ali Murtadho, N. A. M. S. M. (2016). Implementasi quick response (Qr) Code pada aplikasi validasi dokumen menggunakan perancangan unified modelling language (Uml). *Antivirus : Jurnal Ilmiah Teknik Informatika*, *10*(1), 42–50. https://doi.org/ 10.35457/antivirus.v10i1.87

Najib, R. G., Dewi, R. S., Suryoko, S., & Bisnis, D. A. (2022). Pengaruh kualitas produk dan E-service quality terhadap kepuasan pelanggan (Studi pada konsumen lazada di semarang).

In *Jurnal Ilmu Administrasi Bisnis* (Vol. 11, Issue 2). www.i-price.co.id,

Novitasari, N., & Nurmasitah, S. (2025). *Journal of Creativity Student*. *8*(2), 228–235.

Prabawanti, B. E., & Ramawati, Y. (2024). The role of quality, Promotion, and product uniqueness in the decision-making to purchase batik gayatri. *Transekonomika: Akuntansi, Bisnis Dan Keuangan*, *5*(1), 96–103. https://doi.org/10.55047/transekonomika.v5i1.837

Prasad, M. (2008). Interactive clothing based on Iot using QR code and mobile application. *International Research Journal of Engineering and Technology*, *238*(6), 11–13. www.irjet.net

Pratiwi, D. O., & Yuningsih, S. (2022). Perancangan busana ready to wear menggunakan teknik bordir dengan inspirasi motif benang bintik. *Moda*, *4*(2). https://doi.org/10.37715/moda.v4i2.3161

Prianka, D. (2023). Evaluating the impact of basic design fundamentals education on the creative process of fashion design students in Surabaya, Indonesia. *Humanities & Language: International Journal of Linguistics, Humanities, and Education*, *1*(1), 15–21. https://doi.org/10.32734/qxkg8a61

Putrianto, N. K., & Suryawijaya, I. (2023). Analisis dimensi pada pakaian olahraga menurut konsumen dewasa muda di Surabaya dan Malang. *Jurnal Tekstil: Jurnal Keilmuan dan Aplikasi Bidang Tekstil Dan Manajemen Industri*, *6*(2), 60–6 7.https://doi.org/10.59432/jute.v6i2.68

Rahayu, D., Maessa, A. V., & Rafsnjani, M. F. D. (2024). Seminar nasional pendidikan teknik boga dan busana. *Seminar Nasional PTBB*, *19*(1), 1–6. https://journal.uny.ac.id/index.php/ptbb/article/view/83368/23071

Rahmanda, V., Rahma, T. I. F., & Ilhamy, M. L. (2023). Pengendalian kualitas proses produksi konveksi rumahan dalam meningkatkan kualitas produk (studi kasus vivana konveksi). *Ecobisma (Jurnal Ekonomi, Bisnis Dan Manajemen)*, *10*(2), 67–80. https://doi.org/10.36987/ecobi.v10i2.4436

Ridha Alfia Zachra, Usep Suhud, & Muhammad Fawaiq. (2024). Faktor yang memengaruhi keputusan pembelian: kualitas Produk, kualitas pelayanan, kepercayaan dan kepuasan konsumen pada produk sneakers di shopee live video shopping. *Jurnal Manajemen Dan Bisnis Ekonomi*, *2*(3), 311–334. https://doi.org/10.54066/jmbe-itb.v2i3.2068

Sherif Abd Elaziz Mustafa, B., Sayed Mohamed, S., & Mostafa Hafez Professor, N. (2025). The aesthetical impacts of quick response (QR) Codes in apparel design to revitalize handcrafts. In *International Design Journal* (Vol. 15, Issue 1).

Soehartono, S., Enrico, E., & Githapradana, D. M. W. (2025). Perancangan busana Ready-to-Wear deluxe wanita dengan konsep kesetaraan gender menggunakan surface design embroidery. *Moda*, *7*(1). https://doi.org/10.37715/moda.v7i1.5691

Sugiyono. (2019). Pengaruh kualitas produk terhadap keputusan pembelian kendaraan bermotor di kota Bogor. *JIMEA | Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntan*, *6*(3), 146.

Tanzil, M. Y., Astrid, A., Tjandrawibawa, P., Tahalele, Y., & Toreh, F. R. (2021). a study of academic and industry ready-to-wear fashion product collaboration based on design thinking method. *Idealog: Ide dan dialog desain Indonesia*, *6*(2), 135–149. https://doi.org/10.25124/idealog.v6i2.4281

Tiwari, S. (2017). An introduction to QR code technology. *Proceedings - 2016 15th International Conference on Information Technology, ICIT 2016*, *1*, 39–44. https://doi.org/10.1109/ICIT. 2016. 38

Vorobchuk, M., Pashkevych, K., Yezhova, O., & Protsyk, B. (2024). QR code design: From digital graphics to environmental, product and fashion design. *Journal of Graphic Engineering and Design*, *15*(2), 51–57. https://doi.org/10.24867/JGED-2024-2-051

Wakes, S., Dunn, L., Penty, D., Kitson, K., & Jowett, T. (2020). Is price an indicator of garment durability and longevity? *Sustainability (Switzerland)*, *12*(21), 1–13. https:

//doi.org/10.3390/su12218906

Widya Kartika, K. (2024). Perancangan batik kontemporer dengan sumber Ide tokoh ramayana. In *Jurnal Seni Kriya* (Vol. 13, Issue 2). https://orcid.org/no

Yunitasari, S. S. Y. S., & Anwar, M. (2022). Analisis keunikan produk dan inovasi produk terhadap kinerja pemasaran melalui keunggulan bersaing pada busana muslim di Surabaya. *Widya Manajemen*, *4*(2), 160–170. https://doi.org/10.32795/widyamanajemen. v4i2.2885