



RESEARCH ARTICLE

Challenges in The Development of Goyor Woven Sarong Business Based on Non-Machine Weaving Tools in The Digitalization Era (Case Study in Central Java, Indonesia)

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ABSTRACT

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Goyor woven sarong business using non-machine weaving tools (NMWT) is an ancestral heritage that should be preserved as part of the local culture in Indonesia. However, the development is hindered by continuous digitalization which may lead to the extinction of the business. Therefore, this study aimed to examine the challenges of developing NMWT goyor woven sarong business in the digitalization era. A qualitative method was used with a constructivist-interpretive approach. The fishbone diagram approach identified the root of the problem and causes, while valid data were produced using the triangulation method. The study was carried out in four production centers, namely Klaten, Jepara, Pemalang, and Tegal Regencies. The respondents were selected using snowball sampling, which obtained a total of 40. Key respondents were from each regencies' association administrators as well as the Industry and Trade Service. The results showed that a very competitive market was the most fundamental root problem in the challenges of developing NMWT goyor woven sarong business in the digitalization era. The root of the problem includes inefficient technology, limited capital, low human resource capacity, relatively large production risks, and unfavorable government policies. The results also found a relationship between the root of the problem and the causal factors. In conclusion, penta-helix collaboration is needed to formulate adaptation strategies that should be implemented immediately in this digitalization era.

1. INTRODUCTION

Economic development in Indonesia is connected to the role of micro, small, and medium enterprises (MSMEs) in terms of the increasing number and types of businesses. More than 99% of business units are dominated by MSMEs out of 65.25 million units ((Hadi Putra and Santoso, 2020); (Riptanti et al., 2024)). MSMEs play a role as a safety valve for the economy during times of crisis and a dynamic driver of economic growth after the monetary crisis (Utami et al., 2021). The crucial role is to improve people welfare through high labor absorption, thereby reducing unemployment rates, and serving as the backbone of the economy in developing countries (Suminah et al., 2022). Based on the presentation of the Minister of Cooperatives and MSMEs at the 2022 reflection and 2023 outlook events, MSMEs can absorb up to 97% of the total workforce in Indonesia. This condition does not fully show strength because small enterprises are considered below-standard performance (Bravo-Ortega et al., 2023).

The performance of MSMEs is expected to create acceptable results and actions. Performance can be categorized into financial, innovative, productive, and market (Larios-Francia and Ferasso, 2023). However, Indonesian MSMEs performance is still lacking in terms of understanding management and the application of technology as a support (Prabowo et al., 2020). This problem is related to limited access to management training and the difficulty of adopting digital technology. In developing countries, the level of technology adoption is still relatively low (Aisjah et al., 2023). Most MSMEs still use traditional methods in business operations, leading to less effectiveness and efficiency than competitors in technology-based businesses (Al-Shami et al., 2024). This deficiency impacts competitiveness, especially in the global and digital markets. MSMEs that do not adopt technology tend to stagnate. On the other hand, competitors using technology can increase operational efficiency and reach a broader market, which impacts performance (Affandi et al., 2024). Other problems are related to the low quality of human resources, weak business networks, limited market access, and lack of business capital (Nuryanto et al., 2024). Human resources play an important role in business management, hence, a high level of knowledge and skills are needed.

Goyor woven sarong business requires creativity and high precision in the production process. Woven sarong is made of rayon yarn with a base material of eucalyptus and abaca plants natural fibers (Darmawan et al., 2020), which have smooth and flexible properties. Based on the properties of these fibers, the production of flexible weaving in the local language is called "goyor". The soft and flexible nature of the fabric makes this woven fabric very comfortable to wear, both in hot and cold conditions (Nickels, 2019). Rayon fiber can also be produced from empty oil palm fruit bunches as a potential raw material (Nikmatin et al., 2022), considering Indonesia is the world largest palm oil producer (Hidayat et al., 2024).

The various centers of goyor woven sarong producers in Central Java Province include Klaten, Pemasang, Tegal, and Jepara Regencies. Each region has unique motifs and manufacturing techniques, including ancestral heritages, such as Indonesian batik motifs influenced by the socio-cultural conditions (Nurcahyanti et al., 2021). The traditional production method currently practiced is the use of NMWT (Rohmat et al., 2022). The tool allows craftsmen to create fabrics with complex textures and motifs, but it takes a long time. Design making is also conducted manually with high precision and patience for each pattern and motif, producing high artistic value and uniqueness (Wu et al., 2023).

In the current digital era, several competitors have started to innovate by using machine weaving (MW) to make products faster and more efficiently. Mass production using MW can produce constant fabric properties and limit the design space to several designs (Wirth et al., 2023). Another advantage of using machine technology is the cheaper selling price of the product. This will increase the buying interest of consumers who prioritize price over artistic value. Competition is becoming tighter with the development of printed goyor woven sarongs, which are significantly cheaper than NMWT and MW. In responding to these challenges, producers in Central Java should have the right target market to maintain production and turnover, to prevent a decline in the business.

The potential for developing NMWT goyor woven sarong business is estimated to still be very large and promising. The high consumer awareness of traditional products with high artistic value has increased demand. This is in line with (Xue et al., 2022) which reported a trend of consuming goods recommended in a sustainable mode. In other words, there is consumption of durable goods at premium prices, especially those produced with traditional resources. These include domestic and foreign consumers, especially from Saudi Arabia, Africa, and other eastern countries. The main domestic market segmentation for NMWT goyor woven sarong products is traders from Bali, Lombok, Mataram, Jakarta, and tourist areas that have traditional products.

Chen et al. (2022) also emphasized that in line with increasing demand, advanced craft technology should be added to guide progress and sustainable breakthroughs for craftsmen. This study focused on the demand aspect that needs to be met by producers. Meanwhile, the challenge of business sustainability is competition with similar producers who have more modern innovations and technologies (Handoyo et al., 2023). Higher production efficiency produces a significantly cheaper selling price. Therefore, this study aimed to examine the challenges of developing NMWT goyor woven sarong business in the digitalization era. The results will contribute to efforts to preserve the

existence and sustainability of the national culture, especially in Central Java. The adaptability of entrepreneurs is very important for survival in the digitalization era. NMWT goyor woven sarong business, an ancestral heritage, should not be eroded by technological digitalization but become a traditional local product in the global market.

MATERIALS AND METHODS

The study was conducted in Central Java Province, the center of NMWT goyor woven sarong producers, particularly in four regencies, namely Klaten, Jepara, Pemalang, and Tegal. The area is the center of NMWT-based goyor woven sarong production and uses digitalization in business development.

The purposive sampling method was used to select samples according to the objectives following information on Google Maps owned by NMWT Goyor woven sarong producers in the four study areas. The scale of the business, production technology, and the use of digital technology by the producers were observed. The criteria for respondents selected as study samples were the scale of the business selected, which was micro and small, using NMWT and digital technology. Respondents were selected by snowball sampling (Riptanti *et al.*, 2024). Information from the administrators of NMWT Goyor woven sarong producers association, the Industry and Trade Service in each regency, as well as key respondents who were willing to be interviewed in-depth according to the criteria, is very important. Tight business competition implied that not all producers included in this category were willing to be interviewed. A total of 8 respondents were taken from each regency, hence the total number was 40. The snowball sampling of respondents was evenly distributed in the production centers. Excavation of information from various sources in different locations enriches more diverse and in-depth results (Csomós, 2018).

Data collection was carried out using a structured questionnaire prepared by adjusting the conditions after a pre-survey with several respondents open to providing information. In addition, the developed information was recorded and observed by producers, markets, and buyers. Observation and recording are useful for gaining insight into certain actual situations and behaviors (Busetto *et al.*, 2020).

This study used a qualitative and constructivist-interpretive approach (Pascal, 2020; Widiyanti *et al.*, 2024). The scope includes the market, human resources, technology, production, capital, and government policies on the challenges of developing NMWT goyor woven sarong business. The fishbone diagram was used to identify and examine the root of the problem and causes (Riptanti *et al.*, 2023). This diagram explains every possibility from the challenges of developing the business. The advantage is the ability to comprehensively and thoroughly examine the root of the problem and causes (Desai *et al.*, 2015). Furthermore, data was analyzed using the triangulation method including source, collection, method, and theory (Hanson-DeFusco, 2023). This produces valid data that can be studied more comprehensively.

RESULTS

NMWT-based goyor woven sarong business in the four regencies has experienced a division of inheritance rights (business fragmentation). The business survives with effective management but collapses when the management is bad and the current managers are the 3rd-5th generation. It aims to preserve the nation culture by maintaining the production of traditional fabrics to prevent extinction. The preservation of woven sarong is in line with the study results of Al-Shami *et al.* (2024) which emphasized the importance of preserving traditional products such as batik closely related to Indonesian culture, making a significant contribution to Gross Domestic Product (GDP), and preserving the nation heritage.

The competitive conditions of the textile business sector are currently very competitive, causing several large factories in Indonesia based on modern technology to declare bankruptcy and close permanently. The use of modern technology in production does not guarantee the sustainability of businesses in the textile sector. Domestic and global economic conditions also affect the sustainability of NMWT-based goyor woven sarong business. Several entrepreneurs in production centers in the four regencies have closed permanently due to the inability to compete well with

similar businesses. Rodríguez-Espíndola et al. (2022) explained that MSMEs in developing countries find it difficult to transition to further development due to limited financial and resource managerial capabilities. This lack of ability affects progress, influenced by external factors such as economic and environmental conditions.

NMWT-based goyor woven sarong producers whose businesses still exist presently are local workers. This is in line with Lähdesmäki Suutari (2020) stating that MSMEs can recruit workers, the most important assessment in influencing business success. The recruitment of workers is not only an economic process but also includes social and cultural aspects. MSMEs in rural areas are very close to the local community, hence recruiting workers around can reflect legitimacy in the surrounding community. The multiplier effect of business sustainability is enjoyed by producers, the surrounding community, and stakeholders. Other impacts include driving the regional economy, reducing unemployment, and improving the welfare of the surrounding community. This is supported by Ndiaye et al. (2018) stating that the impact of establishing MSMEs in developing countries is increasing the economy, creating jobs, and improving community productivity. Currently, these conditions are not easy to achieve due to the various challenges that hinder business continuity. Some businesses are permanently closed, coma, and stagnant in several production centers, thereby a comprehensive study is needed. The root of the problem and the causal factors need to be studied comprehensively to develop this business sustainably while preserving ancestral culture.

Based on the data analysis result using the fishbone approach, the root of the problem and the causal factors for the under development of NMWT-based goyor woven sarong business was obtained, as shown in Figure 1. The most basic root of the problem lies in the market, followed by technology, capital, human resources, production, and government policy. Specifically, the root of the problem and the causal factors are examined as follow:

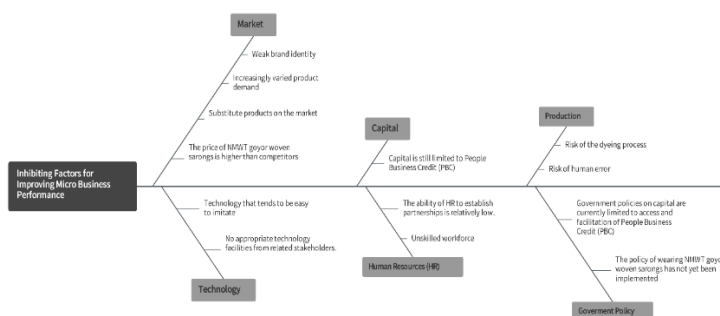


Figure 1. FishBone Approach in Developing Goyor Woven Sarong Business

DISCUSSION

1) Market

The market controls the sustainability of the business and large opportunities attract producers to produce or increase production capacity and vice versa (Wang et al., 2024). Producers try to penetrate both domestic and foreign markets with the availability of resources. However, this very competitive market is difficult for some business actors to penetrate. The penetration ability depends on the producers capacity to manage the business. In general, the factors that hinder producers from competing in the market are:

a. The price of ATBM goyor woven sarongs is higher than competitors.

Raw materials are expensive, especially imported yarn, causing the high selling price of goyor woven sarongs. This is due to the high price of raw materials and the relatively long and complicated production process. The results are consistent with Liu and Yang (2015) stating that raw materials are the highest-cost component in production. This can disrupt the performance of ATBM-based goyor woven sarong business. Sarong uses a combination of raw materials from imported and local yarns of 50%. Producers in Klaten, Jepara, Pemalang, and Tegal Regencies have different combinations when dealing with the high cost of production, which affects the price of sales. However, the difference in the combination of yarn types used is less than 50% as an implementation of a resource management strategy for business efficiency (Ivanov et al., 2021). Competitors come

from ATM and printing-based woven sarong producers, causing the cost of production to be significantly lower. These competitors are also located in the four regencies, making the competition even more challenging.

b. Substitute products on the market.

Tight market competition is the main cause of obstacles to business development. Substitute products circulating on the market are ATM and printed woven sarongs. The price is higher than that of ATM and printed goyor woven sarongs ranging between IDR 250,000 - and IDR 500,000, depending on the complexity of the weaving pattern. On the other hand, the price of ATM and printed goyor woven sarongs range from IDR 100,000 to IDR 250,000. Consumers who do not pay attention to quality will be more interested in buying because the prices are cheaper. The decline in consumer purchasing power due to the COVID-19 impact (Kaur, 2021), has burdened the performance of this business. Fabric design patterns are also more varied than ATBM goyor woven sarongs which are easier to implement (Raya et al., 2021). Technology simplifies the process and efficiency of production.

The purchase motive based on lower prices will expand the market share to lower middle-class consumers (Shaharuddin et al., 2021). Conversely, high prices lead to upper-middle-class consumers. Producers are faced with the upper middle class, thereby significant leverage is needed to expand the market segment in this class, for example, with a contract or franchise model (Woo et al., 2023).

c. Increasingly varied product demand

Goyor woven sarong is one of the raw materials used in making fashion products. In recent years, fashion businesses have faced major challenges in market changes, namely the evolution of purchasing behavior and consumer demand. Rapidly changing fashion trends cause product life cycles to be relatively short (Zamani et al., 2017). Currently, this business faces market uncertainty and an increasingly competitive business environment (Macchion et al., 2015). Adapting ATBM goyor woven sarong business to face market demand is one solution to avoid hampering business continuity. Innovation in creating designs consistent with trends or market demand is very important. However, not all business actors can adapt to this situation, resulting in being left behind by fashion trends.

d. Weak brand identity

Increasingly tight product competition requires a strong brand identity (Kovalchuk et al., 2023). Most producers in the study area sell ATBM goyor woven sarongs without a brand making production only according to buyer orders. This is more profitable than having personal trademarks because marketing is wider. On the other hand, added value is not obtained by producers because the brand is owned by the buyer. Consumers do recognize the producer, but the product branding on the market. Buyers from within and outside the country obtain added value from the branding of products being sold.

Product branding is essential in marketing to increase consumer awareness of products. When a business has good *branding and image*, it can increase consumer trust. Brand image plays an important role in growing *customer satisfaction and loyalty*, ensuring competitiveness in a competitive market (Tahir et al., 2024). Consumer loyalty to a brand will become the strength in the market. Trust and loyalty related to quality or service give a business certain advantages in the market. Several inhibiting factors for ATBM-based goyor woven sarong businesses related to the market need to be considered and solutions should be provided to ensure sustainability.

2) Technology

Technology is one of the important factors in business operations across various fields from production to marketing. The causal factors at the root of this problem include:

a. Technology that tends to be easy to imitate

Basically, there are two types of production technology in the goyor woven sarong business namely Non-Machine Weaving Tools (ATBM) and Machine Weaving Tools (ATM). Technology hinders business performance, especially those that are easy to imitate. Goyor woven sarong producers based

on ATBM or manual weaving in Klaten, Pemalang, Jepara, and Tegal regencies are easily imitated by others. The use of ATBM is an ancestral heritage technology that has not been modified and is less efficient. This observation is consistent with the results of Buckley (2023) on weaving businesses in Southeast Asia. The use of ATBM makes it easy to access similar business technology.

More modern production in the goyor woven sarong business is using ATM or printing technology. Specifically, printing technology is used as a solution to work on motifs with complex patterns because the results have good mechanical performance (Abteu et al., 2022). The fairly expensive price is one of the inhibiting factors in adopting this technology. Currently, there are only a few business actors who have access to and adopt this modern technology with the exception of the government or other institutions. The use of ATBM makes business performance inefficient, thereby making competitive advantage not achievable.

Marketing technology uses platforms such as *e-commerce* and *social media*. Almost all ATBM-based goyor woven sarong businesses in Klaten, Jepara, Pemalang, and Tegal regencies have used *e-commerce* and *social media* as a medium of *digital marketing*. This is in line with the study by Salah and Ayyash (2024) stating that *e-commerce* can be used as a means of marketing MSMEs. *Digital marketing* is able to reach all communities that are not limited by geographical and time boundaries (Yasmin et al., 2015). On the other hand, the use of *e-commerce* and *social media* in this business causes the design/pattern of the goyor woven sarong motif to be easily copied by other producers (Gornostaeva, 2022). Legal protection has not been registered with the Ministry of Law and Human Rights, hence, other producers are free to use designs/pattern motifs.

b. No appropriate technology facilities from related stakeholders.

Access to ATM or goyor woven sarong printing technology has not been facilitated by related stakeholders. Only a few producers with strong capital and access to information on the technology can adopt the technology. Lack of access to credit, training, and skills, inadequate market relations, as well as lack of awareness and knowledge are obstacles to the adoption of modern technology for micro-woven businesses (Hazarika et al., 2016).

Appropriate technology based on ATBM has not been modified to increase the efficiency of the production process. ATBM technology for decades remains the same in form, operation, and output hence, output is based on the operational agility of the workforce. A similar situation was observed in the batik industry which has not been modernized (Suzianti et al., 2023). When the thread is often broken in the production process, it will take longer to produce one sheet of goyor woven sarong. The case of broken thread is the most common which renders production inefficient.

3) Capital

The establishment of the woven sarong business requires huge capital starting from the provision of ATBM, thread, production site, inventory, and other operational costs. Limited capital can be an obstacle to business performance. In most cases, goyor woven sarong producers only have access to capital in the form of People Business Credit (KUR) which has low interest and a limited loan amount. The role of the government regarding KUR makes it easier for producers to access capital by providing recommendations to banks (Haryanto et al., 2023). Currently, capital is still limited to KUR, and there are no large loans from other institutions but low interest rates. This condition is not in line with the study of Esubalew and Raghurama (2020), which found a positive and significant impact of banking financial services on the operations and growth of MSMEs. Ease of accessing financial services or capital helps businesses improve the financial position.

The limited financial position makes producers restricted in taking advantage of opportunities for large demand that comes suddenly (Yifu et al., 2022). Moreover, the process of purchasing yarn is also inefficient compared to buying in certain quantities. This limitation is also evident from the innovation of creating new designs which requires huge capital.

4) Human Resources (HR)

Business management requires HR who have managerial skills starting from the lowest to the highest levels. Based on the results of the analysis, HR capacity in managing businesses varies and tends to be low. According to Korder et al. (2023), MSMEs characterized by businesses with less than 500

employees specifically have structural weaknesses in the form of serious recruitment problems and a need for more skilled workers. This is not in line with MSMEs that avoid replacing employees with skilled ones to maintain economic sustainability.

Most manufacturers in establishing partnerships from raw material suppliers to marketing are outright sales, hence requiring great effort in starting transactions. The major reason for this is distrust of business partners. Being repeatedly cheated by business partners makes most of the transactions that occur in outright sales. Specifically, the factors that cause the root of this problem are:

a. The ability of HR to establish partnerships is relatively low.

The goyor woven sarong business engaged in *fashion* and crafts requires HR capability which affects business management from the production process to the product being absorbed by the market. Establishing partnerships with providers of production facilities, similar industries, government, banking, textile associations, and marketers is very important for growing sustainable businesses (Roziqin et al., 2021). However, the ability to establish these partnerships is relatively low. The same condition was reported by Kurniawati et al. (2022) which recorded a low ability to establish partnerships. This is partly due to the low ability to build networks with various stakeholders.

b. Unskilled workforce

Based on the study by Abdelmeguid et al. (2022), business in the *fashion* industry needs to focus on management to overcome challenges. The workforce should be trained and developed to have the latest skills and knowledge. The skills of the workforce in the *fashion* industry are related to knowledge regarding materials, equipment, techniques, and interactions between all *stakeholders* to share knowledge (Margried, 2015). The existence of special criteria for the workforce needed in ATBM-based goyor woven sarong business can also be an obstacle in improving business performance because it is necessary to be selective in the recruitment process. Generally, not all prospective workers can operate ATBM skillfully. New workers need a learning period of between 3-4 months until the workforce is skilled at using ATBM and errors in operation are minimal. The millennial generation or Z is increasingly less interested in learning to use ATBM. This is a challenge faced by manufacturers in the future because the older the workforce, the less productive (Raya et al., 2021). A similar condition was observed in the agricultural sector where the millennial generation is increasingly engaged in agricultural businesses ((Kusnandar et al., 2023); (Riptanti et al., 2024)).

5) Production

Production risk is among the important factors to consider for all business actors. The risk of failed production or defective products reaches 7%. This percentage is a large amount that reduces revenue and profits. Minimizing production risk is one of the efforts that should be implemented by every running business. The application of risk management can reduce and mitigate the impact of losses incurred. External business uncertainty, natural factors, technology, and economic conditions make risk management one of the main approaches for a business to ensure continuity and overcome uncertainty (Ferreira de Araújo Lima et al., 2020). The results of the production identification risks and the causative factors are:

a. Risk of human error

Considering that the product is handmade, each unit produced by different hands will have various characteristics. Consequently, the product cannot be easily imitated by other manufacturers, because each treatment has different results on each hand. *Human error* is one of the risks that is difficult to overcome in every *fashion* business, specifically crafts (Raya et al., 2021). These include errors in combining threads, the strength, and weakness of hand-foot pressure in using ATBM, as well as frequent thread breaks, causing the product to fail or be defective. Failed or defective products tend to have prices below the market standard.

b. Risk of the dyeing process

A significant risk in the dyeing process is the thread binding which can have a significant effect on the dyeing results. Loose thread binding will make the dyeing unclean, thereby reducing the quality of the product which has an impact on lowering the price. The dyeing process which is high risk has the same conditions as the batik industry (Kusumawardani et al., 2024).

6) Government Policy

The role of the government is considered crucial by business actors, specifically MSMEs, regarding development policies. Government policies and programs are expected to have a positive impact on MSMEs. Currently, the government does not provide policies that burden ATBM goyor woven sarong business actors in Jepara, Pemalang, and Tegal regencies. A conducive business environment plays an important role in the growth and development of MSMEs (Endris and Kassegn, 2022). Indonesia is shifting the economic development approach towards the backbone of the domestic MSMEs economy (Maksum et al., 2020).

The policy of wearing batik clothes on certain days in all regencies in Central Java Province has been able to revive the batik industry which had slumped some time ago. However, the policy of wearing ATBM goyor woven sarongs has not yet been implemented in the four regencies and this is actually a lever that can revive the business.

Government policies on capital are currently limited to access and facilitation of People's Business Credit (KUR) (Haryanto et al., 2023). This program has a maximum limit on the amount of credit disbursed. Producers often fail to meet large capital needs, hence the opportunity for sudden demand cannot be met.

The results showed the relationship between the root of the problem and the causal factors. This is very important as a basis for subsequent follow-up in handling the relationships between the root of the problem and the causal factors. The resolution should be based on a priority scale, namely the market, then technology, capital, human resources, production, and government policy. The producers of ATBM goyor woven sarongs respond more comprehensively, hence, the follow-up should be formulated with a proper problem-solving strategy to minimize the risk of errors in formulating strategies.

CONCLUSION

In conclusion, ATBM-based goyor woven sarong business across the production centers in Central Java faces relatively severe challenges in business operations. Based on the results, six root problems and causal factors were obtained which made the business less developed. These include a very competitive market, less efficient technology, limited capital, low human resource capacity, relatively large production risks, and unfavorable government policies. Business actors must adapt to these conditions in the subsequent operations.

The formulation of a strategy in reviving and developing ATBM goyor woven sarong business requires Penta-Helix collaboration from elements of Academics, Business, Government, Banking Institutions, and the Media. The role of Penta-Helix in this case is adjusted to the core business, hence, these five institutions complement each other in providing input, facilitation, liaison, cooperation, publication, or direction of policy for developing business. This collaboration should run in harmony and no party must feel disadvantaged to avoid a negative impact on sustainability.

Author's Contributions

EWR: conceptualization, methodology, data curation, review original draft; HI: data curation, data analysis, editing and review; EW: project administration, supervision, original draf, and review; T: supervision, original draf, and review

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