The Influence of Green Supply Chain Management and Competitive Advantage on Sustainability Performance in SMEs Bandung, Indonesia

Abstract

Environmental issues encourage companies, especially food and beverage MSMEs in Bandung City, to integrate green supply chains to reduce waste. The implementation of green supply chain management not only supports environmental conservation but also increases economic benefits. Research shows that sustainability performance, which includes environmental, social, and economic aspects, is positively influenced by green supply chain management. However, there are differences in the results in previous studies, so further studies are needed to understand the relationship between supply chain management and sustainability performance in the MSME sector. This research explores how Green Supply Chain Management (GSCM) affect Sustainability performance, intervening in the role of competitive advantage within small and medium-sized food and beverage enterprises in the city of Bandung. A quantitative approach is undertaken for the study for the study, where were the data were collected from 100 owner of businesses within Bandung City using questionnaires. GSCM includes green purchasing, green manufacturing, and green distribution; therefore, these were analyzed along with competitive advantage indicator-cost efficiency, quality, delivery, and flexibility-and sustainable performance aspect-environmental, social, and economic fact. The result, analyzed using SEM-PLS, show that the GSCM practices are moderately implemented among SMEs, and the competitive advantage significantly positively mediates the relationship between GSCM and Sustainable Performance. The study underlined the crucial role of GSCM to enhance competitiveness and sustainability Performance, meanwhile indicating that the SMEs are in need of further improvements in energy efficiency and the use of recyclable packaging.

Keywords: Green Supply Chain Management, Competitive Advantage, Sustainability Performance, Smes

1 Introduction

Environmental issues such as resource decline, pollution, and global warming are prompting companies to take preventative measures. Companies, as one of the main causes, are facing pressure to review their production processes and supply chains [1]. The city of Bandung is one of the cities in West Java, Indonesia that has quite a lot of SMEs, especially businesses in the food and beverage sector. Based on official data from the Bandung city government, the waste produced can reach 1,796.51 tons per day consisting of 65In the face of increasing economic and environmental competition, business actors need to consider and implement the concept of environmentally friendly supply chains [2]. This is not only to preserve the environment but also to increase economic benefits for entrepreneurs. As time goes by, the increase in waste is increasingly a problem that needs to be worried and needs attention [3]. Environmental issues are also a topic of discussion for SMEs entrepreneurs, because people are increasingly aware of the importance of environmentally friendly products [4]. In this case, these companies indirectly play a role in producing environmental pollution through their production activities, which can have a negative impact on people's lives and other ecosystems [5]. Green Supply Chain Management involves all parties, from suppliers to consumers to create a better environment by reducing pollution and excessive use of natural resources [6]. Implementing renewable energy, low carbon emissions, and optimizing resource utilization can improve organizational performance which ultimately drives financial growth, especially for SMES that are starting to implement Supply Chain Management [7]. To achieve Sustainability Performance, companies need to manage resources, create innovative products, and implement strong leadership [8]. Sustainability Performance consists of environmental performance, social performance, and economic performance dimensions [9]. In the literature [10], [11] Sustainability Performance is positively impacted by Green Supply Chain Management. To compete in the global market, companies need mastery of technology, quality human resources, creativity, efficiency, superior products, management, and the ability to compete [12]. To become a competitive business, SMEs must focus on five main factors, namely cost efficiency, product quality, adaptability, delivery speed, and innovation [13]. Competitive advantage occurs when a company develops product or service innovations to meet the needs of stakeholders and maintain the company's presence in the market [14]. Results from previous research [15], [16], [17] Competitive Advantage is positively impacted by Green Supply Chain Management. Moreover, [18] Supply Chain Management has a positive effect on Sustainability Performance, and Competitive Advantage is able to mediate Green Supply Chain Management on Sustainability Performance in fisheries sub-sector businesses. However, there are differences in the results shown by previous studies. In the research [19], [20] Green Supply Chain Management has no effect on Sustainability Performance, nor on research [21] Sustainability Performance is not affected by Competitive Advantage. Therefore, further research is needed because of the difference in the results of previous research regarding the relationship between Supply Chain Management. (**?**).

2 LITERATUR RIVIEW

2.1 Green Supply Chain Management

Green Supply Chain Management as the incorporation of environmental aspects into logistics and supply chain activities to reduce carbon emissions, improve operational efficiency. [22]. In the research [23] Green supply chain management is an integration of traditional supply chains with environmentally friendly concepts in reducing the Company's waste. The essence of green supply chain management itself is the supply chain which refers to environmental principles that include environmentally friendly supply chain processes which are later expected to improve operational efficiency in a company. The GSCM concept aims to integrate innovation and sustainability in supply chain practices to balance the Company's performance with environmental issues, thereby supporting

sustainability and providing long-term benefits in the future [24], [25]. In the research of [[19] The dimension of Supply Chain Management can be identified in several types, namely green purchasing, i.e. the company's efforts to purchase materials from suppliers in an environmentally friendly way, green manufacturing which is an operational process that emphasizes resource sustainability and pollution reduction, and green distribution including green transportation and inventory. GSCM not only has a positive impact on the environment such as waste and pollution reduction, but also contributes to economic efficiency, company reputation, compliance with environmental regulations, and creates added value for a business [18]. The value generated includes reducing production waste, reducing production costs, reusing and recycling products, asset efficiency, and increasing customer satisfaction [16]. In addition, GSCM often faces obstacles such as high costs, lack of government support, and internal organizational resistance [26]. The GSCM strategy itself is still able to meet market demand that cares about environmental issues and answers global pressures related to ecological responsibility.

2.2 Sustainability Performance

Sustainability Performance refers to the asses SMEs of a company's ability to achieve long-term goals through the integration of economic, social, and environmental dimensions by ensuring stakeholder engagement, sustainable waste management, and maintaining the organization's financial stability. Sustainable performance focuses not only on profitability, but also on positive contributions to Society and the environment achieved through sustainable organizational learning and adaptation to social, economic, and environmental challenges [18]. Sustainability Performance includes three main aspects, namely environmental performance, social performance, and economic performance [27]. The same is also stated by [9], [28], [29], [30], [31] that the sustainability performance dimension consists of environmental performance, social performance, and economic performance. Furthermore, the definition of the Environmental Performance dimension is taken from the literature [18], Environmental performance refers to how a company manages its environmental impacts, such as carbon emissions, natural resource use, and efforts to reduce waste. The Environmental Performance dimension can be measured through indicators of the use of organic raw materials in production, energy reduction with natural light, and separation of waste by type [32]. Furthermore, social performance is defined as the effectiveness of the company in meeting and exceeding the expectations of the community due to concern for the natural environment in an effort to maintain the environment [33]. In the research [32], The social performance dimension can be measured through the health impact of the product for consumers and the fulfilment of complete information on the product. Furthermore, economic performance is defined as the measurement of various financial and operational aspects of a business entity to assess how effective the company is in managing its financial resources which include net profit, margin, cash flow, financial ratios, operational efficiency, and business strategy [34]. The economic performance dimension can be measured through indicators of achieving sales targets, productivity plans, and expected profits [32].

2.3 Competitive Advantage

Competitive Advantage is the ability of a company to create and offer value that sets it apart from competitors, so that it can provide higher value to customers compared to competitors. The concept of competitive advantage is a major topic in strategic management that focuses on the organization's ability to achieve added value for customers, thus giving it a bronze position compared to competitors [35]. This concept is divided into two main approaches, namely performance-based focusing on profitability, revenue, and operational efficiency. Meanwhile, the sourcing approach highlights the characteristics of low cost, product differentiation, and resource utilization [36]. The Competitive Excellence dimension refers to research [37] namely there are dimensions of price, quality, shipping, and flexibility. Price is defined as the sum of the value that customers exchange for the benefit

of owning or using a product or service. [38]. The price dimension can be measured through affordable price indicators and product benefit advantages [37]. Furthermore, the definition of quality is stated as a product that meets the expected standards and is in accordance with customer needs, including the accuracy of the product design for functional use and the company's ability to respond to customer needs [39]. The quality dimension can be measured through indicators of meeting consumer expectations, service satisfaction, and minimizing the number of defective goods [37]. Furthermore, Delivery is defined as the ability of a company to provide a product or service to a customer within the promised time. [40]. The delivery dimension can be measured through indicators of timeliness in fulfilling consumer needs and delays due to the production process [37]. Flexibility is defined as a company's ability to adapt to changes in demand or market conditions, including adjustments in volume, delivery times, and product specifications. [40]. The flexibility dimension can be measured through indicators of the company's ability to adjust product variations and adapt production processes according to consumer needs [37].

2.4 Hypothesis Development

On the results of the research [41] Green Supply Chain Management practices have proven to have a positive impact on the company's performance in terms of economic performance with cost efficiency, strengthening environmental performance through reducing resource use and emissions, and promoting social performance by ensuring the health and safety of the community that supports the company's sustainability. Thus, Green Supply Chain Management has a positive effect on Sustainability Performance. This explanation is based on the determination of the hypothesis as follows:

Hypothesis 1 (H1): Green Supply Chain Management has an Effect on Sustainability Performance in Food and Beverage SMEs in the City of Bandung.

In the research results [26] Green Supply Chain Management has a positive effect on Competitive Advantage. The statement is supported by [16] which found that there is a positive influence of Green Supply Chain Management on Competitive Advantage. Based on the results of the study, it is known that the better the Green Supply Chain Management, the higher the Competitive Advantage in a company. Thus, green Supply Chain Management is suspected to have a positive effect on competitive advantage. This explanation is based on the determination of the hypothesis as follows:

Hypothesis 2 (H2): Green Supply Chain Management Affects Competitive Advantage in Food and Beverage SMEs in the City of Bandung.

IResearch conducted by [18] found that Sustainability Performance is positively influenced by Competitive Advantage. The statement is supported by research [42], [43] which stated that there is a positive relationship between Competitive Advantage and Sustainability Performance. Thus, Competitive Advantage is suspected to have a positive effect on Sustainability Performance. This explanation is based on the determination of the hypothesis as follows:

Hypothesis 3 (H3): Competitive Advantage affects Sustainability Performance in Food and Beverage SMEs in the City of Bandung

In the research [18] stated that Green Supply Chain Management has a positive influence on Sustainability Performance mediated by competitive advantage. The statement is supported by [17] which states that Green Supply Chain Management has a positive influence on the Company's Performance mediated by Competitive Advantage in the Company. Thus, it can be assumed that the Green Supply Chain Management dimension has a positive effect on Sustainability Performance mediated by Competitive Advantage. This explanation is based on the determination of the hypothesis as follows:

Hypothesis 4 (H4): Competitive Advantage mediates the influence of Green Supply Chain Management on Sustainability Performance in Food and Beverage SMEs in the City of Bandung.

3 METHODE

Research Methods In this study, we used research with a quantitative approach, a primary data collection technique by distributing questionnaires to 100 SMEs business actors in the city of Bandung, Indonesia. The sampling technique used in this study is probability sampling with random sampling. The main criteria set are SMEs that run their businesses in the food and beverage business domiciled in the city of Bandung with the aim of analyzing the influence of green supply chain management on their sustainability performance. The analysis technique used is Partial Least Square using SmartPLS 3 software. The measurement of variables in this study used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = Strongly Agree).

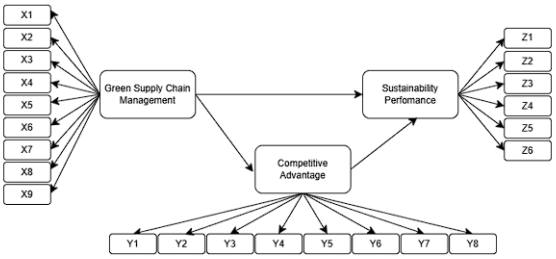

Fig. 1. SEM PLS models
Source: Researcher Conceptualisation.

4 RESULTS AND DISCUSSION

The data that has been collected by researchers as many as 100 respondents is then analyzed to identify several characteristics of the respondents, such as gender, age of business owners, type of business, and monthly income of SMES. Furthermore, the data will be tested using an outer model consisting of convergent validity, discriminant validity, Average Variance Extracted (AVE), composite reliability. After that, an inner model test was carried out in the form of testing the fit and path coefficient models.

4.1 Respondent Profile

Table 1. Respondents' Characteristics

Characteristic	Information	Frequency	Percentage
gender	Male	43	43%
	Female	57	57%
Age	17 - 24 years	20	20%
	25 - 34 years	30	30%
	35 - 44 years	33	33%
	45 - 54 years	11	11%
	55 - 64 years	6	6%
SMES type of business	Food	66	66%
	Beverage	34	34%
Income per Month	< Rp 25.000.000	10	10%
	Rp 25.000.000 - Rp 50.000.000	23	23%
	> Rp 50.000.000	67	67%

Source: Primary data (2024)

The classification of respondents based on gender, age, type of SMEs business, and monthly income of SMEs is analyzed in this study. Based on the table above, the results show that there are more female respondents (57%) than male respondents (43%). Regarding age, respondents with an age range of 35–44 years are the majority (33%). The type of SMEs business in this study is dominated by food businesses (66%). In addition, most of the respondents in this study reported a monthly income of more than 5 million (67%).

4.2 Measurement Model Evaluation (Outer Model)

According to [44], the Outer Model establishes a correlation relationship between the indicator and their latent variables that connect the variable to the corresponding indicator.

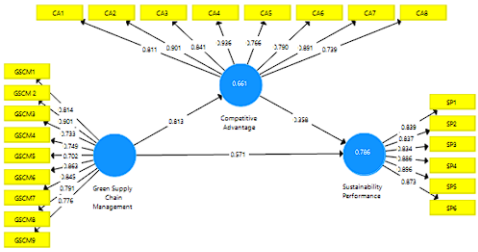

Fig 2. Outer Model Test Results
Source: PLS algorithm test results (2024)

4.2.1 Convergent Validity

Table 2. Outer Loading 100 Respondents

Variable	Indicators	Outer Loading	Result (Loading factor ≥ 0.6)
Green Supply Chain Management	GSCM 1	0.814	Valid
	GSCM 2	0.901	Valid
	GSCM 3	0,733	Valid
	GSCM 4	0,749	Valid
	GSCM 5	0,702	Valid
	GSCM 6	0,863	Valid
	GSCM 7	0,845	Valid
	GSCM 8	0,791	Valid
	GSCM 9	0,776	Valid
Competitive Advantage	CA 1	0,811	Valid
	CA 2	0,901	Valid
	CA 3	0,841	Valid
	CA 4	0,936	Valid
	CA 5	0,766	Valid
	CA 6	0,79	Valid
	CA 7	0,891	Valid
	CA 8	0,739	Valid
Sustainability Performance	SP 1	0,839	Valid
	SP 2	0,837	Valid
	SP 3	0,834	Valid
	SP 4	0,886	Valid
	SP 5	0,896	Valid
	SP 6	0,873	Valid

Source: PLS algorithm test results (2024)

The results of the convergent validity test on 100 respondents, shown in table 2, show that each variable indicator has an outer loading value of more than 0.70. This shows that all indicators are considered valid for use in subsequent research and analysis.

4.2.2 Discriminant Validity

Based on the results of the discriminant validity test on 100 respondents seen in table 3, each indicator variable showed a higher cross loading value compared to other variables that exceeded the value of 0.70. This shows that all indicators can be considered valid for use in subsequent research and analysis.

4.2.3 Average Variance Extracted (AVE), Composite Reliability, and Cronbach's Alpha

The results of the Average Variance Extraction (AVE) test conducted on 100 respondents, as shown in table 4, each indicator showed an AVE value above 0.5. This signifies that all indicators are valid. In addition, the composite reliability and Cronbach alpha values of ¿ 0.70 show that all variables have good reliability to be used in research.

4.3 Structural Model Evaluation (Inner Model)

The inner model test includes three main steps, namely R-Square testing, Q-Square testing, and Path Coefficient testing which includes the original sample value, T-Statistic, and P-Value. The R-square value is divided into three, namely 0.75, 0.50, 0.25 which indicates a strong, moderate, and weak model.

Table 3. Cross Loading 100 Respondents

	Green Supply Chain Management	Competitive Advantage	Sustainability Performance
GSCM1	0,901	0,639	0,648
GSCM2	0,814	0,729	0,777
GSCM3	0,733	0,738	0,619
GSCM4	0,749	0,641	0,759
GSCM5	0,702	0,377	0,502
GSCM6	0,863	0,739	0,749
GSCM7	0,845	0,638	0,692
GSCM8	0,791	0,571	0,754
GSCM9	0,776	0,684	0,637
CA1	0,657	0,811	0,645
CA2	0,701	0,901	0,719
CA3	0,656	0,841	0,675
CA4	0,696	0,936	0,718
CA5	0,536	0,766	0,603
CA6	0,609	0,790	0,653
CA7	0,643	0,891	0,690
CA8	0,863	0,739	0,749
SP1	0,749	0,721	0,839
SP2	0,662	0,756	0,837
SP3	0,744	0,632	0,834
SP4	0,731	0,696	0,886
SP5	0,757	0,699	0,896
SP6	0,802	0,739	0,873

Source: PLS algorithm test results (2024)
*Notes: Green Supply Chain Management (GSCM), Competitive Advantage (CA), Sustainability Performance (SP)

Table 4. AVE, Composite Reliability, and Cronbach's Alpha 100 Respondents

Variable	AVE	Composite Reliability	Cronbach's Alpha
Green Supply Chain Management	0,700	0,941	0,929
Competitive Advantage	0,639	0,949	0,938
Sustainability Performance	0,742	0,945	0,930

Source: PLS algorithm test results (2024)

4.3.1 R-Square

Table 5. R-Square Testing Result

	R Square	R Square Adjusted
Competitive Advantage	0,661	0,657
Sustainability Performance	0,786	0,781

Source: PLS Boostrapping results (2024)

The results of the determination coefficient (R-Square) test conducted on 100 respondents, as shown in table 5, it is known that each variable has an R2 value for Competitive Advantage of 0.661 (66.1%) in the moderate category and Sustainability Performance of 0.786 (78.6%) in the Excellent category.

4.3.2 Q-Square

The results of the determination coefficient (Q-Square) test conducted on 100 respondents, as shown in table 6, stated that the research model used showed Goodness-of-Fit which was included in the good category. This means that the independent latent variable in this model is able to predict the dependent latent variable with an accuracy level for the competitive advantage variable of 0.444 (44.4%) and the sustainability variable of 0.573 (57.3%)

Table 6. Q-Square Testing Result

	SSO	SSE	Q² (=1-SSE/SSO)
Competitive Advantage	800.000	444.924	0.444
Green Supply Chain Management	900.000	900.000	
Sustainability Performance	600.000	256.339	0.573

Source: PLS Boostrapping results (2024)

4.3.3 Path Coefficient

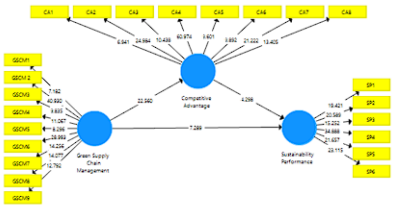

Fig 3. Path Coefficient Result
Source: PLS Boostrapping results (2024)

Table 7. Hypothesis Testing and Path Coefficient Result

	Original Sample (O)	Sample Mean (M)	T Statistics (|O/STDEV|)	P-Values	Information
GSCM -> SP	0,571	0,580	7,193	**0,000**	**Supported**
GSCM -> CA	0,813	0,821	22,832	**0,000**	**Supported**
CA -> SP	0,358	0,351	4,215	**0,000**	**Supported**
GSCM -> CA -> SP	0,291	0,288	4,036	**0,000**	**Supported**

4.4 DISCUSSION

Hypothesis testing in this study was carried out using path coefficient, t-value, and p-value values. According to [45], The hypothesis was tested at a confidence level of 95% (= 0.005) with a t-statistic of 1.96. The null hypothesis (H0) will be rejected, and the alternative hypothesis (H1) is accepted if the t-statistic ¿ 1.96 and the P-Values ¡ 0.005, otherwise the null hypothesis (H0) will be accepted, and the alternative hypothesis (H1) is rejected if the t-statistic ¡ 1.96 and the P-Values ¿ 0.005. The significance value that shows the strength of the relationship between the variables in the model can be seen in the number found on the arrow that connects each variable pair.

4.4.1 The Effect of Green Supply Chain Management (GSCM) on the Sustainability Performance (SP) of Food and Beverage SMEs in the City of Bandung

Based on hypothesis testing using the boostrapping method using SmartPLS software, an original sample value (O) of 0.571 was obtained. This shows that the influence of GSCM on SP SMEs in the city of Bandung is positive, meaning that the better the implementation of GSCM, the SP in the city of Bandung will increase. This influence was proven to be significant with a statistical T-value of 7.193 which is much larger than the t-table (7.193 ¿ 1.96), as well as a P-value of 0 which is smaller than the significance level of 0.005. Therefore, the H1 hypothesis is accepted, which means that GSCM has a significant influence on SP on Food and Beverage SMEs in the city of Bandung.

4.4.2 The Effect of Green Supply Chain Management (GSCM) on the Competitive Advantage (CA) of Food and Beverage SMEs in the City of Bandung.

Based on hypothesis testing using the boostrapping method using SmartPLS software, the original sample value (O) of 0.813 was obtained. This shows that the influence of GSCM on SP SMEs in the city of Bandung is positive, meaning that the better the implementation of GSCM, the CA in the city of Bandung will increase. This effect was proven to be significant with a statistical T-value of 22.832 which is much larger than the t-table (22.832 ¿ 1.96), and a P-value of 0 which is smaller than the significance level of 0.005. Therefore, the H2 hypothesis is accepted, which means that GSCM has a significant influence on CA in Food and Beverage SMEs in the city of Bandung.

4.4.3 The Effect of Competitive Advantage (CA) on the Sustainability Performance (SP) of Food and Beverage SMEs in Greater Bandung

Based on hypothesis testing using the boostrapping method using SmartPLS software, an original sample value (O) of 0.351 was obtained. This shows that the influence of GSCM on SP SMEs in the city of Bandung is positive, meaning that the better the implementation of GSCM, the CA in the city of Bandung will increase. This influence was proven to be significant with a statistical T-value of 4.215 which is much larger than the t-table (4.215 ¿ 1.96), as well as a P-value of 0 which is smaller than the significance level of 0.005. Therefore, the H3 hypothesis is accepted, which means that GSCM has a significant influence on CA in Food and Beverage SMEs in the city of Bandung.

4.4.4 The Effect of Green Supply Chain Management (GSCM) on Sustainability Performance (SP) through the Competitive Advantage (CA) of food and beverage SMEs in the city of Bandung.

Based on hypothesis testing using the boostrapping method using SmartPLS software, an original sample value (O) of 0.291 was obtained. This shows that the influence of GSCM on SP through CA UKM in the city of Bandung is positive. This influence was proven to be significant with a statistical T-value of 4.036 which is much larger than the t-table (4.036 ¿ 1.96), and a P-value of 0 which is smaller than the significance level of 0.005. Therefore, the H4 hypothesis is accepted, which means that GSCM has a significant influence on SP through CA on Food and Beverage SMEs in the city of Bandung.

5 CONCLUSION

Research Methods In this study, we used research with a quantitative approach, a primary data collection technique by distributing questionnaires to 100 SMEs business actors in the city of Bandung, Indonesia. The sampling technique used in this study is probability sampling with random sampling. The main criteria set are SMEs that run their businesses in the food and beverage business domiciled in the city of Bandung with the aim of analyzing the influence of green supply chain management on their sustainability performance. The analysis technique used is Partial Least Square using SmartPLS 3 software. The measurement of variables in this study used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = Strongly Agree).

5.1 THEORETICAL IMPLICATIONS

This study strengthens the literature on Green Supply Chain Management (GSCM) by showing its positive influence on competitive advantage and sustainability performance in SMES in the food and

beverage sector in the city of Bandung, adding empirical evidence on the mediating role of competitive advantage in the relationship between variable independent and dependent for future research that explores the link between Green Supply Chain Management (GSCM), Competitive Advantage (CA), and Sustainability Performance (SP).

5.2 PRACTICAL IMPLICATIONS

SMES in the city of Bandung can improve their Sustainability Performance and Competitive Advantage through the implementation of GSCM practices such as green purchasing, green manufacturing, and green distribution, which not only reduces environmental impact but also improves cost efficiency and customer satisfaction

5.3 LIMITATIONS AND FURTHER RESEARCH

This research has geographical limitations because it only covers SMEs in the city of Bandung, with a limited sample of 100 respondents who may not represent the entire food and beverage sector. For further research, it is recommended to expand the population and sample to be more representative and use a case study approach to explore GSCM in SMEs, including external factors such as government regulations and technological support.

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