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Role of green intellectual capital on business sustainability

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Abstract
This study aims to test and analyze the influence of green intellectual capital and company size on business sustainability. The selection of samples was conducted by purposive sampling under the objectives of this study, namely mining companies registered in IDX from 2017-2020. The findings of this study show that green human capital and green structural capital have a significant effect on business sustainability, while green relational capital does not affect business sustainability. In addition, company size has a positive impact on business sustainability. By examining the factors that affect sustainability, this study paves the way for further investigation of this topic with a set of micro and macro variables. This research provides insight into the disclosure of green intellectual capital to business sustainability. The GIC research in Indonesia has been claimed that it has not been widely researched. Accordingly, this research seems to be preliminary. This research also considers the current context of the era of agility and hybrid cloud and the increasing competition in the advanced industry. The company is likely to try to find a strategy to maintain the sustainability of its business.

Keywords: Green human capital; company size; business sustainability

Introduction

In the current "Agility and Hybrid Cloud Era," business sustainability is an important aspect to pay attention to, as it can provide information about the increasing or decreasing company performance (Syahbana, 2020). The basic principle of business sustainability has three dimensions, namely, social, economic, and environmental (Elkington, 2017). These three pillars support each other and refer to the company's ability to maintain its business sustainability (Roca-Puig, 2019). To keep the company's sustainability, companies must compete with similar companies, especially during the current free trade period. The rapid competition in the industry today turns out to cause adverse effects. The high activity of the company, the desire and interest to gain profits, and efforts to develop its broader business, trigger environmental conflicts in Indonesia. The results of the company's activities cause pollution and resource depletion (Shaw et al., 2016). Research conducted by Gong et al. (2018) suggests that about 60% of ecosystems worldwide have been damaged, and a lot of environmental damage has occurred. Development due to industry in the world results in environmental damage due to using natural resources (Booi Chen & Teck Chai, 2010). Therefore, companies must seek new solutions and innovations to minimize the impact of human activities on the environment. To overcome this, companies must create strategies that lead to going green. These policies are outlined in financial reporting, especially sustainability reporting; this is a strategy companies can use to maintain their companies. This information is considered a corporate responsibility to stakeholders and other parties (Manisa & Defung, 2018).

For environmental awareness, it is necessary to develop a strategy that is no longer optional for all organizations (Ray & Grannis, 2015). In this case, research is needed towards going green and utilizing

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green intellectual capital. Therefore, recent research on intellectual capital has become an interesting issue and a concern, especially about improving performance to maintain business (Stewart & Stephanie, 1994). Companies that can manage green intellectual capital can compete better than other companies related to products and services that are more environmentally friendly (Claver-Cortés et al., 2007); this is one of the company's strategies to compete in the current free trade conditions. The important role of green intellectual capital, one of the company's strategies to maintain business sustainability, is still often ignored by companies (Yong et al., 2019). Mining companies are companies whose activities utilize natural resources, so the impact on the environment is very high. However, in reality, not all mining companies in Indonesia publish disclosures on processing sustainability reports and concerns for the environment.

Disclosure of intangible assets related to green intellectual capital (GIC) is a catalyst for developing the resources that make the company sustainable. Disclosure of green intellectual capital and reporting on the company's business sustainability in Indonesia has not become a necessity. The quality and quantity of corporate reporting disclosures in Indonesia are very diverse. Previous research related to the impact of intellectual capital management on sustainable competitive advantage (SCA) through business model innovation conducted by Khan et al. (2019) shows that intelligent capital management (ICM) and business model innovation (BMI) have a positive influence on the company's sustainable competitive advantage (SCA). Intellectual capital management (ICM) enables companies to manage the company resources effectively and efficiently to ensure product development, company growth, and market proliferation. In addition, Yusoff et al. (2019), which examined the relationship between green intellectual capital and business sustainability, found that awareness in managing intellectual capital in SME manufacturing companies in Malaysia to implement green strategies can strengthen performance and affect business sustainability. Sawarjuwono & Kadir (2003) researched Indonesia on the influence of the green intellectual capital index and sustainability disclosure on the company's financial and non-financial performance with transparency. The results show that every activity carried out by the company is ensured to have an impact that interested parties can assess. With the initiative to manage intellectual capital owned by paying attention to the environment, it can improve non-financial performance by being set from all activities carried out or products or services or business processes carried out that can win awards in their fields or be recognized by several related institutions. In addition, research by Josephine et al. (2020) on those who examine the relationship of green intellectual capital to business sustainability shows that green human capital and green relational capital influence business sustainability, while green structural capital does not affect business sustainability. Good employee management of stakeholders is essential for the company; this can be the primary source of strength for the company to win the competition in the business world by not neglecting the welfare of the environment where the company operates.

Observing the results of previous research, which is still considered low in the number regarding green intellectual capital in companies in Indonesia and the conditions of the revolutionary era and increasingly advanced industrial competition today, can be regarded as an effort to find a strategy to maintain business sustainability. Therefore, researchers are interested in re-analyze the influence of green intellectual capital on business sustainability in mining companies in Indonesia by adding independent variables of company size. The size of the company is used as an indicator that supports the sustainability of the company because, at this time, the company's scale is the top level of total assets that can show the company's condition. Larger companies will have an advantage in the sources of funds obtained to finance their investment in getting profits so that the level of maintaining their business will be greater. The phenomenon in the field shows that companies that have a large size, especially mining companies, have an impact on the environment. To overcome the results, it is necessary to have the latest innovations that lead to going green so that the adverse effects of mining companies can be avoided or minimized and the company can maintain business sustainability. The green intellectual capital indicator can be one of the factors that support the company's sustainability and competitiveness. The activity carried out by the company is ensured to have an impact that interested parties can assess. With the initiative to manage intellectual capital owned by paying attention to the environment, it can improve non-financial performance by setting all activities that have been carried out or products or services or business processes carried out that can win awards in their fields or be recognized by several related institutions to ensure the level of business sustainability. The company's strategy through the disclosure of green human capital, green relational capital, and green structural capital can increase trust and provide positive signals to stakeholders so that stakeholders do not need to hesitate to take action against the company because the company is responsible for the environment through the disclosure of green intellectual capital.

This research contributes in two ways. First, this research can support signaling theory and stakeholder theory. The Company will strive to provide positive information to stakeholders, including investors, through disclosures in the Company's annual reporting (Whiting & Miller, 2008). To maintain

business sustainability, the Company has to have resources, exceedingly competent human resources, and high innovation towards the environment, which becomes a competitive advantage over similar companies. Second, this research can potentially provide input and become a consideration in determining policies related to maintaining business sustainability, one of which is the disclosure of green intellectual capital owned by the Company.

Literature Review

The Signaling Theory

Spence (1973) first introduced the signaling theory in his research on job market signaling. The signaling approach indicates that organizations will try to provide positive signals or information to potential investors through disclosures in the company's annual report (Whiting & Miller, 2008). Company executives with better information about their company will be encouraged to convey this information to potential investors. The company can increase its value through its reporting by sending signals through voluntary reporting contained in the company's annual report (Leland & Pyle, 1977). Information regarding financial and non-financial disclosed in sustainable reporting carried out by the company has to attract investors and get a positive response because the response is a form of maintaining competitive advantage and sustainability of the company.

The signal theory emphasizes the importance of the information provided by the company to stakeholders to make a decision that presents the quality of financial statements (Prasad et al., 2000). Signal theory deals with business sustainability. To maintain business sustainability, companies must have innovations to attract stakeholders to increase trust. One way is to disclose information that leads to green intellectual capital. In addition, large-scale companies generally tend to provide information as a signal of excellence from the company due to the demand to provide quality financial reporting. If the company wants to increase investor confidence, then the company must voluntarily disclose a transparent and open (Elkelish et al., 2015).

Stakeholder Theory

Fontaine et al. (2006) define stakeholder theory as the management of organizations that are expected to carry out activities considered necessary by stakeholders and report those activities to stakeholders. This theory states that organizations will voluntarily disclose information about their environmental, social, and intellectual performance, over and above their mandatory requests, to meet real expectations or be recognized by stakeholders. The primary purpose of stakeholder theory is to assist corporate managers in increasing the value of their activities' impact and minimizing losses for stakeholders.

Value creation in this context is to utilize all the company's potential, both employees (human capital), physical assets (physical capital), and structural capital. Good management of all this potential will create added value for the company, which can then encourage the company's financial performance for the benefit of stakeholders (Watts & Zimmerman, 1983). In this context, stakeholders are interested in influencing management to utilize all the potential possessed by the organization. Because only with good and complete control of all this potential will the organization be able to create value added to encourage the company's financial performance, which is the orientation of stakeholders in intervening in management so that the level of sustainability of the company's business is more guaranteed.

Green Human Capital and Business Sustainability

The era of revolution and increasingly advanced industrial competition turned out to have a negative impact due to the activities carried out by the company. The negative effect is in the form of environmental conflict. Many companies make strategies to stay in business to deal with these impacts. Therefore, human capital's role in going green is vital to support the company's sustainability. Human capital owned by the company reflects the ability of human resources for innovation (Sawarjuwono & Kadir, 2003). Competitive advantage can be maintained based on the wealth of human capital. The signaling theory states that the information provided by the company is an announcement that can provide a signal for investors in making decisions. If the report gives a positive value, the company can maintain its ongoing concern because most companies in carrying out their activities need external funding. To obtain this funding, the company innovates to attract investors, so adequate and competent human capital is required. Companies with a wealth of human capital tend to provide information as a signal of the superiority of their company. This information can be expressed as measurable sustainability reports regarding the company's daily operational activities' economic, environmental, and social impacts.

In today's agility and hybrid cloud era, an organization needs knowledgeable human resources to

make decisions and solve problems. Research by Yong et al. (2020) and Yusoff et al. (2019) found evidence that green human capital harms business sustainability in Small and Medium Enterprises in Malaysia. Incompetent employees and lack of innovation hurt the environment. Based on the description above, the hypothesis in this study was as follows:
H1: Green human capital hurts business sustainability.

Green structural capital and business sustainability

Structural capital is an organizational component described as corporate infrastructure and administrative processes utilized to obtain products and services. Adequate structural capital will have an environment that encourages employees to create innovations. Yong et al. (2020), especially at this time, state that companies try to organize organizational components to maintain their business. In addition, organizations have to improve environmental structures to address climate challenges. This factor enables the organization to produce a comfortable environment and employees with good welfare, generating profits and company sustainability.

Several studies reveal a positive relationship between the impacts of green structural capital on business sustainability. Chang & Chen (2012), Susandya et al. (2019), and Yusoff et al. (2019) found evidence that supports the positive effect of green structural capital on business sustainability. Structural capital is believed to be essential to support organizational sustainability, especially when dealing with new market challenges. Based on the consideration of signaling theory, it is stated that green structural capital is a strategic resource that can increase investor confidence in the company to invest the company; this helps to achieve business sustainability. Based on the description above, the hypothesis in this study is as follows:
H2: Green structural capital has positive effects on business sustainability.

Green relational capital and business sustainability

The signaling theory states that green intellectual capital can be a strategy for attracting investors' attention by providing information (signals) that can be sent to signal recipients through the company's annual reporting (Whiting & Miller, 2008). The relation with voluntary disclosure encourages companies to gain a competitive advantage by reporting the company's intangible assets that do not have physical substance but can become a company's competitive advantage (Bontis et al., 2000). This study utilizes the disclosure of green relational capital since it is possible for the exchange of information between partners of an organization to obtain important information from stakeholders. According to Morgan & Hunt (1994), the main feature of relationships in social interaction is trust. Relationships and networks of all company partners and external parties are essential elements to ensure the continuity of the company's activities. Paying attention to the environment is one way to build good relationships with company partners to improve the company's image or reputation.
Research from Josephine et al. (2020) reveals that green relational capital positively affects business sustainability. A company that can run a business by paying attention to the community's environmental conditions will signal to the stakeholders simply. Close cooperation between companies, suppliers, and consumers will improve the achievement of business goals that do not damage the environment. Based on this description, the hypotheses in this study are as follows:
H3: Green relational capital has positive effects on business sustainability.

Company size and business sustainability

Company size is one indicator to identify the large or small scale of the company. The size of the company can be seen from the total assets owned. The larger the scale of the company, usually it will have its strength in dealing with business problems and the company's ability to overcome corporate competition and survive in the face of today's free trade competition because it has a better organizational structure and more developed information. In addition, companies can face higher pressure to disclose social activities to wider stakeholders due to increased public visibility. Large companies will be more obedient in implementing regulations because these companies have more priority in supervising activities in the capital market than smaller companies (Soelistyoningrum, 2011). To deal with these pressures, companies tend to disclose information on social, economic, and environmental issues as outlined in sustainable reporting. If the disclosure through the sustainability report gets a positive response, the company will be better able to maintain business sustainability. Based on this description, the hypotheses in this study are as follows:
H4: Company size has a positive effect on business sustainability.

Research Method

The approach in this research was a quantitative approach with a positivism paradigm. This study aimed to identify the effect of green intellectual capital and company size on business sustainability. The data used was secondary data obtained by documentation techniques on the related company's financial reporting. The data were taken from the financial reporting of mining companies listed on the Indonesia Stock Exchange in 2017-2020 through IDX's official website, www.IDX.co.id. The mining sector was chosen as the object of research because the utilization of the mining sector for development continues to be carried out. But the impact is quite significant on the environmental damage seen today. In addition, the exploration of mining materials has also failed to contribute significantly to the community's welfare. The period 2017-2020 was chosen because this study wanted to see the development of the disclosure rate of business sustainability reporting from year to year and, in those years, conducted a large-scale exploration of copper and gold that contributed significant income to the company, however, society, in general, has not felt the results of its natural wealth. The populations in this study were mining companies listed on the Indonesia Stock Exchange (IDX), and sampling methods were used in purposive sampling, as seen in Table 1.

Table 1. Sample Selection Procedure

Criteria	Number
The company is a registered mining company and consistently listed on the IDX for the period 2017-2020	47
The company does not have an annual report or reporting information sustainability in the research period	(3)
Total sample companies	44
Observation years	4
Total samples	176

This study implemented the independent variable Green Intellectual Capital (GIC), which combined environmental concepts into intellectual capital related to ecological issues. Companies could express awareness of the environment to improve company performance (Firmansyah, 2017). The intelligent green classification consists of green human capital, green structural capital, and green relationship capital (Chen, 1992). The independent variable was measured based on research conducted by (Chang & Chen, 2012) by giving a score of 1 if one item was disclosed and 0 if it was not revealed. Suwito & Herawati (2005) encourage that the size of the company is a scale where the size of the company can be classified as measured by the natural logarithm of the company's total assets. The dependent variable was based on sustainability disclosures from the Global Reporting Initiative standards, namely disclosures made by companies related to economic, environmental, and social aspects; it represented the company's performance both financially and non-financially (www.globalreporting.org). The sustainability disclosure variable was measured through the disclosure business sustainability index with the GRIG4 index consisting of 91 items by giving a score of 1 if one thing was disclosed and 0 if it was not revealed. Data analysis to conduct empirical tests was carried out in several ways. Descriptive statistics projected the sample company data profile, including the average or mean value, minimum value, maximum value, and standard deviation (Ghozali, 2016). Data analysis in this study used multiple linear regression with the following equation 1. In where Y is the Business Sustainability variable, α is Constanta, β is a variable coefficient, GHC is Green Human Capital, GRC is Green Relational Capital, GSC is Green Structural Capital, CZ is Company Size, and e is an error.

$$Y = \alpha + \beta_1 GHC + \beta_2 GRC + \beta_3 GSC + \beta_4 CZ + e \quad (1)$$

Result and Discussion

Based on the data in Table 2, the average value of the dependent variable of business sustainability was 0.32 or 32% and the maximum value was 0.52 or 52%, it can be concluded that some of the companies in the samples above made voluntary disclosures by utilizing all their potential of the company, from the employees (human capital), physical assets (physical capital), and structural capital. The average value of green human capital was 23%, which means that 23% reflected the ability of management and employees to have knowledge about the company's innovation activities towards being environmentally friendly. Meanwhile, green structural capital had an average of 16%, meaning that 16% of the company's management implementation was supported by an adequate management system. In addition, the average

green relational capital of 9% means that 9% was supported by relationships and networks from the entire company. Company size had an average of 32%, meaning that the size of the company affected the disclosures reported by the company.

Classic Assumption Test

Normality Test

The method used to test normality using Kolmogrogrov non-parametric analysis- Kolmogorov Smirnov Z (1- Sample K-S). The results of the statistical one test for the Kolmogorov-Smirnov sample showed the Sig. with a value of 0.200, meaning that the value was more significant than 0.05, so it was concluded that the residual value was typically distributed or met the requirements of the normality test.

Table 2. Descriptive Statistics Test

Research Variables	N	Minimum	Maximum	Mean	Std. Deviation
SB	176	0.16	0.52	0.32	0.092
GHC	176	0.01	0.34	0.23	0.132
GSC	176	0.01	0.24	0.16	0.100
GRC	176	-1.91	1.69	0.09	0.043
CZ	176	0.16	0.52	0.32	0.094

Table 3. Multicollinearity, Heteroscedasticity, and Autocorrelation Test

Model	Tolerance	VIF	T	Sign	Std. Error of the Estimate	Durbin Watson
GHC	0.900	1.000	1.066	0.245	0.08915	1.995
GSC	0.986	1.000	1.076	0.130		
GRC	0.995	1.005	1.089	0.282		
CZ	0.769	1.300	1.524	0.135		

Multicollinearity, Heteroscedasticity and Autocorrelation Test

Based on Table 3, the VIF value for all independent variables was not more than 10, and the tolerance value for all variables was less than 1. Based on these results, it was concluded that all independent variables had no symptoms of multicollinearity. Moreover, it could be seen that GHC, GSC, GRC, and CZ showed more than 0.05, which means that the independent variables did not occur heteroscedasticity. Referring to the results of the autocorrelation test above, it was known that the number of observations (n) was 176, with 4 independent variables; in the Durbin Watson table, it could be seen that the value of dL = 1.4928, dU = 1.5776, and the result of dW based on SPSS processing was 1.995 so 4-dU = 2.4224. The data were said to be free from autocorrelation if dL < dW < 4-dU, from the results 1.4928 < 1.995 < 2.4224, so there was no autocorrelation.

The influence of Green Intellectual Capital (GHC) on Business Sustainability

The hypothesis test results suggested that green intellectual capital has a positive effect on business sustainability, as evidenced in Table 4. the statistical test results formulated above, that the significance value was 0.044 < 0.05. The GHC variable in this study was proxied using value-added, which indicated a discrepancy between the results and the hypothesis. Companies, especially mining companies, tend to disclose voluntary disclosures by utilizing green human capital and understanding the important role of human capital in the company. The importance of green human capital was explained in the RBV theory; to achieve sustainability and competitive advantage, companies mainly utilize their human resources. The company has invested in environmental protection for its employees to maintain the sustainability of its current business. Company management can encourage employees to work while preserving the environment. This was supported by the competence and knowledge of innovations that lead to environmental friendliness owned by management and employees.

The companies have developed innovations toward going green by utilizing their qualified and skilled employees. In this case, the companies showed that they have, on average, competent employees with environmental knowledge and experience. The companies have imparted environmental knowledge through adequate training. The results of this study support the signaling theory, which states that the

information provided by the company is an announcement that can signal investors in making decisions. If the report gives a positive value, then the company will be able to maintain a going concern by one way of getting investors' trust to invest their capital in the company. Therefore, green human capital significantly contributes to a company's sustainability (Felin et al., 2012).

This finding was also supported by the research of Yong et al. (2020), which pinpoints that GHC has a positive relationship with business sustainability. Employees in the company contribute to reducing the company activities that hurt the environment. In this case, employees' skills that lead to going green and support from active employees to overcome the adverse effects of environmental damage are needed. In addition, research by Yong et al. (2020) shows that skills, competencies, and management support of Malaysian manufacturing organizations are very much required so that employees are committed to gaining competitiveness and impacting company performance.

Table 4. Summary of Hypotheses Testing Results

Hypotheses	Sig.	Coefficient	Note
H1: Green human capital has a negative effect on business sustainability	0.044	Positive	Not supported
H2: Green structural capital has a positive effect on business sustainability	0.023	Positive	Supported
H3: Green relational capital has a positive effect on business sustainability	0.083	Negative	Not supported
H4: Company size has a positive effect on business sustainability	0.025	Positive	Supported

The Influence of Green Structural Capital (GSC) on Business Sustainability

The results of the hypothesis test indicated the suitability between the results and the hypotheses that have been formulated previously. The regression test results in table 4 suggested that the idea was accepted; this can be proven by the effects of statistical tests, which showed that the significance value was 0.023 < 0.05. So it could be said that GSC positively relates to business sustainability. Mining companies recognize the binding effect of green structural capital on business sustainability. Companies emphasize routine organizational processes and management that lead to the environment by utilizing the employees they have. The company's internal structure also supports this by forming a committee that aims to discuss environmental issues that may arise from the company. Competitive and sustainable business advantages can be achieved with structural capital to help improve corporate image, new market development, and productivity (Yusliza et al., 2020).

Utilization of structural capital to maintain business continuity is essential to be carried out or implemented in the company. However, the support factor from top management is also necessary so that the objectives can be achieved. Structural capital, which includes aspects such as the role of innovation and intellectual property rights, supports the routine processes and management within the company. Chen (1992) revealed that the higher the disclosure of structural capital, the more competitive the company would be. The results of this study were relevant to signaling theory which states that organizations need to provide relevant information to interested parties to provide a positive signal. The more relevant the information provided, the more it will affect the public and public interest in the company. This information can be included in a sustainability report. The sustainability report presents an assessment and model of corporate governance and demonstrates the relationship between its strategy and its commitment to a sustainable global economy.

The results of this study supported the research of Yong et al. (2020), which underlines that GSC has a positive relationship with business sustainability. This means that structural capital is applied to improvement, which means that within the organization, it is often necessary to achieve sustainability. Companies that can disclose information by utilizing intellectual capital, especially their structural capital, will get a positive response from the public.

The Influence of Green Relational Capital on Business Sustainability.

The study's value-added measurement results underlined a discrepancy between the results and the formulated hypothesis. The regression test results in table 4 indicated that the idea was rejected; this could be proven from the results of the statistical test developed above, where the significance value was 0.803 > 0.05. Therefore, green relational capital had a negative relationship with business sustainability.

This study displayed that the company and its stakeholders had not been supported by relationships with customers, suppliers, or external parties.

The company did not seem to prioritize relational capital with external parties to maintain the company due to unfavorable conditions. The company has not appropriately utilized the company's relationships and networks to support the company's sustainability. The company emphasizes or takes advantage of the company's internal improvement rather than external. From this fact, it is necessary to motivate companies to improve business sustainability practices by paying attention to the element of green relational capital that involves a willingness to share practical ideas and the benefits when implementing these practices. Malik et al. (2020) emphasize that environmentalism and sustainability should concern organizations.

The Influence of Company Size on Business Sustainability.

Based on the hypothesis test results in table 4, it was shown that company size had a positive relationship with business sustainability, which means that the hypothesis was accepted. This study revealed that mining companies are large-scale and better able to maintain their business than small-scale companies. Large-scale companies have more reserves to sustain their business, one of which is from outside funding, compared to small-scale companies. In addition, the company has financial, organizational, and human resources that have adequate expertise that allows the ability to collect, analyze, and report data according to the requests of interested parties to support the company's business sustainability. To obtain funding from outside parties, companies must compete to get a positive response from investors. Therefore, the company would look for a strategy to maintain the sustainability of its business so that the community can recognize it; this can be stated through a sustainability report. This study supports the signaling theory, where large-scale companies generally provide information as a signal of superiority because of their quality financial reporting.

Conclusion, Suggestions and Limitations

In the current era of globalization and pandemic, organizations are trying to find innovations that lead to going green to achieve business sustainability. In addition, this study found evidence that green human capital affected business sustainability. This showed that companies voluntarily disclosed the concept of green human capital. The company has invested in environmental protection in the form of training. Green human capital is significant in achieving future corporate sustainability. In addition, green structural capital impacts business sustainability, but green relational capital does not affect it. This research suggests that a collaborative approach did not support the relationship between companies and stakeholders. Company size has a positive relationship with business sustainability, meaning that large-scale companies can better maintain their business than small-scale ones.

The limitation of this study was that it used secondary data sources and measurements on green intellectual capital and the use of value-added proxies, so the data did not represent the company's actual state. The selected sample was still limited so that further research can expand its scope that is not limited to the mining company sector but also other sectors. In addition, further research is recommended to use different measurements, whereas the data used should be the primary data from questionnaires.

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