

The Mediating Effect of Eco-Innovation on the Influence of Firm's Capability and Market Pressure to Firm Performance

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This study aimed to determine the effect of internal and external factors on firm performance through eco-innovation. This research is a quantitative descriptive study with associative research methods and explanatory research. Data collected through a survey by questionnaires. There are 113 companies at PT. Surabaya Industrial Estate Rungkut area was used as a sample. Data analysis in this study uses Structural Equation Modeling (SEM) with the Partial Least Square approach using the WarpPLS application. The results show that eco-innovation mediates the influence of a firm's capability and market pressure on firm performance.

Key words: *Eco-innovation, firm's capability, market pressure, firm performance.*

Introduction

Eco-innovation is an innovation that focuses on reducing the impact on environmental damage or pollution. Eco-innovation does not include only product processes, but also marketing processes, organisational methods, and social and institutional structures that have a positive impact on the firm's sustainable development process (OECD, 2009). In general, the application of eco-innovation is to replace the firm's products, processes, and services with more harmonised variants to achieve something better in terms of environmental preservation (Seebode et al., 2012). Firms that implement eco-innovations are expected to participate in environmental preservation. CO₂ waste produced by households and firms keeps increasing every year (Statistik Lingkungan Hidup Indonesia, 2016). Therefore, implementing eco-innovation in business management is very important to achieve the main objectives of sustainability (social, economic and environmental) (Korhonen, 2001).

Eco-innovation is a management effort to create new products or processes with environmental aspects as the primary consideration of the firm in the production process (Bossle et al., 2016; Chen and Chang, 2013; Murphy and Poist, 2003). The efforts to create new products or processes in the production process are done with environmental considerations on the firm's management practices. This will have an impact on the decline in the use of production raw materials and the use of energy in the production process (Bossle et al., 2016; Loucanova et al., 2015). The decrease in the use of raw materials and energy in the production process will have an impact on the decline of the firm's operating expenses (Bossle et al., 2016; Loucanova et al., 2015).

Research conducted by Hart (1995), Bossle et al. (2016) and Loucanova et al. (2015) stated that the eco-innovation strategy could potentially reduce pollution caused by the production process so that it can reduce the firm's obligations and compliance costs for pollution. Also, the benefits of the eco-innovation strategy include increasing the firm's reputation compared to its competitors (Mazzanti, 2018). This is the benefit possessed by sources of market profit that will result in increased cash flow and eco-innovation strategy can improve the firm's business performance (Eiadat et al., 2008). Based on the description above, it can be concluded that the eco-innovation strategy could be associated with improving firm performance. However, the description is contrary to research conducted by Gunday et al. (2011) stated that firms that do product innovation do not have an impact on firm performance. This happened because of the increasing number of products created must be followed by the development of market performance. Firms must strive to develop their markets so that new products produced will be noticed by consumers and then sold in the market which causes an increase in promotion costs.

The efforts to create eco-innovation are strongly influenced by the firm's internal and external capabilities. Internal factors that can influence eco-innovation is the ability of the firm, while the external factor is market pressure (Bossle et al., 2016). Eco-innovation does not work properly in a firm if the firm's capability is insufficient in carrying out eco-innovation activities (Hojnik and Ruzzier, 2016). The firm's capability is the ability possessed by the firm in managing and utilising all its potentials to win the competition in a competitive business environment (Bossle et al., 2016; Hermosilla et al., 2010; Hojnik and Ruzzier, 2016). The firm's capability is demonstrated through efforts by not imitating competitor's products, creating niche markets that are not easily reachable by competitors, and creating products that are difficult to imitate by competitors (Bossle et al., 2016).

Research conducted by Bossle et al. (2016) stated that the appropriate allocation of resources in the adoption of eco-innovation will provide significant results for green innovation and generate profits. Though, this statement is contrary to the research conducted by Weng and Lin (2011) also Lin and Ho (2011), which stated that the application of green innovation and

environmental uncertainty is running insignificantly. This is because the firms are unable to meet their resource needs in implementing eco-innovations because the firm does not have enough funds to buy the equipment needed. This applies to small companies that have high environmental uncertainty, so they tend to allocate a small number of funds to preserve the environment (Del Brìo and Junquera, 2003; Weng and Lin, 2011).

Besides the firm's capability, competitive pressures caused by competition between firms will encourage management to create new efforts that are difficult to imitate by competitors. (Böcker and Meelen, 2017). Market pressure will narrow the firm's market segmentation, so the firm will strive to make new efforts to diversify its market through efforts in creating new products that are not easily imitated by competitors (Loucanova et al., 2015). The firm's top management strives to create eco-innovation as a distinct uniqueness in the products they offer to costumers (Kammerer, 2009). The strategy to make environmental aspects as a market strategy this is a unique method that is difficult to imitate by competitors. High market pressure will force top management to put more effort into eco-innovation to create a new niche market. An increase in a new niche market on products that are difficult to imitate will make it easier for the firms to determine the price levels that apply to the newly created products (Bossle et al., 2016; Hojnik and Ruzzier, 2016; Loucanova et al., 2015). Market pressure encourages top management to be more creative in creating new products that are eco-friendly and these products subsequently are difficult to imitate by competitors. This makes it easier for firms to determine the price levels on applicable products and enter the market segmentation (Kammerer, 2009). This condition will result in an increase in firm profits due to increased sales volume and minimal production costs (Hojnik and Ruzzier, 2016; Kammerer, 2009).

Research conducted by Kammerer (2009) revealed that the market pull factor is a determinant of eco-innovation is the consumer's benefit, which is known in marketing literature. Previous studies showed that there are no strong triggers for eco-innovation in terms of consumer demand because eco-friendly products are still too expensive (Rehfeld et al., 2007). Meanwhile, other opinions said that consumers could also encourage innovation (Brohman et al., 2009). This argument is supported by Kammerer (2009) who found empirical evidence that customer benefits play an important role in eco-innovation as a value-added product to consumers. Lin and Ho (2011) stated that consumer pressure is not significant with the adoption of green practices in logistics service companies. That is because logistics service companies do not have direct contact with their consumers. Most consumers may feel the environmental impact of their products, but consumers are less interested or even do not care about the eco-performance of logistic companies. Logistics service consumers pay more attention to the efficiency of shipping logistic companies.

Based on the previous explanation, this study discussed current issues, namely environmental issues which have become a problem in various countries. Here, the firm could take part in environmental preservation because it had the support of internal and external factors of the firm. The application of eco-innovation by the firm later can provide a positive outcome for the firm. Thus, this study still needs to be done in Indonesia because Indonesia is the world's lungs which has currently become a centerpoint of the world's attention in reducing global warming. In 2010, Bali hosted an environmental conference attended by 192 countries (www.kompas.com). The results of the conference stated that Indonesia would also participate in implementing a green economy. One of the expected concepts of a green economy is the application of eco-innovations in Indonesian firms. Therefore, a study on eco-innovation that has an impact on improving firm performance is important in Indonesia.

Grounding Theory

Institutional Theory

DiMaggio and Powell (1983) stated that an organisation is formed by the institutional environment that is around them. The ideas in the community where the organisation is located are then institutionalised and are considered valid and accepted as a way of thinking in the style of the organisation. Organisations are formed because of the outside power of the organisation that shapes through mimicry or imitation processes and compliance (DiMaggio and Powell, 1983). Scott (1987) said that the constitutional view and instrumentality are complementary. Scott (1995) provides a framework for studying institutions. According to Scott, there are three institutional pillars, namely (1) Regulative, (2) Normative, (3) Cognitive. The difference between the three pillars is seen from the basic side of obedience, management mechanism, logic regarding human behaviour, indicator regarding the pillars of the institution.

Therefore, the institutional theory is the firm's foundation to make efficient usage of firm resources and innovations that do not harm life and do not damage the environment (eco-innovation) in its operational activities. In this study, the resources are those from internal and external factors of the firm. Internal factors consist of environmental capabilities and human resources, while external factors consist of regulation and market pressures.

Legitimacy Theory

Legitimacy theory assumes that the firm does not have the right to stand unless the values embraced in the firm are reciprocated in the wider community in which the firm operates (Dowling and Pfeffer, 1975). In the theory of legitimacy, the firm must be able to prove that the firm is an entity that has operated based on the prevailing norms and all activities carried out

by the firm can be accepted by outsiders (O'Donovan, 2002). Firm legitimacy can be obtained if there are similarities between the results and the community's expectations of the firm (Deegan, 2002). Based on the previous explanation, the legitimacy theory can be used as the basis for firms to understand social values in society, the social values referred to in this study are those related to the environment. In order to be able to apply environmental and social values in its operational activities, the firm must apply eco-innovation (Dixon and Clifford, 2007). The firm is a business entity that expects profits from its business processes. Thus, the eco-innovation applied by the firm due to this legitimacy theory is ultimately expected to improve the firm performance.

Stakeholder Theory

According to Freeman and Medoff (1984), stakeholder theory means a group of people or individuals who can influence or be affected by the achievement of the firm's goals. Stakeholder theory said that firms do not only operate based on the interests of the firms, but also the firm must provide benefits and value-added for the stakeholders (Friedman and Miles, 2006). In this study, the firm could provide more benefits to stakeholders through eco-innovations that are supported by the capability of the firm's internal and external resources. In return, stakeholders could support the firm by improving firm performance through the application of eco-innovation.

Hypothesis Development

Mediation of Eco-Innovation in Influencing Firm's Capability

The institutional theory explains that the efficient use of resources is a necessity held by firm management (Meyer and Rowan, 1977). The view to make efficient use of firm resources will shape awareness and management behaviour to be more careful in allocating resources in the production process (Hojnik & Ruzzier, 2016). The ability of firm management in streamlining the management of resources forms a firm's capability. Specifically, a firm's capability is an ability possessed by the firm's management in managing and utilising all of its potentials to win the competition in a competitive business environment (Bossle et al., 2016). The firm's capability to manage these resources will encourage firm management to be more active in creating new products or processes that competitors do not have (Marín-Vinuesa et al., 2018). Related to the problems in the industry today, the firm's management will create more eco-friendly innovations, so that the innovations have an impact on reducing production costs due to decreased use of raw materials and energy, as well as an increase in production volume from innovations undertaken. Eco-innovation will have an impact on improving performance (Bossle et al., 2016; Chen et al., 2012; Costantini et al., 2017; Loucanova et al., 2015).

Firms that have the ability to use existing resources to create different products with competitors and different niche markets will be motivated to create new ideas in using available resources (Marín-Vinuesa et al., 2018). This will encourage firms to be more innovative in reducing operational costs by reducing the costs of using large amounts of energy in production (Loucanova et al., 2015). Besides, firm management is more active in making efforts to minimise the use of raw materials by using recyclable raw materials. Along with the problems faced in each county on environmental issues, the firm will strive to be more innovative in the use of resources so it will not cause a greater impact on the environment (Hojnik and Ruzzier, 2016). The firm's efforts to make efficient use of resources based on a low operating cost approach encourage management to be more active in carrying out eco-innovations. Firms that have the ability to manage resources properly will take into account the minimum use of raw materials products so that the resulting innovation does not cause a large impact on the environment (Weng and Lin, 2011).

Eco-innovation that emerges from the firm's capability to manage resources encourages firm management to be more active in making efforts to minimise the burden of production by reducing the use of raw materials and excessive use of energy (Horbach et al., 2012). Efforts to use minimal raw materials and energy usage will have an impact on decreasing the firm's operating expenses so that the firm performance will increase. The increase in firm performance is caused by a decrease in production costs so that the reduction in costs can improve firm performance (Bossle et al., 2016).

This statement echoed with Bossle et al. (2016) stated that the proper allocation of firm resources in the adoption of eco-innovations could provide significant results for green innovation and generate profits. So, if the firm's profit increases, the firm performance will also increase.

H1: Eco-innovation mediates the effect of a firm's capability on firm performance

The Mediation of Eco-Innovation on the Effect of Market Pressure on Firm Performance

The institutional theory explains that firm management must be able to control uncertainty and control the business environment by viewing the prevailing norms as a reference in carrying out an action (DiMaggio and Powell, 1983). A highly competitive business environment will cause high market pressures for firms, so firms must be able to overcome these market pressures accurately so that the firm's performance does not decline. One form of action that can be taken by management is to carry out eco-innovation (Bossle et al., 2016; Chen and Chang, 2013; Hojnik and Ruzzier, 2016; Murphy and Poist, 2003).

The legitimacy theory states that firms must be able to absorb the values and norms prevailing in society to get legitimacy from the community (O'Donovan, 2002). The firm's effort to carry out eco-innovation is an attempt to gain community legitimacy. Eco-innovation, is a firm's effort to gain community legitimacy, this will be intensified by the firm when the pressure faced is increasing. Market pressure encourages firm management to absorb the values and norms prevailing in society to carry out eco-innovation (Dixon and Clifford, 2007). This is because the firm is an entity that has a large environmental impact, so it takes responsibility from the firm to overcome this. The firm's management efforts in carrying out eco-innovation due to high market pressure will provide benefits for improving firm performance (Bossle et al., 2016; Chen and Chang, 2013; Hojnik and Ruzzier, 2016; Murphy and Poist, 2003). This is due to the existence of great legitimacy from the community, which will have an impact on the firm's operational activities so that the firm's performance will improve.

Market pressure will narrow the firm's niche market, so the firm will strive to make new efforts to diversify its market through efforts to create new products that are not easily imitated by competitors (Bossle et al., 2016; Hojnik and Ruzzier, 2016). The firm's top management will strive to create eco-innovation as uniqueness in the products they offer to consumers (Kammerer, 2009). The strategy to make environmental aspects as a marketing strategy is a unique method that is difficult for competitors to imitate. High market pressure will force top management to put more effort into making eco-innovation to create a new niche market (Bossle et al., 2016; Hojnik and Ruzzier, 2016; Loucanova et al., 2015).

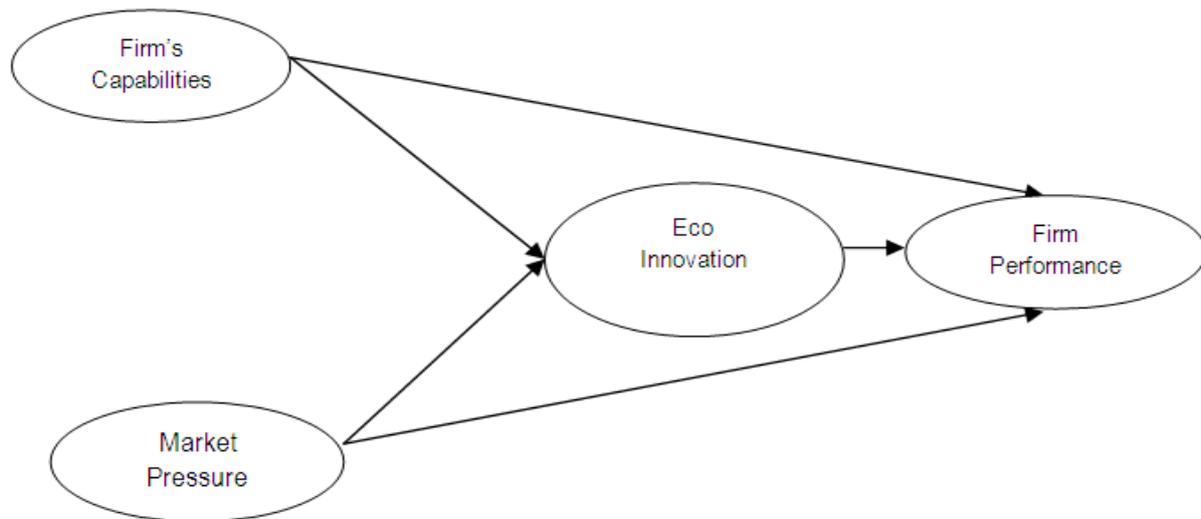
An increase in a new niche market on products is difficult to imitate will make it easier for companies to determine the price levels that apply to newly created products (Hojnik and Ruzzier, 2016). Market pressure will encourage top management to be more creative in creating new products that are eco-friendly and difficult to imitate by competitors so that companies will be easier in determining the price levels of applicable products and enter the market segmentation (Kammerer, 2009). This condition will result in an increase in firm profits due to increased sales volume and minimal production costs (Bossle et al., 2016; Hojnik and Ruzzier, 2016; Loucanova et al., 2015).

Research by Kammerer (2009) revealed that the market pull factor acts as a determinant of eco-innovation particularly when for the consumer's benefit, this phenomenon is known in marketing literature. Kammerer (2009) also found empirical evidence that consumer's benefit plays an important role in eco-innovation after providing the value-added products to consumers. This is in line with research by Loucanova et al (2015) which stated that firms in Slovakia implement eco-innovation because it is driven by the increasing number of consumers who are starting to realise the importance of preserving the environment. This statement is also supported by Hojnik and Ruzzier (2016), Horbach et al (2012) about how

one important factor in the adoption of eco-innovation is market pressure. Based on the previous explanation, it can be concluded that market pressure is an external factor that requires firms to implement eco-innovation.

H2: Eco-innovation mediates the influence of market pressure on firm performance

Figure 1. Conceptual Framework



Research Methodology

The data analysis method used in this research was descriptive analysis and inferential statistical analysis. The inferential statistical analysis used was the Structural Equation Model (SEM) and the Partial Least Square (PLS) approach. The method used was interviews and questionnaires distributed to research subjects. The study was conducted from May 2019 to July 2019. The firms selected located in Surabaya Industrial Estate Rungkut (SIER), consists of 113 firms.

Result

Information about the job position, length of work, gender, and last education of the respondents is presented in Table 1.

Table 1: Respondent Profile

Information	Category	Percentage
Gender	Male	72%
	Female	28%
Ages	<40 years old	15%
	40 - 50 years old	71%
	>50 years old	15%
Positions	Research and development manager	21%
	Engineering manager	40%
	Supply chain manager	38%
Lenght of work	<1 year	2%
	1 - 5 years	18%
	5 - 10 years	48%
	>10 years	31%
Education	Associate Degree	4%
	Bachelor degree	64%
	Master degree	32%
	Doctoral degree / Ph.D	0%

Based on Table 1, for the job position, most respondents held was the position of an engineering manager this was the highest shown by 40%. The longest work time was 5 – 10 years shown by 48%. The highest percentage of gender was male as 72% identified as males. Last, for the education level of respondents a Bachelor Degree was highest with a number of 64%.

Table 2 indicated that all proxies have an outer loading factor value greater than 0.5. It can be concluded that all indicators are suitable to be used as indicators that can reflect each of the corresponding variables.

Table 2: The Result of Outer Loading Factor

Variable	Indicator	Outer Loading	P-Value	Result
Firm's Capability	CAP1	0,743	<0,001	Valid
	CAP2	0,816	<0,001	Valid
	CAP3	0,906	<0,001	Valid
Market Pressure	TP1	0,74	<0,001	Valid
	TP3	0,747	<0,001	Valid
	TP4	0,723	<0,001	Valid
	TP5	0,716	<0,001	Valid
Eco Innovation	IBL1	0,769	<0,001	Valid
	IBL2	0,853	<0,001	Valid
	IBL3	0,763	<0,001	Valid
	IBL5	0,794	<0,001	Valid
	IBL6	0,812	<0,001	Valid
Firm Performance	KP2	0,715	<0,001	Valid
	KP3	0,773	<0,001	Valid
	KP4	0,771	<0,001	Valid
	KP5	0,73	<0,001	Valid

Source: Data, processed 2019.

Table 3 also explains the value of the reliability coefficient. Variable reliability testing used composite reliability techniques. To see whether a measure is reliable or not, it is done through the reliability coefficient with the value being greater than 0.7.

Table 3: Reability Testing Result

Variabel	Cronbach's Alpha	Composite Reliability
Firm's Capability	0,760	0,863
Market Pressure	0,759	0,847
Eco-Innovation	0,858	0,898
Firm Performance	0,775	0,857

Source: Data, processed 2019.

The indirect effect test aims to find out the mediation of eco-innovation on the influence of a firm's capability, human resources, regulations, and market pressures on firm performance. The indirect effect test is carried out using simultaneous indirect estimation with triangle partial least square (PLS) model. The following are the results of testing the hypothesis in this study

Table 4: Hypothesis Testing Result

Direct Effect before Entering Mediation Variabel		
Relationship between Variabels	Path Coefficient	p-value
CAP -> KP	0,247	0,003
TP -> KP	0,463	<0,001
Direct Effect after Entering Mediation Variabel		
Relationship between Variabels	Path Coefficient	p-value
CAP -> KP	0,098	0,145
CAP -> IBL	0,859	<0,001
TP -> KP	0,348	<0,001
TP -> IBL	0,759	<0,001
IBL -> KP	0,481	<0,001
Indirect Effect		
Relationship between Variabels	Path Coefficient	p-value
CAP -> IBL -> KP	0,413	<0,001
TP -> IBL -> KP	0,123	0,030

Source: Data, processed 2019.

Discussion

Hypothesis 1 stated that eco-innovation mediates the effect of a firm's capability on firm performance. The results of the statistical test show that eco-innovation can mediate the effect of a firm's capability on firm performance so that H1 is accepted. It can be concluded that increasing the firm's capability to increase corporate awareness to do eco-innovation so that occurs an increase in awareness in participating in eco-innovation has a significant positive impact on improving firm performance.

The result showed that the business unit manager at SIER was careful in allocating resources for the production process resulting in increased production efficiency. The capability of firm management to streamline the management of these resources formed a firm's capability. Business unit managers at SIER were able to manage the firm's resources so that the firm is able to create new processes or products that are difficult to imitate. The process to streamline resources encouraged business unit managers to be more active in creating processes and products that are eco-friendly. Efforts of business unit managers to implement processes and products more efficiently are due to resource efficiency that will improve firm performance. This is because new processes and products created will reduce the production costs that will increase financial performance.

Hypothesis 2 stated that eco-innovation mediates the effect of firm performance on market pressure. The result of the statistical test showed that eco-innovation is able to mediate the

influence of market pressure on firm performance so that H2 is accepted. It can be concluded that as the market pressure increases, the awareness to carry out eco-innovation will also increase so that the increase in awareness to carry out eco-innovation has an impact on improving firm performance.

Consumers put great pressure on firms to manage the environment positively in the production process. Many Indonesians are aware of the importance of preserving the environment by reducing the use of items that are easily thrown away or potentially cause waste. This requires firms to create products that are also eco-friendly. The firm's management will strive to create eco-innovation as a unique quality in the products offered by the firm to consumers (Kammerer, 2009). Firms that succeeded in creating a product that meets the consumer's interest will drive the consumer to buy the products so that the firm performance will increase along with the sales.

Besides, shareholders also exert considerable pressure on firms to carry out environmental management. Environmental management by the firm can be in the form of eco-innovation. Shareholders were aware that by doing eco-innovation, it could reduce the production costs that will impact the firm's financing options. The decrease in the use of raw materials and energy in the production process will have an impact on the decline in the firm's operating expenses (Bossle et al., 2016; Loucanova et al., 2015). Shareholders realised that more Indonesians wanted to use eco-friendly products, so shareholders will encourage firm management to conduct eco-innovation. Efforts to create new processes or products in the production process with environmental aspects is how firm management can have a controlling impact on the declining use of raw materials for production and a decline in energy used in the production process (Bossle et al., 2016; Loucanova et al., 2015). A decrease in a firm's operating expenses as long as there is also an increase in a firm's sales volume will have an impact on increasing profits generated by the firm.

Trade unions, environmental organisations, and community groups are also one of the drivers of the firm in conduction eco-innovation (Bossle et al., 2016). The result showed that the existing organisations began to campaign for environmental preservation by encouraging people to participate in managing the environment. Organisations in the community will always see and monitor the extent to which environmental management is carried out by the community. The firm is part of the community environment, so the supervisory mechanism of the organisation would make firm management participate in protecting the environment by implementing eco-innovation.

The pressure to make eco-innovation comes from competitors (Bossle et al., 2016; Hojnik and Ruzzier, 2016). The strategy to make environmental aspects as a marketing strategy is a unique method that is difficult to imitate by competitors. Mazzanti (2018) stated that the

benefits of an eco-innovation include increasing the firm's reputation compared to its competitors. High market pressure will force top management to put more effort into making eco-innovation to create new a niche market. An increase in a new niche market on products that are difficult to imitate will make it easier for firms to determine the price levels that apply to newly created products (Bossle et al., 2016; Hojnik and Ruzzier, 2016; Loucanova et al., 2015). Market pressure encourages top management to be more creative in creating new products that are eco-friendly and difficult to imitate by competitors so that firms will easily determine the price levels of applicable products and enter market segmentation (Kammerer, 2009). This condition increased in sales volume and reduce production costs (Hojnik and Ruzzier, 2016; Kammerer, 2009).

Conclusion

The results of this study indicate that eco-innovation is able to mediate the effect of a firm's capability on firm performance. So, the higher the firm's capability to manage its resources, the firm's eco-innovation will increase, and the firm performance will also increase.

The results of this study indicate that eco-innovation is able to mediate the influence of market pressure on firm performance. The greater the market pressured faced by the firm, the firm's eco-innovation will increase, and then the firm performance will also increase.

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