

The Effect of the Proportion of Female Board of Directors on Firm Performance in All Companies Listed on the Indonesian Stock Exchange with Innovation as a Mediating Variable

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The study investigates the relationship between the proportion of female directors on corporate boards and firm performance, with innovation serving as a mediating variable. Previous research has revealed inconsistencies between those variables. Therefore, this study investigates whether there is a direct and indirect effect of the proportion of female directors on firm performance, which is innovation as a mediating variable. To measure the variables studied, this study also employs quantitative data types and secondary data sources from 55 companies listed on the Indonesian Stock Exchange from 2017 to 2021. Using the Partial Least Square method, the following findings were obtained: (1) The proportion of women on the board of directors has no direct impact on firm performance. (2) Female on board of directors has a positive significant impact on innovation, (3) This research shows a positive significant relationship between innovation and firm performance, and (4) The results also show full mediation of innovation on the impact of proportion of female on board of directors on firm performance. Since it is being conducted in Indonesia, it may differ in other countries, and further research such as using the difference mediating variables and indicators to influence the study's results is strongly advised.

Keywords: Female Directors, Firm Performance, Innovation, Partial Least Squares, Indonesia Stock Exchange

INTRODUCTION

In the present era of digitalization, businesses prioritize innovation as a means to enhance revenue (Rochmah & Ardianto, 2020). Business innovation encompasses research, development, and implementation, necessitating novel methods to integrate information and technology into current products and manufacturing processes (Rogers, 2003). This business innovation encompasses product innovation, process, marketing, and technology innovation (Robbins & Judge, 2009). Companies achieve their goals not only through product innovation but also through other business innovations.

Innovation enhances a company's survival and competitiveness by influencing its financial performance, as reflected by liquidity and financial ratios. As reflected by liquidity and financial ratios, a company's survival and competitiveness influence its financial performance. A company's success can be determined by its effective utilization of available resources. Effective top-level management is essential for enhancing company performance. The top-level management of a company holds the highest authority. Top management is responsible for strategically planning and achieving the company's goals, directly affecting the company, its owners, and its shareholders. The board of directors constitutes a vital component of the company's top-level management.

Research shows that companies with female directors may make more profitable decisions for shareholders in the past decade ("IFC: Companies Are More Profitable If There Are Women Directors," June 27, 2019). In addition to the tendency for women's positions to increase in top management (Huang & Kisgen, 2013), this may occur since a female director will bring a unique perspective and a high level of competence to organizational discussions, thereby influencing the improvement of board reports (Hillman et al., 2007). Women's senior-level representation increased steadily from 19% in the previous year to 20% in 2018. In agreement with the 2020 Women in a Business report by Grant Thornton International, Indonesia, and Mexico rank fourth in terms of the proportion of women holding senior management positions, with a rate of 37 percent (Grant Thornton, 2020).

The influence of females in top management, specifically on the board of directors, remains a topic of ongoing discussion. Martinez and Rambaud (2019) contend that more women in a company can lead to improved returns and achievement of organizational goals. The economic perspective advocates for the promotion of women based on their education and professional aptitude. Otherwise, the company's profitability may decline. Recent research has shown significant interest in the differences in ethical and social behaviors exhibited by women compared to men (Mahmood et al., 2019).

Studies suggest that women directors positively impact innovation through their diverse ideas, high levels of creativity, and production of higher-quality innovations (Chen et al. (2018); Liu et al. (2014); Terjesen et al. (2009); Chen (2021)). Several studies, including Simionescu (2021), Bennouri et al. (2018), Đặng et al. (2020), and Reguera-Alvarado et al. (2017) have established a positive relationship between the presence of females on board and the performance of the company. However, recent studies conducted by Suherman et al. (2021), Hasina and Bernawati (2021), and Saleh et al. (2021) challenge the conventional belief that the percentage of women on board significantly impacts its performance. Habtewold (2022) and Huang (2021) have

demonstrated that enhancing innovation efficiency can lead to higher innovation output in R&D and greater financial profits for companies.

Indonesian companies across sectors must continuously innovate in products and other areas to enhance profitability. It has been alleged that women's existence and traits may impact company performance indirectly through innovation as a mediator rather than directly affecting it. Due to the inconsistent research findings and the importance of female directors' attributes in decision-making and fostering innovative practices that boost firm performance, it is crucial to examine the relationship between the percentage of female directors, innovation, and company performance.

LITERATURE REVIEW

Critical Mass Theory

Kanter's (1980) Critical Mass Theory proposes a sociological perspective to elucidate the process of attaining a critical mass of minority group members, specifically women, within the context of a board of directors. According to this theory, when there are enough women on the board, they can influence business judgment (Konrad et al., 2018), foster enterprise innovation (Torchia et al., 2011), and enhance sustainable business practices (Bear et al., 2010; Cabeza-García et al., 2021; Post et al., 2011). Numerous researches have shown that the impact of female directors is significantly substantial when at least three women are on the board, compared to a single female member (Liu et al., 2014; Nguyen, 2012). Consequently, the Critical Mass Theory provides a valuable framework for studying the impact of women on boards in organizational contexts.

Upper Echelon Theory

The Upper Echelon Theory posits that the top management background characteristics can predict a company's success (Hambrick & Mason, 1984). The relevant managerial background traits include experience, education, socio-economic status, values, and personality. Gender differences in a company can impact its performance due to variations in the personalities of male and female employees. The women's board of directors is a primary section that receives significant attention due to its leadership style and personality.

The prominent female leaders in the company exhibit perseverance, thoroughness, and innovative thinking, which aligns with the company's requirements. Women's leadership styles are perceived as more effective, resulting in enhanced decision-making competence and a more significant impact on the company. According to Solimene et al. (2017), women face a higher educational threshold when aspiring to secure positions on the board of directors. Moreover, Dezso and Ross (2012) suggest that women must outperform men to gain recognition in the professional environment. The diverse capabilities of female board members in handling company challenges and emergencies can impact shareholder decision-making, given the vital role of the board in conveying the company's standing.

Resource-Based Theory

Barney (1986) proposed the Resource Based Theory to explain how companies can utilize sustainable resources to attain and sustain their objectives. Resource Based

Theory emphasizes the importance of comprehending the connection among resources, capabilities, competitive advantage, and profitability. This understanding is crucial in comprehending how a competitive advantage is sustained over time (Wernerfelt, 1984). Barney (2000) also emphasized the significance of company resources in improving the efficiency and effectiveness of overall company performance.

Barney (2017) categorizes company resources into tangible and intangible. The company possesses intangible resources such as expertise and perspective. Tangible resources, such as the board of directors, play a key role in attaining company objectives through effective business management and enhanced performance. A diverse board of directors in terms of gender can lead to increased diversity of ideas, marketing strategies, and improved organizational outcomes.

Firm Performance

Company performance refers to a company's capacity to effectively allocate its resources to create value (Financial Accounting Standards, September 1, 2007). Moreover, it is a criterion utilized to evaluate the productivity and efficiency of the organization. Performance measurement enables management to make crucial decisions and identify the company's prospects. Munawir (2013) highlighted that assessing company performance serves various purposes, such as examining its liquidity, solvency, profitability, and activity level to ensure organizational stability. This study employs profitability ratios to assess corporate performance. The profitability ratio evaluates a company's capacity to generate profits (Kasmir, 2018). The ratio is valuable for approximating the company's worth as investors use financial ratios to gauge the return rate provided by a business. Return On Asset is a profitability ratio metric. A high Return on Assets indicates that the company's assets have produced a profit. A below-average ROA suggests that a company may experience losses from its assets. ROA is calculated by dividing net income by total assets and multiplying the result by 100% (Brigham dan Houston, 2016).

The Proportion of Female Board of Directors

The proportion of female board members is derived by dividing the total number of women on the board by the overall number of directors (Campbell & Mínguez-Vera, 2008). Having women on the board introduces diverse viewpoints, expanding the range of perspectives in decision-making and differing from those typically offered by male board members. It can potentially impact company strategy and decision-making processes. Women's thoroughness and perseverance are advantageous traits that enhance their ability to oversee the innovation process. Analyzing the representation of females on board is crucial as it favorably impacts the standard of a company's earnings and financial reports in terms of conservatism, persistence, and loss avoidance tendencies (Na & Hong, 2017). Hence, the presence of women directors affects its performance (Herring, 2009).

Innovation

Innovation is a process that requires original thought and inventiveness. Business innovation aims to generate new goods and services via research and development. (Kotler & Keller, 2009). Innovation also serves as the method through which businesses create and implement novel products, processes, and organizational frameworks (Zahra & Garvis, 2000). The company can create more innovative and high-quality products if its processes and products are innovative. In addition, innovative product quality can increase a company's competitive advantage by

identifying its customers' requirements. By innovating, the company can expand the market for these products, resulting in increased revenue, which impacts the company's performance. In this investigation, the ratio of R&D spending to total assets is employed as a proxy for innovation (Loukil et al., 2020)

The Effect of the Proportion of Female Board of Directors on Firm Performance

The Critical Mass Theory suggests that three females on a board are more influential than having only one female (Liu et al., 2014). According to Hernández-Lara and Gonzales-Bustos (2020), women have different viewpoints, ideas, and decision-making styles from men, which results in an increase in the number of women who can exert influence within a company. Bennouri (2018), Green (2018), and Balsam (2021) report that the results of their research on female board of directors, as measured by the proportion of female board of directors, positively affect company performance as measured by ROA.

According to Loukil et al. (2020), the presence of females on the board of directors can contribute to enhanced disclosure transparency and reduced information asymmetry, which explains a possible positive association between the number of women on the board and company performance. Based on this explanation, it can be inferred that an increase in the proportion of female directors in a company is positively associated with improved performance. The initial hypothesis in this study is as follows.

H1: The proportion of female directors has a positive impact on company performance

The Effect of the Proportion of Female Directors on Innovation

In line with Upper Echelon Theory, the success of an organization can be anticipated by examining the managerial background traits of its top-level executives (Hambrick & Mason, 1984). Women's leadership qualities, such as tenacity, thoroughness, and creativity, have positively affected businesses (Solimene et al., 2017). The presence of women's creativity in the development of products, processes, and services has a significant impact on innovation.

According to the findings stated in the research by Torchia et al. (2018), Atallah et al. (2020), and Hernández-Lara and Gonzales-Bustos (2020), there exists a positive correlation between the presence of women on boards and innovation. The elucidation above leads to the inference that an increase in the percentage of female directors is favorably correlated with enhanced decision-making proficiency and innovation within the organization, thereby augmenting corporate innovation (Torchia et al., 2018). Thus, the hypothesis that was conducted is as follows.

H2: The proportion of female directors has a positive effect on innovation

The Effect of Innovation on Firm Performance

By the Resources Based Theory, comprehending the interplay among resources, capabilities, competitive advantage, and profitability can sustain a competitive edge over an extended period (Wernerfelt, 1984). In the contemporary day, companies recognize innovation as a valuable intangible asset. Implementing innovative strategies can enhance a company's competitive advantage by enabling the provision of novel products and services, thereby facilitating the sustenance and growth of the organization. The implementation of innovative strategies within a company has the potential to attract both consumers and investors due to the competitive advantage it provides. This competitive edge is currently unavailable to the company's rivals and can potentially boost the business' standing in the market.

Huang's (2021) research is one example of the existing literature that lends credence to this claim by showing a favorable relationship between R&D spending and innovation and long-term organizational performance. Based on the explanation provided, it can be inferred that a positive correlation exists between a company's level of innovation and its overall performance. Thus, the third hypothesis formulated is as follows.

H3: Innovation has a positive impact on company performance

The Effect of Proportion of Female Directors on Firm Performance, with Innovation as the Mediating Variable

According to Resources Based Theory, the acquisition and allocation of resources are crucial for sustaining and enhancing organizational performance. Including women on a board is a valuable asset due to their unique perspectives, viewpoints, and creative abilities, dissimilar from those of their male directors. The distinct attributes of creativity and perseverance exhibited by women in directors' positions have the potential to enhance innovation in comparison to their male directors. Moreover, Arfken et al. (2004) argue that women's enhanced comprehension of consumers and markets enhances the precision and profitability of innovation. The presence of a female board of directors who demonstrate proficiency in executing innovative initiatives aimed at producing high-quality products is likely to enhance organizational performance. Designing products can enable companies to compete effectively in business and emerge victorious in market competition. Thus, a significant representation of women on the board of directors can enhance organizational performance by fostering the development of exceptional and inventive products. The hypothesis is formulated based on the description above.

H4: Proportion of female board of directors to company performance with innovation as a mediating variable

RESEARCH METHOD

All of the research's study subjects were firms registered on the Indonesian Stock Exchange, utilizing quantitative data from financial statements and Bloomberg. The research employed the documentation method, encompassing the entire population of companies registered on the Indonesian Stock Exchange from 2017 to 2021. Additionally, the sample selected for the study consisted of 55 companies meeting specific research criteria, chosen through purposive sampling.

The research goal is to investigate the connection among the proportion of female board of directors (independent variable), company performance (dependent variable), innovation (mediating variable), and control variables, including company size, firm age, leverage, and sales growth. Therefore, the research model used is as follows.

Analysis Model:

$$Inov : \alpha + \beta_1 PWANITA + \varepsilon_1$$

ROA:

$$\alpha + \beta_2 PWANITA + \beta_3 INOV + \beta_4 FSIZE + \beta_5 FAGE + \beta_6 LEV + \beta_7 SG + \varepsilon_2$$

This research also employs the path analysis estimation technique used to test the relationship model between variables in the form of cause and effect. This research was processed using WarpPLS 7.0 software, a development of Partial least square analysis.

RESULTS

Table 1 illustrates the descriptive statistical data to provide an overview of panel data with a cross-section of 55 companies listed in the Indonesian Stock Exchange and time series from 2017-2021. The descriptive statistics table presents insightful findings regarding Indonesian companies that prioritize innovation. The data reveals that the representation of women on the Board of Directors ranges from 0 percent to a maximum of 80 percent, with an average of 14 percent. This information highlights the significant variation in gender diversity within the leadership positions of innovative Indonesian companies.

Table 1. Descriptive Statistics Example ($N = 275$)

Construct	Obs	Min.	Max.	M	SD
Proportion of Female on BOD	275	0.00	0.80	0.14	0.20
Firm Performance	275	-0.21	0.61	0.06	0.90
Innovation	275	0.00	0.13	0.01	0.02
Firm Size	275	25.80	33.26	29.49	1.49
Firm Age	275	0.00	41.00	19.02	9.93
Leverage	275	0.08	4.84	0.53	0.53
Sales Growth	275	-0.90	1.70	0.09	0.28

Note. M = Mean, SD = Standard Deviation.

Source: Processed WarpPLS Data, 2023

Measurement Model

The measurement model establishes the connections and evaluates the associations between variables and the indicators that represent them. The measurement model includes two tests: the validity test, which assesses how well the research instrument can be used, and the reliability test, which assesses how reliable the results or measurements are (Cooper & Schindler, 2003). Therefore, this research is automatically reliable and valid in the validity and reliability tests since it only uses one measurement indicator for each variable to declare each indicator reliable and valid (Ghozali, 2016).

Model Fit

The suitability and effectiveness of the measurement model and the overall structural model is assessed through the Goodness of Fit (GoF) index, which measures model validity. In this study, the GoF test is solely applied to the structural models due to using financial data exclusively. The obtained data results indicate a well-fitting model, as demonstrated by the several p-values in Table 2, all below the threshold of 0.05. No concerns arise regarding collinearity between proxies and independent variables within the model, as both the values are less than 3.3. However, one indicator lacks robust

support, with a value exceeding 0.07. The model was employed to test the formulated hypotheses, as the remaining data satisfied the established criteria.

Table 2. Result for Model Fit Test

Criteria	Fit Criteria	Output Value	Result
Average Path Coefficient	P-value < 0.05	0.001	Good Fit
Average R-squared	P-value < 0.05	<0.001	Good Fit
Average adjusted R-squared	P-value < 0.05	<0.001	Good Fit
Average block VIF	Favorable if ≤ 5 ; ideally ≤ 3.3	1.125	Fit
Average full collinearity VIF (Favorable if ≤ 5 ; ideally ≤ 3.3	1.180	Good Fit
Tenenhaus GoF	Small $\geq 0,1$; Medium ≥ 0.25 ; Large ≥ 0.36	0.424	Good Fit
Sympson's paradox ratio	Favorable if ≥ 0.7 ; ideally = 1	1.000	Good Fit
R-squared contribution ratio	Favorable if ≥ 0.9 ; ideally = 1	1.000	Good Fit
Statistical suppression ratio	Favorable if ≥ 0.7	0.857	Good Fit
Nonlinear bivariate causality direction	Favorable if ≥ 0.7	0.500	Non Fit

Source: Processed WarpPLS Data, 2023

Structural Model Analysis

The structural model forecasts causality linkages or causal connections among latent variables made from the theory's substance. The structural model analysis is conducted through the adjusted R-square value by considering the Q-square value.

Table 3 provides the R² and Q² for each autogenous variable based on the structural model testing presented below. Additionally, the R² values for the innovation and firm performance variables are 0.087 and 0.273. It indicates that innovation can be interpreted by 8,7 percent by the presentation of women in the BoD. In comparison, the firm performance variable can be elucidated by 27,3 percent by the presentation of women on the board and innovation. Moreover, the outcome of firm performance in predictive validity (Q²) shows 0.29, which exceeds zero. It indicates that the research model meets the criteria of good predictive validity.

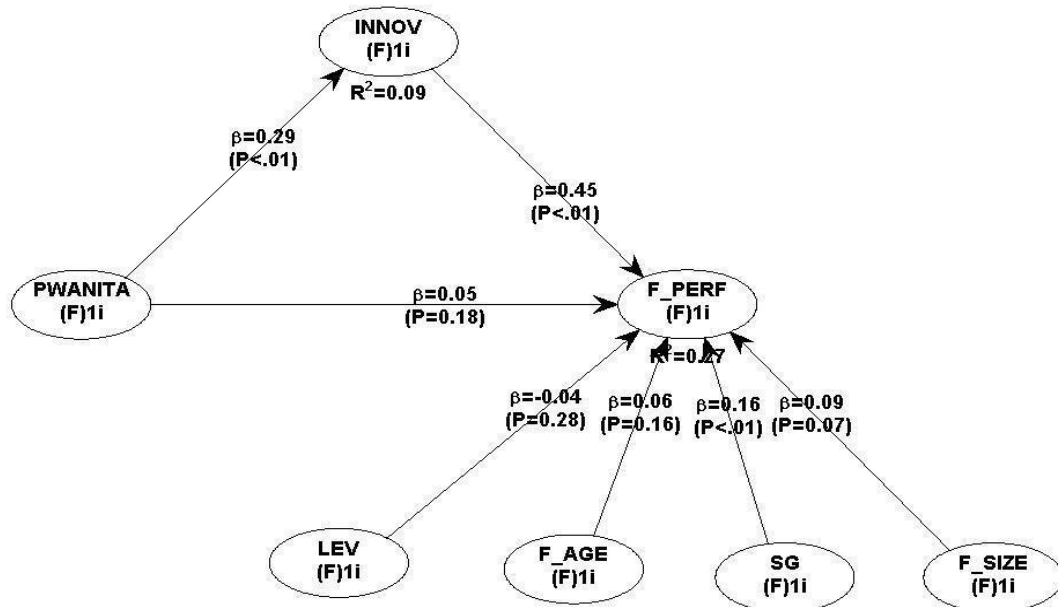
Table 3. Structural Model Testing

Dependent Variable	Value Adjusted R-square (R^2)	Value Q-square (Q^2)
Innovation	0.087	0.083
Firm Performance	0.273	0.290

Source: Processed WarpPLS Data, 2023

The figure shown below is an interpretation of an analysis model captured after processing data using WarpPLS 7.0:

Figure 1. Structural Model Evaluation.



Source: Processed WarpPLS Data, 2023

Hypothesis Testing

- Based on Table 4, there are several outcomes, which are:
- The path coefficient of the proportion of female directors on firm performance shows 0.054 with a p-value of 0.185, more significant than 0.05. It suggests no effect of the proportion of female board of directors on firm performance. As a result, hypothesis one is rejected.
- The path coefficient between the proportion of female board of directors and innovation is 0.294, with a p-value of <0.001. It indicates that the proportion of female board of directors significantly impacts innovation. As a result, hypothesis 2 is accepted.
- The path coefficient of innovation on firm performance shows 0.046 with P values <0.01, which is lower than 0.05, so the results are accepted in hypothesis 3. It indicates that innovation affects firm performance.

Table 4. Direct Effect

Relationship Variables	Path Coefficient	P-Value	Result
Proportion of Female on BOD -> Firm Performance	0.054	0.185	Non significant
Proportion of Female on BOD -> Innovation	0.294	<0.001	Significant Positive
Innovation -> Firm Performance	0.446	<0.001	Significant Positive
Firm Size -> Firm Performance	0.089	0.068	Non

			significant
Firm Age -> Firm Performance	0.06	0.159	Non significant
Leverage -> Firm Performance	-0.036	0.276	Non significant
Sales Growth -> Firm Performance	0.161	0.003	Significant Positive

Source: Processed WarpPLS Data, 2023

The result of the outcome of the path coefficient and p-value of the indirect relationship is an increase of 0.131 from 0.054 on the path coefficient and the p-value < 0.001, which means that the outcome turns out to be significant. Innovation can fully mediate the relation enclosed by the proportion of female directors and the company's performance with innovation as a mediating variable. Therefore, the outcome of this subject is accepted in accord with hypothesis 4.

Table 5. Indirect Effect

Relationship Variables	Path Coefficient	P-Value	Result
Proportion of Female on BOD -> Innovation -> Firm Performance	0.131	< 0.001	Full Mediation

Source: Processed WarpPLS Data, 2023

DISCUSSION

The Effect of Female Board of Directors to Firm Performance

The outcome indicates that the representation of female board members does not involve a company's performance. It aligns with studies by Suherman et al. (2021) and Hasina and Bernawati (2021), which declare that the proportion of female directors does not impact company performance. Based on Table 1 above, which is descriptive statistics data, the proportion of females in companies that innovate is still categorized as low, around 14 percent, so the effect is insignificant on a company's growth. As a result, their opinions and contributions need to be sufficiently heard and recognized within the decision-making processes.

The Effect of Female Board of Directors to Innovation

The study's findings indicate that the presence of female directors on the board had a significant positive response to innovation. These outcomes advise that the more female directors on the board can create, the more innovation represented by research and development in a company. It aligns with an examination by Torchia et al. (2018), Hernández-Lara and Gonzales-Bustos (2020), and Atallah et al. (2020), who initiated a positive relationship of female directors on board on innovation. According to the findings within Indonesian enterprises, the presence of female directors exerts influence on a company's R&D expenditures, which manifests in the innovative initiatives undertaken by the company.

The Effect of Innovation to Firm Performance

The results showed that innovation has a positive influence on the performance of the company. These results state that developing innovation within the company can improve the performance of a company, as seen from the competitive advantage possessed by the company. This outcome is in line with research by Huang (2021), which states that a company's investment in research and development positively influences innovation and has a continuing impact on the company's success. Based on the outcome of the research conducted, the positive relationship found between innovation on company performance is seen in the existence of innovations in companies in Indonesia that improve company performance.

The Effect of Female Board of Directors to Firm Performance Using Innovation as Mediating Variable

The study's findings indicate that innovation can fully mediate the relationship between the proportion of female directors on the board and firm performance. These results advise that including female directors can enhance innovation within organizations, and innovation can contribute to improved company performance. These results are also supported by previous research, namely Habtewold (2022), Chen et al. (2021), and Hernandez et al. (2019), which declare R&D expense as a representative of innovation and has a favorable outcome on the performance of the company. The ability of female directors in terms of creativity and persistence can influence the innovations that emerge in the company. Furthermore, innovation within the company is also crucial, considering the business world is increasingly sophisticated, and the business environment is constantly changing. Therefore, innovation is one of the factors that can mediate the proportion of females on the board of directors in improving firm performance.

CONCLUSION

The subject's findings are dependable with the critical mass theory since it states that their presence cannot affect the company's performance since there are still so few female board members in Indonesian corporations. However, according to the upper echelon theory, women's leadership style and personality can contribute to company performance through innovative thinking and targeted innovation aligned with business knowledge and consumer insights. Research indicates that female directors on the board can enhance innovation, resulting in improved company performance, competitive advantage, and resource-based alignment. In conclusion, the proportion of female directors on the board cannot directly influence company performance as measured by ROA. Instead, innovation is needed to mediate the proportion of female directors in the company.

LIMITATION

The study's limitation lies in its geographical scope, as it focuses solely on Indonesia, thus potentially yielding different outcomes in other countries. Additionally, future researchers can explore alternative mediating variables and indicators to influence the study's findings. In conclusion, it is imperative to pursue further research.

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DECLARATION OF CONFLICTING INTERESTS

There are no potential conflicting interests reported by the authors

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