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Beyond Green Innovation: Reconsidering How Entrepreneurial Orientation Creates Sustainability Performance

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Abstract

Purpose – *This study aims to explore the relationship between Entrepreneurial Orientation (EO) and Sustainability Performance (SP) in Indonesian small and medium-sized enterprises (SMEs) and to examine whether Green Innovation (GI) serves as an intermediary between EO and sustainability performance. Based on Dynamic Capability Theory, the study investigates the possibility of developing an EO as a sustainability outcome through GI.*

Design/methodology/approach – *This study used a quantitative research method and questionnaires, with 120 SMEs as respondents in Indonesia. The data were gathered through a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the direct and indirect relationships among EO, GI, and sustainability performance.*

Findings – *The results indicate that EO positively affects GI and sustainability performance. Nevertheless, the improvement in SP attributable to GI is not significant, and there is no mediating effect of EO on sustainability performance. These results show an innovation-performance gap, indicating the potential of SMEs to produce GI but not necessarily sustainability outcomes.*

Research limitations/implications – *The study contributes to the field of research on Dynamic Capability Theory by differentiating between innovation generation and innovation realisation. However, the speed at which sustainability value is required from GI requires greater organisational transformation and integration to foster an EO.*

JEL : *L26, O32, Q55, Q56*

INTRODUCTION

As the world becomes increasingly concerned about sustainability, environmental pressures, resource limitations and responsible business practices are increasingly shaping a company's competitiveness and longevity. In response to the growing demands of consumers,

regulators, and stakeholders, companies are under increasing pressure to demonstrate their ability to manage environmental impacts and contribute to society, not just in terms of economic results. In such situations, the business must be oriented toward adapting to change, seizing new opportunities, and adjusting its activities to meet sustainability needs. As a result, the study of strategic factors influencing SP has been an important research topic in entrepreneurship and sustainability studies.

The issue is even more important for SMEs because, although SMEs are among the most important pillars of the economy, they are less developed than large corporations in implementing sustainability practices (Manalu et al., 2025). In addition to managerial aspects, the lack of resources, capabilities, access to technology, and financial access is a key factor hindering SMEs from implementing green practices and improving their SP (Silva et al., 2021). With increasing environmental pressures, the need to implement sustainable business practices has become more urgent in Indonesia, especially for SMEs, where low energy efficiency, poor waste management, and limited operational systems often hinder their implementation (Fandeli et al., 2026). In this context, Entrepreneurial Orientation (EO) can be seen as one of the strategic factors that can aid companies in adapting to change, capitalising on opportunities, and revitalising their business activities (Majali et al., 2022). EO is measured as innovativeness, proactiveness, and risk-taking, which directly impact the innovation performance of SMEs (Manalu et al., 2025). EO has a positive effect, encouraging SMEs to develop new products, processes, and services that are more effective and efficient, thereby improving their long-term competitiveness (Manalu et al., 2025). EO itself is a general strategic direction; however, it is not enough for innovation, proactivity, and risk-taking to be applied genuinely towards environmental goals (Melati, 2026).

This restriction is also evident in prior empirical research, where the association between EO and SP is neither direct nor consistent (Fandeli et al., 2026). Many studies suggest that EO, innovation, and entrepreneurial performance are positively correlated, but this is not the case for sustainability and the intermediate mechanisms that link EO and actual sustainability implementation (Melati, 2026). Further, even leadership commitment, GI, and green EO may be unimportant in some SME environments, indicating that situational factors such as environmental turbulence, resources, or organisational maturity can be important (Fandeli et al., 2026). GI is the most likely mechanism to explain this transformation (Musfar et al., 2025). GI refers to product and process improvements and innovations that enhance a company's environmental performance (Coelho et al., 2024). It is also known as a response towards public concerns about global environmental problems and as a strategy to increase the sustainability and profitability of SMEs (Rustiarini et al., 2022).

GI is not the same as EO, EO is an overall strategic preference, whereas GI is an implementation that directly targets minimising the environmental footprint (Coelho et al., 2024). The two approaches of green product innovation and green process innovation enable companies to create more environmentally friendly products and reduce resource use, costs, and negative environmental impacts (Majali et al., 2022). Moreover, GI is associated with competitive advantage, as well as economic, environmental, and social performance (Coelho et al., 2024; Muangmee et al., 2021). This difference forms the basis for establishing GI as a transformative mechanism linking EO and SP (Musfar et al., 2025). EO serves as the engine driving ventures into new opportunities and trying things in different ways. GI provides direction to that engine by adding a green element to entrepreneurial efforts (Febrianda et al.,

2025). Therefore, the sustainability benefits of EO are likely to be realised through a company's ability to leverage its innovation to create sustainable products, processes, or organisational practices (Coelho et al., 2024).

This is supported by empirical evidence in different contexts. The indirect effect of GI on the relationship between Green Entrepreneurial Orientation (GEO) and sustainable business performance is observed among food SMEs in Riau (Musfar et al., 2025). Green digital innovation is the medium that carries the influence of green EO to green sustainable performance in *endek* weaving SMEs in Bali. For manufacturing SMEs in Portugal, green product and process innovations are the mechanisms through which GEO contributes to improving SP from a dynamic capabilities perspective (Antara et al., 2024)(Coelho et al., 2024). Likewise, green product innovation among manufacturing SMEs in Oman has been found to mediate the relationship between green market orientation and sustainable performance (Manalu et al., 2025).

However, recent literature has revealed a growing focus on the academic community from general EO to Green Entrepreneurial Orientation (GEO) (Coelho et al., 2024; Muangmee et al., 2021). GEO refers to the entrepreneurial and environmental orientations, and some definitions even include the social orientation (Muangmee et al., 2021). The "green" element is integrated into the antecedent variables of the general EO; the GEO concept is different from the general EO concept, which does not explicitly include the environmental element (Ye et al., 2022). Evidence on GEO, GI and SP is strong, but not sufficient to answer the questions of general EO (Muangmee et al., 2021; Ye et al., 2022). GEO has been shown to boost green process and product innovation, thereby improving triple-bottom-line performance (Coelho et al., 2024). For SMEs in Indonesia, GEO can also have a positive impact on sustainable business performance in both direct and indirect ways, via GI (Antara et al., 2024; Musfar et al., 2025). However, when considering general EO, however, whether it can also contribute to sustainability when focused on GI remains an issue, as GEO is already entrepreneurial and environmental from the beginning (Muangmee et al., 2021).

Dynamic Capability Theory can be used to answer this question. Accordingly, from this conceptual angle, the strategic orientation is useful when linked to capabilities, resource securing, innovation, and process reconfiguration and adaptation to the environment (Ye et al., 2022). GI is a concrete manifestation of such a shift, translating resources, creativity, and opportunities into practices that enhance sustainability outcomes (Muangmee et al., 2021). Therefore, the impact of EO on sustainability should be seen as a process of transformation, rather than as a given. The empirical context of Indonesian SMEs is highly relevant for testing this argument (Tjahjadi et al., 2026). The impact of competitive pressure, market needs, technological change, and growing environmental pressures (Fandeli et al., 2026; Febrianda et al., 2025). on SMEs in Indonesia has been felt. At the same time, research in Indonesia shows that innovation, organisational creativity, digital skills, and disciplined management processes can help SMEs realise innovation from a sustainable perspective in the realisation of strategic orientations (Antara et al., 2024). There is also evidence that these effects might require institutional support, market orientation, organisational maturity, and resource availability (Fandeli et al., 2026; Ishaq et al., 2024).

Therefore, the context of Indonesian SMEs is deemed important for examining whether EO can drive SP through GI as a means of transformation (Rustiarini et al., 2022). Conceptually, this approach helps to distinguish the entrepreneurial impetus from the environmental

direction, which would simultaneously contribute to the understanding of the entrepreneurial phenomenon in the field by analysing the relationship between variables as well as the understanding of the role of sustainability processes in SMEs (Muangmee et al., 2021; Tjahjadi et al., 2026).

The following are three contributions of this research. First, it contributes to the literature on EO (EO) by differentiating EO from Green EO and showing that it is essential to examine whether a general EO can lead to sustainability, even when the antecedent construct does not explicitly include environmental factors. Second, it contributes to the literature on GI by positioning it as a transformative means that imparts an environmental orientation to the entrepreneurial attitude, rather than merely as a direct determinant of performance. Third, it offers a more sophisticated view of the link between entrepreneurship and sustainability by demonstrating that entrepreneurship does not equate to SP and that the sustainability value of EO emerges only when the firm is able to translate it into GI. This study, therefore, helps clarify not only the influence of EO on sustainability but also the mechanisms by which it affects sustainability.

LITERATUR REVIEW

The study concept is grounded in integrating the Resource-Based View (RBV) and Dynamic Capability Theory to examine the relationships among EO, GI, and sustainability performance. Firms can benefit from resources and capabilities that are valuable, rare, inimitable and non-substitutable, as viewed from an RBV perspective (Barney, 1991). In this context, EO can be seen as an intangible strategic resource for identifying business opportunities, acting proactively, and taking risks in a changing business environment (Alshebami, 2023). The RBV also suggests that having resources does not necessarily confer a performance advantage; rather, resources need to be well mobilised and used to produce value (Muangmee et al., 2021). This explanation is supported by the Dynamic Capability Theory (DCT), which emphasises a firm's capacity to adapt and reconfigure its resources in response to environmental shifts (Teece, 2018). EO in this study is conceptualised as a strategic posture that compels firms to seek opportunities and initiate transformation. At the same time, GI is considered a mechanism of transformation that turns resources, knowledge, and opportunities into environmentally oriented products, processes, technologies, and practices (Majali et al., 2022). GI, therefore, plays a crucial role as a mechanism for achieving an EO and creating SP (Nguyen-Van et al., 2025).

This framework also introduces the concepts of EO and GEO. In this study, environmental orientation is a construct formed during the process of GI, yet GEO explicitly includes an environmental orientation within the concept of entrepreneurship (Zhang et al., 2024). This is important because EO alone does not imply a positive environmental outcome, as the sustainability effect of EO will depend on firms' capacity to focus their entrepreneurial energies on environmentally relevant innovations (Makhloufi et al., 2022). Therefore, by adopting the RBV and DC theory, EO is seen as a strategic factor, GI as a transformation process, and SP as the result of the small business owner's strategic work (Muangmee et al., 2021). This framework clarifies not only whether EO affects SP but also how it can contribute to sustainability through GI. In this way, the theoretical framework can be used to explore the possibility of GI as a mediator between the EO and SP(Nguyen-Van et al., 2025).

Entrepreneurial Orientation and Sustainability Performance

In this complex business environment, SMEs are expected not only to achieve economic profit but also to meet environmental and social challenges (Akomea et al., 2023; Frare et al., 2022). From this perspective, SP is now an important measure of an organisation's success and a means of assessing a company's ability to remain economically viable while controlling its environmental and social impacts. As a result of these changing requirements, companies must adopt strategic orientations that enable them to seize opportunities, proactively address change, and innovate for long-term sustainability (Öztürk et al., 2024). Amongst these strategic orientations, EO (EO) has received considerable research attention as a tendency of firms to be innovative, proactive, and risk-taking (Yaghoubi Farani et al., 2024).

The EO of a firm refers to its strategic positioning in terms of opportunities and uncertainty through three aspects: innovativeness, proactiveness, and risk-taking (Ingram et al., 2023). Businesses have to be innovative in trying out new ideas and solutions, proactively focused on changes in the business environment, and ready to invest resources in those opportunities with some risk (Abid et al., 2024). RBV of the firm, EO can be considered a strategic resource and capability that enables the firm to discover and act upon opportunities before its competitors do. Thus, firms that are entrepreneurially oriented should, in theory, have a greater capacity to respond to market changes and to create new ways of acting that would help them perform in the long run. EO, however, does not necessarily follow sustainability performance. Innovativeness, proactiveness, and risk-taking behaviour are not necessarily environmentally oriented (Zhang et al., 2024). For example, corporate innovation may improve product competitiveness but may also lead to increased resource consumption and waste production. In the same way, a proactive approach can open up market opportunities that do not necessarily improve resource efficiency, and a risk-taking attitude can lead to investments in business opportunities that are evaluated for economic rather than environmental or social reasons. Therefore, EO can be used as a strategic force to drive change but not to define its direction (Zhang et al., 2024).

This is why EO and SP do not always exhibit a one-to-one relationship or uniformity (Zhang et al., 2024). Several studies have shown that EO can enhance firm performance by providing firms with the flexibility to pursue opportunities and create innovations (Abid et al., 2024). However, other research indicates that the influence of EO on SP depends on the organisation's capacity to translate its sustainability orientation into sustainability-relevant actions (Ingram et al., 2023).

Green Innovation to Improve Sustainability Performance

GI is considered one of the most important mechanisms which may help companies respond to environmental demands without compromising their competitiveness (Coelho et al., 2024). It involves the design and application of products, processes, technologies, and organisational practices that minimise harmful environmental effects, optimise resource use, and contribute to sustainability objectives (Manalu et al., 2025). GI is more tangible in terms of organisational actions and processes, and in response to environmental problems. In contrast, EO is a company's strategic orientation or posture. As a result, GI is a key element in connecting strategic orientation with the realisation of a company's sustainable performance (Xiao et al., 2023). SMEs are especially vulnerable to resource and technological constraints, and to a lack of knowledge and managerial skills (Baeshen et al., 2021). which is why the role of GI is more

important for these businesses. In such scenarios, GI can help SMEs create ecologically friendly products, optimise production processes, minimise energy and raw material usage, and improve waste management (Wasiq et al., 2023). At the same time, this can provide economic advantages through lower operating costs, stronger product differentiation, a boost in reputation, and the ability to meet changing consumer desires. Therefore, GI is defined as both a solution to environmental pressures and a management competence that can enhance economic, environmental, and social outcomes (Ahmed et al., 2023).

According to Dynamic Capability Theory, GI is the capacity of a company to convert resources, knowledge and opportunities into new environmentally inspired solutions (Teece et al., 1997). Knowing environmental resources is not enough for any business to make it happen; it needs the ability to see opportunities, allocate resources, change routines, and adopt new solutions (Makhloufi et al., 2022). Based on this view, GI is a process that helps companies to transform resources and knowledge into products, processes and practices that are both environmentally and economically beneficial (Majali et al., 2022). This view is important because EO does not necessarily lead directly to sustainability performance, but it needs to be translated into action through organisational mechanisms. Empirical studies also show a positive relationship between GI and other aspects of SP (Guo et al., 2020). Companies that can develop a green product or process are more likely to increase resource efficiency, reduce environmental impact, and improve their competitiveness. GI, however, does not fully account for its drivers. The motivations for GI may come from regulation, stakeholder pressure, consumer demand, or technological change. Thus, it is crucial to differentiate between the strategic orientation that motivates a business to act and the capabilities that enable it to act on the environment. In this framework, EO serves as the strategic orientation, whereas GI is an enabling mechanism to drive that orientation toward sustainability (Majali et al., 2022).

Entrepreneurial Orientation and Green Innovation

EO is related to GI through the ability to identify opportunities, develop solutions to them, and take proactive action in response to environmental changes, as discussed by (Majali et al., 2022). Companies with high EO are more likely to be experimental, develop new products, alter manufacturing practices and embrace new technologies (Alshebami, 2023). Innovative features motivate companies to explore other possibilities; proactivity allows companies to anticipate changes in the environment and the market, and taking risks gives the courage to invest in innovative projects with uncertain results. EO can therefore be a key pillar to build GI. EO is a strategic, intangible resource that helps companies identify and capitalise on opportunities (Alshebami, 2023). On the other hand, GI is a company's capability to mobilise and integrate these resources to create products, processes, or practices that are less harmful to the environment (Muangmee et al., 2021). Moreover, the dynamic capabilities perspective holds that companies must be able to sense, seize, and transform to remain competitive in a changing environment. EO can enhance a company's capability to identify and leverage environmental opportunities, and GI is the process that transforms EO into action (Nguyen-Van et al., 2025).

Based on empirical evidence, the relationship between EO and GI has generally been found. However, in recent years, the idea of the GEO has increasingly been used as an antecedent variable. The difference between EO and GEO is important because the latter explicitly incorporates environmental issues into the EO, whereas the former lacks an inherent

environmental orientation (Muangmee et al., 2021). Therefore, it is challenging to determine whether the innovation is a result of entrepreneurial traits or of the environmental dimension of the GEO construct (Coelho et al., 2024). This study does not assume that a company needs to be green-entrepreneurially oriented to create GI. Rather, it explores the potential to direct and translate EO in general toward GI. Through this, GI is not just viewed as a result of EO but as a process that gives an environmental orientation to the firm's entrepreneurial effort.

The Mediating Mechanism, Green Innovation.

Incorporating GI as a mediating variable provides a broader understanding of how EO influences SP (Frare & Beuren, 2022). EO is a firm's willingness to pursue opportunities, try things out, take initiative, and take risks. These characteristics, however, need to be translated into organisational activities before impacts on sustainability can be expected (Beuren et al., 2018). This mechanism is possible through the evolution of GI, such as products, processes, technologies, and organisational practices, that are directly related to the reduction of environmental impacts and the improvement of resource efficiency (Coelho et al., 2024). This correlation can be approached in a stepped manner. The introduction of EO fosters an entrepreneurial drive to identify opportunities and provoke change (Frare & Beuren, 2022). Second, this push leads companies to innovate or act green; ultimately, it drives direct action to address environmental challenges. Third, the transformation of the economy towards GI results in better resource use, lower environmental impacts, product differentiation and firm competitiveness, which in turn drives sustainability performance.

The research conducted so far has confirmed the role of innovation as a mechanism between EO and performance (Frare & Beuren, 2022). Research on EO and sustainability is also beginning to demonstrate that EO and SP are connected through GI (Coelho et al., 2024). In the meantime, research on GEO suggests that Green Product and Green Process innovations play an important role in attaining environmental and SP (Muangmee et al., 2021). However, there is a conceptual problem arising from the widespread use of GEO, since the antecedent variable already includes a notion of orientation towards the environment. Therefore, it remains unclear how a general EO can contribute to sustainability if environmental aspects are not explicitly incorporated into the EO construct. To tackle this issue, this study theoretically differentiates EO from GI (Makhloufi et al., 2022). EO is positioned here as a strategic stimulus, and GI is seen as a mechanism that helps guide the strategic stimulus towards achieving environmental goals. Therefore, GI can be defined as an instrument that "greens" EO, i.e., making the entrepreneurial impulse to innovate, act proactively, and take risks into actions that create beneficial effects for the environment and contribute to corporate sustainability (Mu et al., 2026).

Hypotheses development

Green Innovation and Sustainability Performance

EO is a strategic orientation that includes innovativeness, proactivity, and risk-taking (Öztürk et al., 2024). These qualities help companies proactively adapt to changes in the business landscape, identify new possibilities, and make decisions in advance to counteract future market pressures (Alshebami, 2023). As part of the sustainability strategy, these

capabilities can help companies meet the expectations of consumers, environmental laws and standards, resource limitations and stakeholder pressures (Abid et al., 2024). EO can be considered a strategic resource that enables firms to gain a competitive advantage through their capacity to recognise and exploit opportunities, as stated in the RBV (Dias et al., 2021). Entrepreneurially oriented firms are more inclined to invest in new activities that may improve future firm performance and are more open to change (Vrontis et al., 2022). Proactivity helps companies anticipate environmental changes, and innovativeness and risk-taking can give them room to develop new methods to address sustainability issues (Zhang et al., 2024).

The impact of EO on sustainability, however, is not to be taken for granted. EO is not a direct expression of an environmental orientation. This implies that it is possible to achieve economic benefits from innovative, proactive, and risk-taking activities without necessarily reaping environmental benefits. However, EO can lead to better SP when companies leverage their entrepreneurial mindset to meet environmental requirements and optimise resource use (Zhang et al., 2024). EO can therefore help create a mindset for change that enables companies to reach sustainability goals. This could be supported by previous studies showing that EO is linked to sustainability performance, based on the firm's exploration ability, innovativeness, and adaptability to environmental changes (Abid et al., 2024). Therefore, the greater the EO, the greater the ability to increase SP (Dias et al., 2021). Based on this, this study sets forth the hypothesis that:

H_1: The Entrepreneurial Orientation has a positive impact on sustainability performance.

Entrepreneurial Orientation and Green Innovation

The EO is also regarded as a key factor in the development of GI *(Muangmee et al., 2021)*. Companies with strong EO are more likely to think outside the box, anticipate market changes, and adopt innovative approaches to their products or services (Alshebami, 2023). These qualities foster a context in which companies actively explore and adopt new strategies and solutions to reduce their environmental footprint, including product, process, or organisational innovations (Coelho et al., 2024). Dynamic Capability Theory views firms as capable of sensing, seizing, and transforming resources in response to environmental changes (Nguyen-Van et al., 2025). Proactive companies are quicker to sense and seize opportunities in the environment, and EO can boost these capabilities (Baquero, 2024). Innovativeness and a propensity for risk-taking can, on the other hand, lead to the emergence of new solutions that may not pay off in the short term (Majali et al., 2022). Environmentally, it can be achieved by creating ecological products, adopting more efficient production processes, implementing clean technologies, or reducing waste (Muangmee et al., 2021).

This linkage could also be understood through the lens of the Resource-Based View (RBV). EO (EO) is a strategic resource that can help firms leverage existing resources and integrate them to create innovations (Coelho et al., 2024). Firms are more likely to pursue innovation to improve resource efficiency and reduce environmental harm when EO is applied to environmental challenges. This means that entrepreneurial traits are not necessarily 'green', but they can motivate the creation of GIs (Majali et al., 2022; Wang et al., 2023). GI, therefore, is a concrete expression of a company's entrepreneurial attitude towards environmentally oriented behaviour. Based on this, this study sets forth the hypothesis that:

H_2: Entrepreneurial Orientation has a positive effect on Green Innovation.

Green Innovation and Sustainability Performance

GI is about a company's capacity to develop and adopt a product, process, technology, or organisational practice that generates value for the company while simultaneously addressing negative environmental impacts (Makhloufi et al., 2022). GI is a concrete response by a company to environmental problems, while EO is an orientation (Muangmee et al., 2021). Therefore, the link between GI and the achievement of SP is more direct (Coelho et al., 2024). From the perspective of Dynamic Capability Theory, GI is a firm's capability to adapt its resources and/or capabilities to changing environmental conditions (Nguyen-Van et al., 2025). Companies can achieve greater productivity in the production process, lower energy and raw material requirements, and minimise waste by employing GI, thereby creating more environmentally friendly products (Manalu et al., 2025). These changes can not only benefit the environment but can also provide economic savings, improved efficiency, product differentiation, and improved competitiveness.

A RBV approach suggests that GI can also enable companies to convert their knowledge, technology, and resources into something hard to replicate. The capacity to continually innovate green solutions can provide a competitive edge in the market and among stakeholders when they are concerned with sustainability (Zhang et al., 2024). Therefore, GI is not only a tool that meets environmental challenges but also a strategic instrument for achieving sustainability. Thus, companies with a greater capacity to develop and apply GI should be able to outperform in economic, environmental, and social performance (Coelho et al., 2024; Muangmee et al., 2021). Based on this, this study sets forth the hypothesis that:
H_3: Green Innovation positively affects sustainability performance.

The Mediating Role of Green Innovation

GI can be seen as a mediator between EO and SP, thereby explaining their relationship. *(Coelho et al., 2024)*. While these qualities may lead a firm to seek opportunities or act proactively, they do not necessarily lead to sustainability-oriented actions (Frare & Beuren, 2022). A mechanism is thus needed to translate entrepreneurial spirit into sustainable action. This is considered the mechanism of GI (Nguyen-Van et al., 2025). The mediation process can be conceptualised as having three stages. First, EO stimulates companies to be prepared for opportunities and change (Alshebami, 2023). Organisations characterised by high EO are more likely to explore new technologies, products, and processes (Anwar et al., 2024). Secondly, this orientation fosters the development of GI as a tangible response by the firm to environmental issues (Baquero, 2024). Thirdly, GI allows companies to reap economic, environmental, and social dividends that boost SP(Manalu et al., 2025).

This reasoning is consistent with the Dynamic Capability Theory, which suggests that organisational advantage is as much about a firm's ability to change and reconfigure its resources in response to environmental changes as it is about resource ownership. From this research perspective, EO is a strategic posture, and GI is the mechanism for the transformation. Thus, EO provides the impetus for action, whereas GI lends an environmental direction to that impetus. This argument also makes an important distinction between EO and green EO (GEO). The study further investigates the general EO towards the environment, which is situated at the innovation stage in the entrepreneurial construct of GEO and presents an orientation towards the environment (Frare & Beuren, 2022). The method enables the study to show that entrepreneurship need not be 'green' to produce sustainability results; when interpreted as 'GI'

for the firm, it can do so. EO is therefore likely to affect SP both directly and by enabling the firm to create GI. Therefore, GI is a link between EO and SP (Alshebami, 2023)(Manalu et al., 2025; Muangmee et al., 2021). Based on this, this study sets forth the hypothesis that:
H_4: Green Innovation positively mediates the relationship between Entrepreneurial

Orientation and sustainability performance.

The theoretical framework and hypothesis development form the basis for the research model presented in Figure 1.

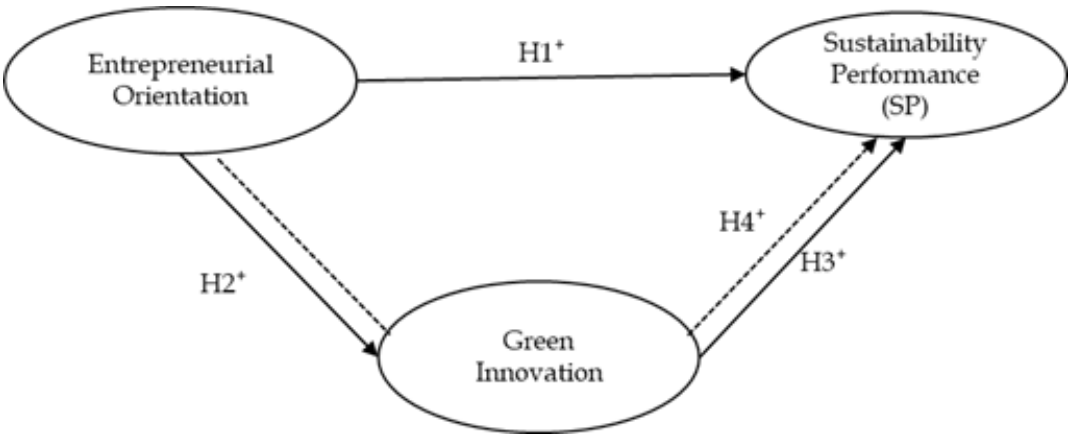


Figure 1. Research Model

RESEARCH METHOD

This study investigates the effect of EO on SP, with GI positioned as a mediating variable. Specifically, the study examines both the direct relationship between EO and SP and its indirect relationship through GI. The research was conducted within the natural operating environment of Small and Medium-sized Enterprises (SMEs), allowing business activities to take place without researcher intervention. A quantitative research design was adopted to empirically assess the relationships proposed in the research model. The SME represents the unit of analysis, while the owner or manager was designated as the key informant. Owners and managers were chosen as respondents because they are expected to possess relevant knowledge about business strategies, operational processes, innovation activities, and sustainability-related performance. Researcher involvement was limited to data collection, with primary data obtained through a structured questionnaire and no intervention in the respondents' business operations.

The study employed a non-probability sampling technique using purposive sampling (Etikan et al., 2016). Respondents were recruited according to predetermined criteria aligned with the objectives of the study. The required criteria were: (1) being an SME owner or manager; (2) having direct involvement in the day-to-day management and operations of the business; (3) possessing adequate knowledge of the business's activities and development; and (4) having operated the business for a minimum of one year. The application of these criteria was intended to ensure that respondents had sufficient knowledge and practical experience to provide relevant and dependable responses regarding the variables investigated.

Table 1. Operationalization of Research Variable

Type	Variable	Dimension / Formula	Source
Independent Variables	Entrepreneurial Orientation (EO)	1. Innovativeness 2. Proactiveness 3. Risk-taking	Oyedele et al. (2020)
Mediating Variable	Green Innovation (GI)	1. Green product innovation 2. Green process innovation 3. Green organizational innovation 4. Green technology and resource innovation	(Asad, 2024)
Dependent Variable	Sustainability Performance (SP)	1. Economic performance 2. Environmental performance 3. Social performance	Ali et al. (2021)

All variables were measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. EO was measured through innovativeness, proactiveness, and risk-taking. GI was measured through indicators reflecting environmentally friendly processes, environmental management, green products, resource efficiency, green technologies, and related green practices. SP was measured through economic, environmental, and social performance.

Population

The population of this study consists of SMEs actively operating in Indonesia. The SME sector was selected because SMEs play an important role in economic activity while simultaneously facing increasing demands to adopt environmentally responsible business practices and improve sustainability performance. The population was defined as business entities that were actively conducting their operations during the data collection period.

Sample

The research sample was selected using purposive sampling. The sample selection criteria included SME owners or managers who had decision-making authority or were involved in business operations, understood the activities and development of their businesses, and whose businesses had operated for at least one year. The minimum sample size was determined using G*Power version 3.1.9.7 (Memon et al., 2020). Based on the maximum number of predictors in the structural model, the minimum required sample size was 77 respondents. Data collection resulted in 120 valid respondents, indicating that the number of observations exceeded the minimum sample requirement.

Data Sources and Data Collection

This study uses primary data collected through a structured online questionnaire. The questionnaire was distributed to SME owners and managers through social media platforms

and SME community networks. The questionnaire consisted of two sections. The first section collected information concerning respondent and business characteristics, while the second section contained statements measuring EO, GI, and SP. Each measurement item was assessed using a five-point Likert scale, where 1 represents strongly disagree and 5 represents strongly agree. The use of primary survey data enables the study to obtain direct responses from SME owners or managers regarding EO, GI practices, and sustainability performance.

Data Analysis

The collected data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with the assistance of SmartPLS software (Hair et al., 2021). PLS-SEM was selected because the study seeks to examine the predictive relationships among latent constructs and evaluate the mediating role of GI. The analysis consisted of two main stages: measurement model evaluation (outer model) and structural model evaluation (inner model). The outer model was evaluated to assess the reliability and validity of the measurement instruments through outer loading, Average Variance Extracted (AVE), Cronbach's alpha, Composite Reliability (CR), and discriminant validity. The inner model was subsequently evaluated using R-square (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficients. Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS. The significance of the relationships was assessed based on the t-statistic and p-value, with a significance level of 5%. The mediation hypothesis was examined through the indirect effect of EO on SP through GI. The direct effect of EO on SP and the indirect effect through GI were evaluated to determine the role of GI in the proposed research model.

RESULTS

Table 2. Demographic Respondent

Characteristic	Description	Number	Percentage (%)
SMEs	Trade	87	73
	Service	25	21
	Manufacturing	8	7
	Total	120	100
Length of time the UKM has been operating	< 5 years	49	41
	5 - 10 years	54	45
	10 – 15 years	12	10
	>15 years	5	4
	Total	120	100
Location	Kalimantan	21	18
	Sumatra	17	14
	Java	70	58
	Nusa Tenggara Timur	4	3
	Maluku Utara	6	5
	Sulawesi Selatan	1	1
	Papua Barat	1	1

	Total	120	100
Sales Results/Year	< 300 Million	84	70
	300 Million – 2 Billion	33	28
	2– 15 Billion	2	2
	15– 50 Billion	1	1
	Total	120	100
Gender	Man	40	33
	Woman	80	67
	Total	120	100
Age	20 – 35 years	77	64
	36 - 50 years	37	31
	>50 years	6	5
	Total	120	100
Last education	Senior High School	53	44
	Bachelor	58	48
	Master's degree	9	8
	Total	120	100
Working Period at SMEs	< 1 years	10	8
	2- 5 years	54	45
	>5 years	56	47
	Total	120	100
Positions in SMEs	SMEs owners	105	88
	Management	15	13
	Total	120	100

Source: PLS Output (2026)

According to Table 2, the study involved 120 SME respondents. Most SMEs operated in the trade sector (73%) and had been in operation for 5–10 years (45%). The majority were located in Java (58%) and reported annual sales below IDR 300 million (70%). Most respondents were female (67%), aged 20–35 years (64%), and held a bachelor's degree (48%). In terms of experience, 47% had worked in SMEs for more than five years, while 45% had 2–5 years of experience. The respondents were predominantly SME owners (88%), indicating that most participants were directly involved in business management and decision-making. Overall, the respondent characteristics indicate that the sample primarily represents relatively small-scale SMEs with experienced owners or managers who are directly engaged in business operations.

Descriptive Analysis

Table 3. Statistic Descriptive

Name	Mean	Median	Scale min	Scale max	Standard deviation
GI1	4.63	5.00	3.00	5.00	0.52

GI2	4.62	5.00	1.00	5.00	0.59
GI3	4.66	5.00	2.00	5.00	0.54
GI4	4.50	5.00	2.00	5.00	0.67
GI5	4.58	5.00	1.00	5.00	0.68
GI6	4.18	5.00	1.00	5.00	1.03
GI7	4.49	5.00	3.00	5.00	0.61
GI8	4.28	4.00	2.00	5.00	0.82
GI9	4.32	5.00	2.00	5.00	0.83
GI10	4.58	5.00	3.00	5.00	0.60
GI11	4.48	5.00	3.00	5.00	0.68
GI12	3.88	4.00	1.00	5.00	1.32
SP1	4.55	5.00	1.00	5.00	0.63
SP2	4.53	5.00	1.00	5.00	0.66
SP3	4.47	5.00	1.00	5.00	0.72
SP4	4.62	5.00	1.00	5.00	0.61
SP5	4.56	5.00	1.00	5.00	0.66
SP6	4.60	5.00	1.00	5.00	0.61
SP7	4.52	5.00	1.00	5.00	0.74
SP8	4.59	5.00	1.00	5.00	0.61
SP9	4.63	5.00	2.00	5.00	0.55
EO1	4.58	5.00	2.00	5.00	0.62
EO2	4.60	5.00	1.00	5.00	0.62
EO3	4.53	5.00	2.00	5.00	0.61
EO4	4.60	5.00	2.00	5.00	0.58
EO5	4.58	5.00	1.00	5.00	0.65
OC1	4.38	5.00	1.00	5.00	0.81

Source: PLS Output (2026)

Table 3 shows that the respondents reported relatively high levels of EO, GI, and sustainability performance. The mean scores range from 3.88 to 4.66, with most indicators having a median of 5.00, indicating a tendency toward positive responses. For GI, GI3 has the highest mean (4.66), while GI12 has the lowest mean (3.88) and the highest standard deviation (1.32), indicating greater variation in respondents' perceptions. SP shows consistently high scores, with means ranging from 4.47 to 4.63 and relatively low standard deviations (0.55–0.74). EO also demonstrates high and consistent responses, with means ranging from 4.53 to 4.60 and standard deviations between 0.58 and 0.65. Overall, the descriptive statistics indicate that the sampled SMEs generally perceive their EO, GI, and SP positively. These results provide an initial overview of the data, while the relationships among the constructs are examined through the subsequent measurement and structural model analyses.

Table 4. Common Method Bias (CMB) Test Using Full Collinearity VIF

Item	VIF
EO2	2.399

EO3	2.366
EO4	2.527
EO5	2.450
GI1	2.442
GI10	2.304
GI11	3.081
GI2	2.003
GI7	1.934
GI8	1.993
SP2	2.386
SP3	2.388
SP4	4.283
SP5	3.691
SP6	3.573
SP7	3.136
SP8	4.276

Source: PLS Output (2026)

Table 4 presents the results of the Common Method Bias (CMB) test using the full collinearity Variance Inflation Factor (VIF) approach in PLS-SEM. The findings indicate that all VIF values range from 1.934 to 4.283, which remain below the threshold value of 5. These results suggest that the research model is free from serious multicollinearity and common method bias issues. According to Joseph F. Hair Jr. et al. (2021), VIF values below 5 indicate that collinearity problems are not critical and can still be considered acceptable in structural model assessment. Therefore, the constructs of EO, GI, SP, and their interaction effects do not exhibit problematic levels of collinearity, confirming that the model is statistically reliable for further hypothesis testing.

Table 5. Outer Loading Test Results

Item	Outer loadings
EO (AVE = 0.760: CR = 0.927: CA = 0.895)	
EO2	0.874
EO3	0.858
EO4	0.874
EO5	0.881
GI (AVE = 0.623: CR = 0.908: CA = 0.879)	
GI1	0.827
GI2	0.766
GI7	0.740
GI8	0.768
GI10	0.784

GI11	0.844
SP(AVE = 0.730: CR = 0.950: CA = 0.938)	
SP2	0.798
SP3	0.800
SP4	0.896
SP5	0.876
SP6	0.860
SP7	0.841
SP8	0.905

Source: PLS Output (2026)

The results in Table 5 indicate that the measurement model demonstrates adequate reliability and convergent validity. The outer loadings of all retained indicators range from 0.740 to 0.905, exceeding the minimum recommended value of 0.70. This indicates that each indicator adequately represents its respective construct. EO shows strong measurement quality, with an AVE of 0.760, composite reliability of 0.927, and Cronbach's alpha of 0.895. GI also meets the required criteria, with an AVE of 0.623, composite reliability of 0.908, and Cronbach's alpha of 0.879. Similarly, SP demonstrates strong reliability and convergent validity, reflected in an AVE of 0.730, composite reliability of 0.950, and Cronbach's alpha of 0.938. Taken together, the AVE values above 0.50 confirm that the constructs explain a substantial proportion of the variance in their indicators, while the reliability coefficients above 0.70 indicate satisfactory internal consistency. Therefore, the retained indicators provide a sound basis for proceeding to the structural model assessment.

Table 6. Heterotrait-monotrait ratio (HTMT)

Item	Heterotrait-monotrait ratio (HTMT)
GI <-> EO	0.863
SP <-> EO	0.897
SP <-> GI	0.795

Source: PLS Output (2026)

Discriminant validity was assessed using the Heterotrait–Monotrait (HTMT) ratio, as presented in Table 6. The HTMT values range from 0.795 to 0.897 and remain below the conservative threshold of 0.90. The highest HTMT value is observed between SP and EO (0.897), indicating that these two constructs are closely related but remain empirically distinguishable. The HTMT ratios between GI and EO (0.863) and between SP and GI (0.795) are also below the recommended threshold. Overall, the results provide evidence of adequate discriminant validity, indicating that EO, GI, and SP represent empirically distinct constructs. Although the HTMT value between SP and EO approaches 0.90, it remains within the acceptable range and therefore does not indicate a critical discriminant validity concern.

Table 7. Fornell Lacker Criterion

Item	EO	GI	SP
EO	0.872		
GI	0.781	0.789	
SP	0.829	0.742	0.855

Source: PLS Output (2026)

The Fornell–Larcker criterion indicates that the square root of the AVE for each construct is higher than its correlations with other constructs. Therefore, the Fornell–Larcker criterion is satisfied, confirming adequate discriminant validity among EO, GI, and SP. These results indicate that each construct is empirically distinct from the other constructs in the research model.

Table 8. Structural Model Assessment Result

Relationship	Hypothesis	T Statistics	Effect Size (f^2)	p-value	Conclusion
Direct Effect					
Entrepreneurial Orientation → Sustainability Performance	H1	3.832*	0.547	0.000	Supported
Entrepreneurial Orientation → Green Innovation	H2	20.467*	1.568	0.000	Supported
Green Innovation → Sustainability Performance	H3	1.608**	0.079	0.054	Not Supported
Indirect Effect					
Entrepreneurial Orientation → Green Innovation → Sustainability Performance	H4	1.586***	0.052	0.056	Not Supported
SRMR	0.091				
R^2 Green Innovation	0.611				
Sustainability Performance	0.710				

*Note * = p < 0.05, Supported*
*** = Not Supported*
**** = Not Supported Mediating Effect*
SRMR= Standardized Root Mean Square Residual.

Source: PLS Output (2026)

The results in Table 8 show that EO has a positive and significant effect on SP (T = 3.832; p < 0.001), supporting H1, with a substantial effect size (f^2 = 0.547). This finding indicates that SMEs with a stronger EO tend to demonstrate better sustainability performance. In PLS-SEM, effect sizes are useful for assessing the practical contribution of an exogenous construct beyond statistical significance (Hair et al., 2019).

EO also has a positive and significant effect on GI (T = 20.467; p < 0.001), supporting H2. The effect size is substantial (f^2 = 1.568), indicating that EO makes a meaningful contribution to explaining variations in GI. In contrast, GI does not have a statistically significant effect on SP (T = 1.608; p = 0.054), leading to the rejection of H3. Although the p-value is close to the 5% significance threshold, it remains above 0.05; therefore, the relationship cannot be considered statistically significant at the conventional level (Hair et al., 2019). The relatively small effect size (f^2 = 0.079) further suggests that GI contributes only modestly to explaining SP.

The indirect effect of EO on SP through GI is also not significant (T = 1.586; p = 0.056), and therefore H4 is not supported. This result indicates that GI does not significantly transmit the effect of EO to SP. Thus, although EO strongly promotes GI, the increase in GI does not translate into a statistically significant improvement in SP within the present model. The model demonstrates relatively strong explanatory power. EO explains 61.1% of the variance in GI (R^2 = 0.611), while EO and GI jointly explain 71.0% of the variance in SP (R^2 = 0.710). These R^2 values indicate that the model has substantial explanatory capacity for the endogenous constructs. In addition, the SRMR value of 0.091 is below the commonly used threshold of 0.10, indicating an acceptable level of model fit (Hair et al., 2014).

Overall, the findings emphasize the direct role of EO in improving both GI and SP. However, the non-significant effects of GI on SP and its mediating role suggest that GI may require additional organizational or contextual conditions before it can contribute effectively to sustainability outcomes among Indonesian SMEs.

Table 9. Prediction Results

	Q^2predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
GI1	0.413	0.401	0.309	0.401	0.309
GI2	0.506	0.423	0.310	0.436	0.284
GI7	0.181	0.554	0.395	0.595	0.427
GI8	0.265	0.705	0.551	0.733	0.574
GI10	0.310	0.502	0.341	0.524	0.355
GI11	0.328	0.564	0.378	0.595	0.403
SP2	0.530	0.455	0.310	0.439	0.281
SP3	0.425	0.550	0.366	0.539	0.353
SP4	0.511	0.429	0.268	0.451	0.283
SP5	0.424	0.503	0.326	0.530	0.355
SP6	0.539	0.420	0.273	0.432	0.268
SP7	0.425	0.567	0.355	0.583	0.357
SP8	0.475	0.448	0.291	0.451	0.295

Source: PLS Output (2026)

Table 9 presents the predictive assessment using Q^2predict and the comparison of prediction errors between PLS-SEM and the linear model (LM). All indicators of GI and SP show positive Q^2predict values, ranging from 0.181 to 0.539. Positive Q^2predict values indicate that the model provides predictive relevance for the endogenous constructs (Hair et al., 2017; Shmueli et al., 2019). The highest Q^2predict values are observed for SP6 (0.539), SP2 (0.530), and SP4 (0.511), suggesting relatively stronger predictive relevance for these indicators.

The predictive performance was further assessed by comparing the RMSE and MAE values of PLS-SEM with those of the LM benchmark. The results show that PLS-SEM produces lower prediction errors than LM for several indicators, particularly GI7, GI8, GI10, and GI11, as well as SP3, SP5, SP7, and SP8. However, for GI1, GI2, SP2, SP4, and SP6, the LM produces slightly lower prediction errors than PLS-SEM. Therefore, the results do not support the conclusion that PLS-SEM consistently outperforms the LM across all indicators.

Nevertheless, the positive Q^2predict values across all indicators demonstrate that the model possesses predictive relevance. Following the PLS predict approach, the comparison with the LM benchmark provides additional evidence regarding the model's out-of-sample predictive performance (Shmueli et al., 2019). Overall, the findings indicate that the proposed model has meaningful predictive capability, although its predictive performance varies across individual indicators.

DISCUSSIONS

This study offers valuable empirical evidence on the processes through which EO fosters GI and sustainability performance, highlighting that these processes are distinct (Coelho et al., 2024). The results show that EO has a significant impact on GI and it has a direct effect on SP(Baquero, 2024; Coelho et al., 2024; Manalu et al., 2025; Zhang et al., 2024). On the other hand, GI has no significant positive effect on SP and is not a mediating variable between EO and SP(Baquero, 2024; Majali et al., 2022; Zhang et al., 2024). These results indicate that EO has been successfully used as a strategic driver. However, GI has not yet been used as an effective translation mechanism to achieve SP *(Watto et al., 2025)*. Therefore, EO and the ability to create GI do not automatically translate into measurable sustainability outcomes (Coelho et al., 2024).

The positive link between EO and GI suggests that, for companies to respond to environmental change, innovativeness, proactivity, and a propensity for risk-taking are important prerequisites (Coelho et al., 2024). Entrepreneurial companies are more inclined to experiment with new technologies, create new products, enhance production methods, and identify business opportunities from changing environmental demands (Majali et al., 2022). According to the Dynamic Capability Theory, EO is a strategic drive whereby a firm identifies new opportunities and environmental changes and then captures them by creating and executing innovations (Coelho et al., 2024). Thus, GI is a concrete sign of companies' entrepreneurial attitude in response to environmental challenges (Popa et al., 2022). The results confirm the notion that dynamic capabilities are not about reacting to change but about proactively recognising and seizing opportunities created by change (Hurtado-Palomino et al., 2024).

EO is indeed related to the capability for GI, but the reverse is not true: GI has little impact on SP(Majali et al., 2022). This is an "innovation-to-performance gap", meaning the company can create or adopt GI, but has not been able to improve its SP yet directly (Coelho et al., 2024). This can happen because the benefits of GI must be realised for the innovation to be implemented alongside broader organisational processes (Maldonado-Guzmán et al., 2019). Changing to more environmentally friendly products or production processes, for example, might require organisational learning, regular adjustments, competency building and development, integration with the company's operational processes, and value-creation changes (Baquero, 2024). If the company cannot make such changes, GI could be limited to

products, processes, or projects only. It may not create any significant improvements in the company's economic, environmental, and social performance (Watto et al., 2025). For this reason, it is not the difficulty of the innovation itself, but the difficulty of turning the innovation into sustainability value that poses a challenge for a company

The absence of a significant influence of GI on SP suggests that GI is not an independent activity but is embedded in sustainability. Product or process innovations have sustainability benefits only if they are introduced by a company that manages to integrate them into its other systems and strategies (Maldonado-Guzmán et al., 2019). For example, an item that is "eco-friendly" does not necessarily improve SPif the manufacturing process still consumes a lot of energy, the supply chain does not support environmental objectives, or the company is unable to manage the sustainability impacts of any such changes. Likewise, implementing green technology could boost productivity in one particular process or activity without necessarily affecting the company's overall productivity. The Dynamic Capability Theory (DCT) approach to this perspective is rooted in the idea that there are two types of capabilities involved: Innovative capabilities that seize opportunities, and Configurational capabilities that enable changes in organisational configurations. Thus, it can be argued that there are two organisational capabilities involved in innovation generation and innovation realisation, respectively (Alajmi, 2026).

Other study outcomes suggest that EO is directly related to the SP (Baquero, 2024; Watto et al., 2025). The results indicate that a company's SP can be enhanced without solely focusing on achieving GI, especially when it has a strong entrepreneurial attitude (Nguyen-Van et al., 2025). Proactivity helps companies predict market, regulatory, and environmental shifts; innovativeness helps them identify novel approaches to value creation and delivery; and a propensity for risk-taking helps them make strategic decisions when facing uncertainty. These capabilities enable companies to observe and act on environmental shifts and adapt strategically in multiple ways (Hurtado-Palomino et al., 2024). The role of EO (EO) in sustainability need not be seen as GI but rather as a more general process of how organisations change and transform themselves (Huang et al., 2023).

It is interesting to note here that the entrepreneurial-innovative-sustainability (EIS) relationship presents a big paradox (Shehzad et al., 2023). While EO (EO) positively influences GI, GI has yet to be a significant contributor to SP(Coelho et al., 2024). At the same time, EO directly impacts SP(Majali et al., 2022). These results suggest that GI can be achieved through EO, even when the innovation itself is not the primary means of achieving SP(Frare & Beuren, 2022). That is, although a firm might have the dynamic capabilities to recognise opportunities and create innovations, the sustainability gains from these innovations may not be realised via the GI pathway. The results provided an important interpretation of the role of GI in entrepreneurship and sustainability (Baquero, 2024). *GI is theoretically supposed to be a "seizing" which will give an environmental direction to entrepreneurial drive* (Shehzad et al., 2020). However, studies show that this has not yet been fully translated into sustainability performance. Although GI has been successfully created and realised in EO, it has not yet translated the underlying drive into sustainability performance. This indicates the functional limitations of GI as a mediating mechanism: it can be an output of EO but does not necessarily act as a performance-conversion mechanism (Watto et al., 2025).

Theoretical Implications

This study advances the DCT by providing evidence that an organisation's EO enables its responsiveness to change and exploration of new opportunities. EO promotes innovation, proactivity, and risk-taking behaviours among organisations, which are critical to developing GI. The results, therefore, support the DCT view that coping with environmental changes is not simply a function of the resources an organisation has, but how it proactively searches for opportunities and responds to them with strategic moves. The discovery that GI has not yet proven to be a pathway for improving sustainability performance, however, has a particularly strong impact on the evolution of DCT. The results suggest that there is not necessarily a direct connection between the ability to generate innovation and the ability to translate it into organisational results. From the DCT perspective, organisations must move beyond the ability to "seize" (innovation development) to the ability to "transform" (processes, structures, resources, and practices within an organisation) to create sustainable value from innovation. This study, therefore, reveals a gap between innovation and performance, defined as the capacity to create GI and the capacity to implement it and achieve its sustainability impact.

Another interesting result is that, although the influence of EO on SP was mediated by the three variables, EO itself still has a direct effect on sustainability performance, thus extending our understanding of DCT. It shows that EO is expressed not only in the development of GI but also in other forms of strategic adaptation. In the context of environmental change, organisations can proactively and innovatively respond, adapt their business models, seize new opportunities, and sustain themselves without relying on a single type of innovation. Moreover, the lack of support for the mediating role of GI suggests that it is not automatically regarded as a transformation mechanism linking EO and sustainability performance. From a DCT perspective, GI should be considered a consequence of the organisation's 'seizing' capability. In contrast, additional capabilities are needed to improve SP in the areas of 'transformation' and 'integration'. This research, therefore, contributes to DCT by establishing that the ability to create change is distinct from the ability to reap value from a change. This study indicates that, overall, these elements can be considered strategic impetus (EO), GI (innovative response), and SP (sustainable value), reflecting an organisation's ability to translate that response into sustainable value. However, the ability to generate innovation is not enough to determine the success of GI; the capacity to integrate, implement, and add value to GI needs to be added to the mix

Practical Implications

From a practical perspective, the research results show that EO should be enhanced as part of the organisation's dynamic capabilities. Management needs to create a place where employees are encouraged to think outside the box, take proactive steps in response to environmental changes, and take risks. This orientation is essential not only for innovation but also for establishing the organisation's capacity to adapt to environmental change in a more sustainable way. The generation of GI, however, does not automatically improve sustainability performance; rather, it must be ensured. It is not enough to be able to 'produce' GI; it must be 'realised' to increase its value. Evaluation, implementation, development, and integration into business activities are required for each innovation to attain both environmental and economic benefits. As part of the transformation process, organisations should also ensure that GI is incorporated into their operations, production processes, supply chains, marketing, decision-

making, and performance assessment processes. Thus, GI is not just a new product or process; it is an organisational transformation that can achieve sustainability performance. The other implication is the need to develop post-innovation capacities. After the innovation is developed, the organisation needs to learn to do the job, gain competency, coordinate interdepartmentally, and allocate its resources to implement the innovation effectively. The organisational question is not just about how to create GI, but about how to enact such innovation within an organisation to achieve sustainability performance. Therefore, it is concluded that the research message is that EO can be utilised as a strategic tool in achieving sustainability. However, this energy must be utilised during the organisational transformation process. GI plays an important role in this process, but it is not enough without the ability to incorporate and value it.

CONCLUSIONS

This study examines the role of EO (EO) in enhancing SP through GI among small and medium-sized enterprises (SMEs) in Indonesia. The findings provide an important perspective on how entrepreneurial characteristics and innovation capabilities interact in the pursuit of business sustainability. Overall, the results demonstrate that EO plays a more decisive role than GI in explaining sustainability performance. The empirical findings confirm that EO has a significant and substantial effect on GI, indicating that SMEs with stronger entrepreneurial characteristics tend to be more proactive in developing and adopting environmentally oriented innovations. EO also has a significant direct effect on SP, suggesting that entrepreneurial behaviors such as proactiveness, innovativeness, and willingness to take risks can contribute directly to the ability of SMEs to achieve better sustainability outcomes. These findings highlight that EO is not merely a strategic attitude but can become an important organizational capability for SMEs facing increasingly complex economic and environmental challenges.

However, the effect of GI on SP is not statistically significant, and GI does not significantly mediate the relationship between EO and SP. This finding provides an important insight into the sustainability challenges faced by Indonesian SMEs. GI alone may not immediately translate into improved SP because its benefits often depend on complementary resources and capabilities, such as financial resources, technological capabilities, human resources, market access, and effective implementation. For many SMEs, adopting environmentally friendly processes or products may initially require additional investment, while the economic and environmental benefits may only emerge over a longer period. Therefore, the presence of GI should not automatically be interpreted as evidence of improved sustainability performance.

From an SME perspective, the findings suggest that sustainability should be approached as an integrated entrepreneurial process rather than as an isolated innovation activity. SMEs need to strengthen EO while simultaneously developing the organizational capabilities required to convert green initiatives into measurable economic, environmental, and social outcomes. In this context, EO can function as a strategic foundation that encourages SMEs to identify opportunities, respond proactively to environmental changes, and pursue innovative solutions, while supporting capabilities are necessary to ensure that these initiatives generate tangible sustainability benefits. The findings also carry practical implications for policymakers and SME development institutions in Indonesia. Support programs should move beyond

simply encouraging SMEs to adopt green technologies or environmentally friendly practices. Instead, interventions should integrate entrepreneurial development, access to finance, technological assistance, managerial capabilities, and market opportunities. Such an integrated approach may help SMEs overcome the resource constraints that prevent GI from producing immediate improvements in sustainability performance.

In conclusion, this study shows that EO is a critical driver of both GI and SP among Indonesian SMEs, whereas GI alone is insufficient to guarantee superior sustainability outcomes. The absence of a significant mediating effect does not diminish the strategic relevance of GI; rather, it suggests that the transition from EO to SP is more complex than a simple innovation pathway. Future research should therefore examine additional organizational and contextual factors that may strengthen the conversion of GI into sustainability performance, including technological capability, access to green finance, organizational learning, government support, and market orientation. Such efforts are essential for developing a more comprehensive understanding of how Indonesian SMEs can transform entrepreneurial initiatives into long-term and measurable sustainable growth.

Declaration of Generative AI

The authors leveraged Generative AI tools such as ChatGPT, QuillBot, and Grammarly to paraphrase, translate, enhance, and develop ideas. The authors carefully checked the authenticity and validity of all the AI-generated outputs and are solely responsible for the accuracy, originality, and academic integrity of the manuscript.

REFERENCE

Abid, N., Ceci, F., & Aftab, J. (2024). Attaining sustainable business performance under resource constraints: Insights from an emerging economy. *Sustainable Development, 32*(3), 2031-2048. doi:10.1002/sd.2763

Ahmed, R. R., Akbar, W., Aijaz, M., Channar, Z. A., Ahmed, F., & Parmar, V. (2023). The role of GI on environmental and organizational performance: Moderation of human resource practices and management commitment. *Heliyon, 9*(1). doi:10.1016/j.heliyon.2022.e12679

Akomea, S. Y., Agyapong, A., Ampah, G., & Osei, H. V. (2023). EO, sustainability practices and performance of small and medium enterprises: evidence from an emerging economy. *International Journal of Productivity and Performance Management, 72*(9), 2629-2653. doi:10.1108/ijppm-06-2021-0325

Alajmi, N. H. (2026). Resource-centered transformation paths: The role of digital transformation in optimizing SME resources for sustainable entrepreneurship. *Business Strategy and the Environment*. doi:10.1002/bse.70535

Ali, Y., Younus, A., Khan, A. U., & Pervez, H. (2021). Impact of Lean, Six Sigma and environmental sustainability on the performance of SMEs. International Journal of Productivity and Performance Management, 70(8), 2294-2318.

Alshebami, A. S. (2023). GI, self-efficacy, EO and economic performance: Interactions among Saudi small enterprises. *Sustainability, 15*(3), 1961. doi:10.3390/su15031961

Antara, M. E. Y., Martini, I. A. O., & Sugianingrat, I. A. P. W. (2024). Innovation ambidexterity and digital capability as drivers of SMEs' sustainability. *IEEE Access, 12*, 144621-144630.

doi:10.1109/access.2024.3470029

Anwar, S. U., Xu, J., Yuan, P. Z., Su, K., Ur Rehman, S., Hameed, M., . . . Li, F. (2024). Green EO and environmental performance a moderated mediation perspective of perceived environmental innovation and stakeholder pressure. *Scientific Reports, 14*(1), 30266. doi:10.1038/s41598-024-81885-y

Asad, M. (2024). Impact of environmental management on sustainable performance of Pakistani entrepreneurial firms: The mediating role of green product innovation and the moderating effect of transformational leadership. Sustainability, 16(24), 10935.

Baeshen, Y., Soomro, Y. A., & Bhutto, M. Y. (2021). Determinants of GI to achieve sustainable business performance: Evidence from SMEs. *Frontiers in Psychology, 12*, 767968. doi:10.3389/fpsyg.2021.767968

Baquero, A. (2024). Linking green EO and ambidextrous GI to stimulate green performance: a moderated mediation approach. *Business Process Management Journal, 30*(8), 71-98. doi:10.1108/bpmj-09-2023-0703

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120.

Beuren, I. M., Anzilago, M., & Dal Vesco, D. G. (2018). Efectos del uso diagnóstico e interactivo de medidas de evaluación de desempeño en la ambigüedad de los papeles y en el empoderamiento psicológico. *Cuadernos de Administración, 31*(56).

Coelho, A., Ferreira, J., & Proença, C. (2024). The impact of green EO on SPthrough the effects of green product and process innovation: The moderating role of ambidexterity. *Business Strategy and the Environment, 33*(4), 3184-3202. doi:10.1002/bse.3648

Dias, C., Gouveia Rodrigues, R., & Ferreira, J. J. (2021). Small agricultural businesses' performance—what is the role of dynamic capabilities, EO, and environmental sustainability commitment? *Business Strategy and the Environment, 30*(4), 1898-1912. doi:10.1002/bse.2723

Fandeli, H., Tomas, M., Qalbina, F., & Har, N. F. (2026). Key Determinants of SMEs Sustainable Performance in West Sumatra: A PLS-SEM Analysis. *Jurnal Optimasi Sistem Industri, 25*(1), 174-190. doi:10.25077/josi.v25.n1.p174-190.2026

Febrianda, R., Ariyani, L., Hermawati, W., Aminullah, E., & Dinaseviani, A. (2025). Model of Entrepreneurship and Digital Technology in Responding to Green and Non-GI: Case Study of Batik SMEs in Indonesia. *Sustainable Development, 33*(4), 5904-5918. doi:10.1002/sd.3444

Frare, A. B., & Beuren, I. M. (2022). The role of green process innovation translating green EO and proactive sustainability strategy into environmental performance. *Journal of Small Business and Enterprise Development, 29*(5), 789-806. doi:10.1108/jsbed-10-2021-0402

Guo, Y., Wang, L., & Chen, Y. (2020). Green EO and GI: The mediating effect of supply chain learning. *Sage Open, 10*(1), 2158244019898798. doi:10.1177/2158244019898798

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European business review, 31(1), 2-24. https://doi.org/10.1108/EBR-11-2018-0203

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., Ray, S., . . . Sarstedt, M. (2021). An introduction to structural equation modeling. Partial least squares structural equation modeling (PLS-SEM) using R: a workbook, 1-29. https://doi.org/10.1007/978-3-030-80519-7

Hair Jr, J. F., & Sarstedt, M. (2021). Data, measurement, and causal inferences in machine learning: opportunities and challenges for marketing. Journal of Marketing Theory and Practice, 29(1), 65-77. https://doi.org/10.1080/10696679.2020.1860683

Huang, S., Huang, Q., & Soetanto, D. (2023). EO dimensions and the performance of high-tech and low-tech firms: A configurational approach. *European Management Journal, 41*(3), 375-384. doi:10.1016/j.emj.2022.03.002

Hurtado-Palomino, A., De La Gala-Velásquez, B., & Merma-Valverde, W. F. (2024). The synergistic effects of innovativeness, risk-taking and proactiveness on performance of tourism firms. *Tourism Planning & Development, 21*(2), 178-199. doi:10.1080/21568316.2021.2001036

Ingram, G. P. D., Gómez, Y., Ibarra, M. C., Jaramillo, P. E., Robles, K. D., & Carrillo, S. (2023). "Gratitude Is Thanking Someone, and Happiness Is Showing It": A Qualitative Study of Colombian Children's Perspectives on Gratitude. *Revista Colombiana de Psicologia, 32*(2), 33-50. doi:10.15446/rcp.v32n2.100130

Ishaq, M. I., Sarwar, H., Aftab, J., Franzoni, S., & Raza, A. (2024). Accomplishing sustainable performance through leaders' competencies, green EO, and innovation in an emerging economy: Moderating role of institutional support. *Business Strategy and the Environment, 33*(2), 1515-1532. doi:10.1002/bse.3557

Majali, T. e., Alkaraki, M., Asad, M., Aladwan, N., & Aledeinat, M. (2022). Green transformational leadership, green EO and performance of SMEs: The mediating role of green product innovation. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(4), 191. doi:10.3390/joitmc8040191

Makhloufi, L., Laghouag, A. A., Meirun, T., & Belaid, F. (2022). Impact of green entrepreneurship orientation on environmental performance: The natural resource-based view and environmental policy perspective. *Business Strategy and the Environment, 31*(1), 425-444. doi:10.1002/bse.2902

Maldonado-Guzmán, G., Garza-Reyes, J. A., Pinzón-Castro, S. Y., & Kumar, V. (2019). Innovation capabilities and performance: are they truly linked in SMEs? *International Journal of Innovation Science, 11*(1), 48-62. doi:10.1108/IJIS-12-2017-0139

Manalu, V. G., Santoso, A., & Sulaiman, E. (2025). The influence of EO and learning orientation on innovation performance of SMEs in Indonesia: Organizational learning as a mediator. *Problems and Perspectives in Management, 23*(2), 469-481. doi:10.21511/ppm.23(2).2025.34

Melati, M. (2026). Product Differentiation And Digital Promotion In A Bakso Rusuk Microenterprise In Konawe. *Creative Research Management Journal, 9*(1), 22-35. doi:10.21511/ppm.24(1).2026.40

Memon, M. A., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Journal of Applied Structural Equation Modeling.

Mu, R., Workneh, B. A., & Zhang, J. (2026). The interplay of green EO, ambidextrous GI and environmental performance. *Journal of Intellectual Capital*, 1-23. doi:10.1108/jic-07-2025-0287

Muangmee, C., Dacko-Pikiewicz, Z., Meekaewkunchorn, N., Kassakorn, N., & Khalid, B. (2021). Green EO and GI in small and medium-sized enterprises (SMEs). *Social Sciences, 10*(4), 136. doi:10.3390/socsci10040136

Musfar, T. F., Alwie, A. F., & Wijayanto, G. (2025). Enhancing sustainable business performance

through green EO in circular economy food SMEs. *Environmental Economics, 16*(4), 15-29. doi:10.21511/ee.16(4).2025.02

Nguyen-Van, H., Le, A. H., Van Nguyen, C., Ho, L. D., & Nguyen, Q. T. T. (2025). Green ambidextrous innovation and sustainable performance in Vietnam's low-carbon transition: The role of green intellectual capital, green ambidextrous leadership, and green EO. *Journal of Open Innovation: Technology, Market, and Complexity*, 100655. doi:10.1016/j.joitmc.2025.100655

Oyeku, M., Oduyoye, O., Karimu, F. A., Akindoju, A. F., Togunde, M. O., & Elemo, G. N. (2020). Entrepreneurial capability and entrepreneurial success. European Journal of Business and Innovation Research, 8(5), 56-79.

Öztürk, R., Öztürk, M., & Kızılkan, Z. (2024). Meta-analysis of the relationship between green EO and sustainable firm performance. *Sustainability, 16*(24), 11224. doi:10.3390/su162411224

Popa, S., Soto-Acosta, P., & Palacios-Marqués, D. (2022). A discriminant analysis of high and low-innovative firms: the role of IT, human resources, innovation strategy, intellectual capital and environmental dynamism. *Journal of Knowledge Management, 26*(6), 1615-1632. doi:10.1108/JKM-04-2021-0272

Rustiarini, N. W., Bhegawati, D. A. S., & Mendra, N. P. Y. (2022). Does GI improve SME performance? *Economies, 10*(12), 316. doi:10.3390/economies10120316

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. European journal of marketing, 53(11), 2322-2347. https://doi.org/10.1108/EJM-02-2019-0189

Shehzad, H. M. F., Ibrahim, R. B., Yusof, A. F., Khaidzir, K. A. M., Hassan, O. H. A., & Abdalla, S. A. (2020). *Building Information Modelling Adoption: Systematic Literature Review.* Paper presented at the International Conference of Reliable Information and Communication Technology.

Shehzad, M. U., Zhang, J., Latif, K. F., Jamil, K., & Waseel, A. H. (2023). Do green EO and green knowledge management matter in the pursuit of ambidextrous GI: A moderated mediation model. *Journal of Cleaner Production, 388*, 135971. doi:10.1016/j.jclepro.2023.135971

Silva, G. M., Gomes, P. J., Carvalho, H., & Geraldes, V. (2021). Sustainable development in small and medium enterprises: The role of EO in supply chain management. *Business Strategy and the Environment, 30*(8), 3804-3820. doi:10.1002/bse.2841

Teece, D. J. (2018). Business models and dynamic capabilities. *Long range planning, 51*(1), 40-49. doi:10.1016/j.lrp.2017.06.007

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal, 18*(7), 509-533. doi:10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Tjahjadi, B., Soewarno, N., Ningsih, S., Kamarudin, K. A., Hariyati, Dianti, D. K., & Karima, T. E. (2026). Green intellectual capital-SPrelationship: Do green EO and GI capacity matter? *Journal of Intellectual Capital, 27*(4), 780-806. doi:10.1108/jic-11-2024-0350

Vrontis, D., Chaudhuri, R., & Chatterjee, S. (2022). Adoption of digital technologies by SMEs for sustainability and value creation: Moderating role of EO. *Sustainability, 14*(13), 7949. doi:10.3390/su14137949

Wang, C., Zhang, X. e., & Teng, X. (2023). How to convert green EO into GI: the role of knowledge creation process and green absorptive capacity. *Business Strategy and the Environment, 32*(4), 1260-1273. doi:10.1002/bse.3187

Wasiq, M., Kamal, M., & Ali, N. (2023). Factors influencing GI adoption and its impact on the SPof small-and medium-sized enterprises in Saudi Arabia. *Sustainability, 15*(3), 2447. doi:10.3390/su15032447

Watto, W. A., Abubakar, M., Kouser, R., Quddus, A., & Fayaz, M. (2025). Green supply chain management practices and sustainable firm performance via green dynamic capacity and green EO (GEO) mediation of GI. *International Journal of Innovation Science*. doi:10.1108/ijis-08-2024-0247

Xiao, H., Al Mamun, A., Masukujjaman, M., & Yang, Q. (2023). Modelling the significance of strategic orientation on GI: mediation of green dynamic capabilities. *Humanities and Social Sciences Communications, 10*(1), 777. doi:10.1057/s41599-023-02308-3

Yaghoubi Farani, A., Karimi, S., Sajedi, M., & Ataei, P. (2024). The effect of environmental sustainability orientations and EOs on the performance of greenhouses. *Scientific Reports, 14*(1), 2095. doi:10.1038/s41598-024-52062-y

Ye, F., Yang, Y., Xia, H., Shao, Y., Gu, X., & Shen, J. (2022). Green EO, boundary-spanning search and enterprise sustainable performance: The moderating role of environmental dynamism. *Frontiers in Psychology, 13*, 978274. doi:10.3389/fpsyg.2022.978274

Zhang, Q., Zhu, X., & Lee, M.-J. (2024). Exploring institutional pressures, GI, and sustainable performance: examining the mediated moderation role of EO. *Sustainability, 16*(5), 2058. doi:10.3390/su16052058

Zhang, S., Hu, B., & Zhou, M. (2024). Top management team social capital and business model innovation: moderating role of business ecosystem health. *European Journal of Innovation Management*. doi:10.1108/EJIM-11-2023-0954