

RESEARCH ARTICLE OPEN ACCESS

Linking Responsible Innovation and Nonfinancial Reporting: Evidence From Manufacturing SMEs

Marika Intenza^{1,2}  | Teresa Turzo³  | Antonio Netti⁴  | Giacomo Marzi⁵ 

¹Department of Economics and Management, University of Pisa, Pisa, Italy | ²Department of Social Sciences, Corporate Social Responsibility Research Laboratory (CSR Lab), University of Foggia, Foggia, Italy | ³Department of Law and Economics, University of Rome UnitelmaSapienza, Rome, Italy | ⁴Department of Economics and Finance, University of Bari 'Aldo Moro', Bari, Italy | ⁵IMT School for Advanced Studies Lucca, Lucca, Italy

Correspondence: Antonio Netti (antonio.netti@uniba.it)

Received: 7 May 2025 | **Revised:** 19 August 2025 | **Accepted:** 25 August 2025

Keywords: entrepreneurial orientation | environmental innovation ambidexterity | NFR | nonfinancial reporting | responsible innovation | stakeholder pressure

ABSTRACT

For small- and medium-sized enterprises (SMEs), engagement in nonfinancial reporting (NFR) often reflects a commitment to accountability, yet the engagement in NFR remains lower than that of large firms. Given SMEs' widespread presence across markets, clarifying the determinants of their reporting behaviour is a relevant research objective. Guided by an integrated framework that combines stakeholder theory (ST) with dynamic capability theory (DCT), this study assesses whether responsible innovation (RI) raises SMEs' propensity to engage in NFR. Environmental innovation ambidexterity (EIA) and entrepreneurial orientation (EO) are modelled as mediators, while stakeholder pressure is posited as an antecedent to RI. Survey data from 559 SME managers are analysed using partial least squares structural equation modelling (PLS-SEM). The structural estimates reveal a positive association between RI and NFR engagement. RI also stimulates both EIA and EO, and each mediator exhibits a significant indirect effect on NFR. Stakeholder pressure displays a substantive positive link with RI. These findings extend current discussions on SME sustainability disclosure by highlighting the relevance of RI and its capability-based mechanisms.

1 | Introduction

The growing global emphasis on sustainability and transparency has placed nonfinancial reporting (NFR) at the forefront of regulatory and business agendas (Deloitte 2024). Driven by initiatives such as the EU's Corporate Sustainability Reporting Directive (CSRD, 2022/2464/EU)—which officially entered into force on 5 January 2023—NFR has rapidly evolved from a voluntary practice into a mandatory requirement for many firms (Doni et al. 2020), particularly larger firms and listed small- and medium-sized enterprises (SMEs). However, a significant market segment, especially SMEs, remains reluctant to adopt NFR practices, often citing perceived resource constraints, complexity and a lack of awareness of NFR's strategic benefits (Setyaningsih et al. 2024). This gap in NFR adoption presents a challenge for policymakers seeking to foster comprehensive

NFR across the entire market. CSRD states that '[...] reported sustainability information should also take into account short-, medium- and long-term time horizons and contain information about the undertaking's whole value chain, including its own operations, its products and services, its business relationships and its supply chain' (European Parliament and Council of the European Union 2022, 25). Accordingly, many large firms require their smaller suppliers to comply with defined sustainability standards, thereby exerting indirect regulatory pressure on SMEs. Those wishing to remain in supply chains often issue voluntary nonfinancial reports to show compliance, even in absence of legal requirements (KPMG 2022). The scope of NFR therefore extends beyond the immediate reporting entities to encompass the entire network of interconnected firms. This indirect regulatory pressure pushes SMEs towards more sustainable practices and potentially leads to voluntary or proactive

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NFR. Given that SMEs constitute approximately 90% of all firms and account for about 50% of employment worldwide (World Bank 2022), attention to NFR is steadily increasing. In this vein, an increasing number of firms have begun issuing NFR in various forms, such as corporate social responsibility (CSR) reports, integrated reports (IR), sustainability reports aligned with the Sustainable Development Goals (SDGs) and Global Reporting Initiative (GRI) reports (Cho et al. 2015; Turzo et al. 2022). SMEs that act as first movers may view NFR as a strategic asset on the path to sustainable development and enhanced competitiveness (Arvidsson 2011; Pizzi et al. 2021). Beyond the potential for competitive advantage, NFR issuance allows SMEs to benefit from network effects (Lin and Lin 2016), including easier access to partnerships with other firms that share similar values (Song et al. 2020). However, due to the financial constraints typical of SMEs and the perceived high costs of sustainability initiatives, many SMEs remain sceptical about NFR. Often, they decide not to engage in NFR at all, citing financial burdens, organisational shortcomings and the lack of a supportive network for integrating sustainability practices (Johnson and Schaltegger 2016). While current research highlights stakeholder pressure as a key driver of NFR adoption in SMEs (Ahinful et al. 2022), further investigation is warranted because additional factors may influence SMEs' propensity to engage in NFR (Lisi et al. 2024). The present study argues that existing literature lacks a comprehensive understanding of the interplay between responsible innovation (RI) and NFR in the context of SMEs. To address this gap, our analysis targets three specific shortcomings in the literature. First, a conceptual gap—Prior research has largely focused on environmental innovation (often because it is more readily measurable via secondary data) (Carrión-Flores and Innes 2010; Liao et al. 2025; Romano et al. 2024), leaving the role of RI underexplored. Second, a contextual gap—Existing studies on RI and NFR primarily examine large or listed firms (Cha and Park 2024; Chin et al. 2022; Venturelli et al. 2018), whereas our research specifically explores SMEs, recognising their unique characteristics and challenges. Third, a methodological gap—Many studies rely on secondary data or proxies (Hamim and Mollah 2025; Romano et al. 2024; Rossi and Harjoto 2020), whereas we base our analysis on primary data collected directly from SME managers.

Starting from the established premise that stakeholder pressure can foster RI, this study also considers additional factors that influence an SME's propensity to engage in NFR. These include environmental innovation ambidexterity (EIA), entrepreneurial orientation (EO) and key characteristics of an SME's primary decision-makers, namely, gender, education, age and tenure (McGuinness et al. 2017; Monteiro et al. 2022). In particular, RI can encourage SMEs to issue nonfinancial reports because these accountability tools effectively communicate a firm's commitment to forward-looking sustainable innovation, community well-being and environmental protection (Voegtlin and Scherer 2017). We posit that EIA and EO serve as mediators in the relationship between RI and SMEs' NFR engagement. EIA can influence an SME's propensity to engage in NFR by helping the firm balance the exploitation of existing knowledge with the exploration of new technologies. Achieving this balance allows a firm to improve its competitive position in dynamic markets while meeting stakeholder sustainability demands (Gibson and Birkinshaw 2004; O'Reilly and Tushman 2008). Likewise, EO,

characterised by innovation, risk-taking and the proactive pursuit of market opportunities, can similarly encourage NFR engagement in SMEs (Lumpkin and Dess 1996). A well-designed strategic framework and established routines, features associated with a strong EO, enable SMEs to face stakeholder pressures more effectively and anticipate demands for transparency and sustainable practices (Khan et al. 2021). Thus, EO provides SMEs with the agility and capabilities needed to publish non-financial reports that effectively communicate their sustainability efforts and innovations (Khan et al. 2021).

Our assumptions are framed through an integrated theoretical lens that combines stakeholder theory (ST) and dynamic capability theory (DCT) (Freeman 1984; Teece et al. 1997). ST highlights how the expectations and demands of various stakeholders—such as governments, competitors, employees, investors and society at large—can influence a firm's strategic orientation (Freeman et al. 2004). DCT explains how firms can face market changes and gain competitive advantages by continually developing and adapting their internal capabilities (Winter 2003).

To analyse the relationships among stakeholder pressure, RI, and SMEs' propensity for NFR engagement, we employed Partial Least Squares Structural Equation Modeling (PLS-SEM). A mediation analysis including EIA and EO was also conducted. From a methodological standpoint, PLS-SEM was chosen for its effectiveness in estimating relationships between observed and latent variables and for its strength in theory testing (Hair et al. 2021).

As a result, this study contributes to the literature on NFR engagement and decision-making in SMEs by applying our integrated theoretical framework. First, it enriches the academic debate on the importance of sustainable and ethical innovation practices in business management (Adomako and Tran 2022). Second, our empirical analysis incorporates two mediating variables, EO and EIA, thereby acknowledging the complex nature of decision-making processes related to NFR engagement (Fassin 2012). Third, our study adds to the growing body of literature on NFR adoption by providing new insights into the factors that drive SMEs to adopt NFR (Thoradeniya et al. 2015). In doing so, we aim to help practitioners identify the key drivers behind NFR adoption in the SME context. The remainder of the paper is organised as follows. Section 2 outlines the theoretical foundations, Section 3 describes the methodological approach, Section 4 presents the empirical evidence, Section 5 discusses the results, and Section 6 addresses the implications of our findings. Finally, the last section offers concluding remarks, highlights the study's limitations, and suggests avenues for future research.

2 | Theoretical Background

The decision-making process within SMEs differs markedly from that of large firms, which often have complex hierarchies and multiple layers of authority (Hauser et al. 2020). In SMEs, decision-making authority is typically concentrated in a single owner-manager or a small management team, meaning strategic choices heavily reflect the owner's personal outlook

(Brousseau et al. 2006; Kruse et al. 2023). This centralisation can lead SMEs to pursue idiosyncratic, often personal or noneconomic goals (e.g., family or community objectives) alongside financial aims. Such noneconomic priorities may sometimes overshadow profit-oriented opportunities, causing SMEs to overlook chances to enhance performance in favour of personal or social goals (Randolph et al. 2019). In addition, SMEs frequently face resource constraints—they have limited financial and human resources and often perceive the costs of sustainable initiatives as prohibitive. High upfront costs and lack of slack resources foster uncertainty and scepticism towards voluntary sustainability efforts like NFR (Johnson and Schaltegger 2016). Finally, some traits of the primary decision-makers in SMEs shape the implementation of sustainability strategies. For instance, the academic debate proves the influence of women managers on NFR engagement (Katmon et al. 2019; Monteiro et al. 2022), due to their higher level of empathy, altruism, and sensitivity to ethical concerns (McGuinness et al. 2017). Likewise, managers with higher levels of education bring advanced knowledge and cognitive capacity, which helps them acquire and process complex information (Wally and Baum 1994). This enhanced problem-solving ability can give educated managers more confidence to voluntarily embark on initiatives such as NFR.

The aforementioned claims call attention to the relevance of considering the multifaceted factors that drive the decision-making processes in SMEs, since they are different compared to large firms and are heavily influenced by the characteristics of their primary decision-makers. Consequently, these traits shape the SMEs' strategic orientation and directly condition their propensity to engage in NFR.

2.1 | An Integrated Theoretical Framework: Combining DCT and ST

This study adopts an integrated theoretical lens, drawing on both DCT (Teece et al. 1997) and ST (Freeman 1984). DCT posits that firms with strong dynamic capabilities can better adapt to changing environments through innovation and strategic change. However, DCT alone provides only a partial answer as to why firms choose to develop certain capabilities (Teece 2018; Winter 2003). ST, on the other hand, asserts that stakeholder expectations shape business strategy (Freeman 1984), yet it sometimes underexplores the mechanisms by which stakeholder demands influence internal decision-making. To bridge this gap, our model proposes that dynamic capabilities serve both as organisational responses to stakeholder pressures and as proactive tools to shape competitive advantage. We incorporate the concept of stakeholder salience, which is the degree to which managers prioritise various stakeholder claims. Mitchell et al. (1997) propose that a stakeholder's salience to managers is positively related to the number of these attributes (power, legitimacy and urgency) the stakeholder holds. Stakeholders possessing all three attributes are considered 'definitive' and will likely receive the most attention from management. Building on this framework, we argue that SMEs will prioritise developing dynamic capabilities (in our context, operationalised by specific factors such as EIA and EO) to address the demands of the most salient

stakeholders, i.e., those exerting strong pressure through one or more of the above attributes. Furthermore, firms function with a layered portfolio of capabilities (Teece 2018). At the base are ordinary capabilities, encompassing routine operations, administrative procedures and governance mechanisms necessary for day-to-day functioning. Above these are dynamic capabilities, differentiated into microfoundations and higher order capabilities. Microfoundations refer to a firm's ability to adapt and redeploy existing resources and routines while simultaneously developing new ones. This includes actions such as launching new products, entering new markets or reallocating responsibilities—all of which enable the firm to face uncertainty. At a higher level, dynamic capabilities encompass anticipatory strategic thinking, innovative business model design and the structural reconfiguration of the firm to capitalise on emerging opportunities.

Within this context, RI may function both as a reactive response to stakeholder pressure and as a proactive strategy for gaining competitive advantage. For instance, an SME demonstrating commitment to sustainability is more likely to be selected by larger clients or suppliers that impose specific environmental or social standards. This dual nature of RI highlights how dynamic capabilities may be shaped both by external stakeholder pressure and by the proactive pursuit of market differentiation. By responding to salient stakeholder expectations and anticipating broader societal demands, SMEs can enhance both survival and competitiveness in a shifting landscape. Thus, by integrating the microfoundations of dynamic capabilities with the stakeholder salience framework, we provide a more coherent interpretation of how SMEs align external pressures and internal strategic intent through informed organisational choices, rather than treating DCT and ST as two parallel explanatory logics.

2.2 | Responsible Innovation

RI emphasises creating new products and processes that do not harm consumer health or the environment (Voegtlin and Scherer 2017). While prior studies have paid attention to the role of environmental innovation (Carrión-Flores and Innes 2010; Liao et al. 2025; Romano et al. 2024), this study shifts the focus to RI, which adopts a broader, more integrative approach (Genus and Iskandarova 2018). Whereas environmental innovation primarily emphasises measurable outcomes and market-based returns, RI is grounded in societal values and ethical responsibility (Adomako and Tran 2022), encapsulating a commitment to 'taking care of the future through collective stewardship of science and innovation in the present' (Stilgoe et al. 2013: 1750).

Stilgoe et al. (2013) conceptualise RI through four interrelated dimensions: (i) *anticipation* that prompts firms to proactively consider the intended and unintended consequences of innovation in advance; (ii) *inclusion* that refers to the engagement of a diverse range of stakeholders in the innovation process, such as those typically marginalised or underrepresented in decision-making processes (e.g., low-income communities and minority groups), or those provided with a limited power or influence (e.g., customers and employees); (iii) *reflexivity* that regards the firm's ability to critically assess the assumptions, values and knowledge that underpin innovation and recognise

the limits and; (iv) *responsiveness* that pertains to the adaption of innovation processes and outcomes to stakeholder feedback and evolving circumstances. These dimensions together stress that innovation should reflect societal needs and values, rather than being confined to technical or commercial considerations.

Adomako and Tran (2022), drawing on this conceptual foundation, offer an updated and empirically validated measurement scale for RI. In particular, even though their scale does not directly measure each dimension of RI, it provides a pragmatic and validated measure that aligns with the core tenets of RI. For instance, items such as ‘products/services that demonstrate a willingness to add value to customers’ well-being’ and ‘new products/services that provide social welfare needs’ reflect anticipatory and responsive dimensions. Thus, it is evident the alignment with the dimension of anticipation. Similarly, the emphasis on resource conservation, environmental protection and ‘responsible solutions to a meaningful problem’ represents a recognition of the values and limits that underpin innovation, aligning with the dimension of reflexivity.

The existing literature offers a limited understanding of the relationship between RI and the propensity to engage in NFR, particularly when it comes to SMEs. Thus, three main gaps emerge that require further investigation. The first gap presents a conceptual nature. While prior research has largely stressed the impact of environmental innovation on NFR engagement, this study offers a novel conceptual integration of two distinct research domains: NFR, which is rooted in accounting and management literature (Skouloudis et al. 2010; Stolowy and Paugam 2018), and RI, which is entrenched in environmental studies (Owen et al. 2012, 2013; Voegtlin and Scherer 2017). Second, this study addresses a contextual gap. Most studies addressing RI and NFR focus on large or listed firms (Cha and Park 2024; Chin et al. 2022; Venturelli et al. 2018); this research examines the unexplored context of SMEs, recognising their unique features and constraints. Third, our paper faces a methodological gap. Unlike prior studies that often rely on secondary data or proxies (Hamim and Mollah 2025; Rossi and Harjoto 2020), our analysis is based on primary data collected directly from SME managers. This allows us to gather individual-level data concerning their propensity to engage in NFR, which is not typically available in financial and NFR databases such as Bloomberg or DataStream.

Through this research, the impact of RI on the propensity to engage in NFR practices is examined in the light of an integrated theoretical framework, in order to provide a forward-looking perspective on NFR. Within this context, firms may adopt RI reactively—in response to regulatory requirements—or proactively—as a strategic initiative (Chang 2015). In this vein, ST posits the grounds for aligning business activities and stakeholders’ expectations towards RI. In detail, factors such as stakeholder engagement, long-term perspective, legitimacy and reputation can influence the behaviour of the firm (Fassin 2012). While RI as a response to stakeholder pressure is now widely recognised (Hadj 2020; Lee et al. 2018). However, RI is not only a response to external stakeholder pressure. According to DCT (Teecce et al. 1997), DCT offers a complementary view: RI can serve as a strategic capability that enables firms to differentiate themselves, shape emerging standards and seize market opportunities (Teecce et al. 1997; Voegtlin and Scherer 2017). Firms should

therefore take into account the interests of their multiple stakeholders to formulate strategies to gain support and trust from them (Freeman 1984), rather than passively perform a compliance exercise. For instance, an SME applying *anticipation* might carry out a lifecycle assessment of new products to identify long-term social and environmental impacts. An SME practising *inclusion* would actively engage employees, customers and marginalised groups in the innovation process. *Reflexivity* may involve critically evaluating internal assumptions about sustainability, and *responsiveness* would reflect a willingness to adapt innovation strategies based on feedback, scientific advancements and evolving stakeholder needs.

In essence, we argue that stakeholder pressures induce SMEs to implement RI as a strategic response to requests of the internal and external environment. RI implementation subsequently leads to a higher propensity of SMEs to engage in NFR, implying the existence of a relationship between stakeholder pressures, RI strategies and effective communication through nonfinancial reports. Taking into account that firms can engage with higher levels of sustainability practices when stakeholders strongly influence them, we posit our baseline expectation:

Hypothesis 1a. *Stakeholder pressure positively influences RI.*

Among various stakeholder groups, customers and multinational enterprises appear particularly influential. From the customer perspective, innovation is often demand-driven, motivating SMEs to obtain sustainability certifications to demonstrate compliance with ethical and environmental standards (Huang et al. 2016; Yalabik and Fairchild 2011). These last might raise strategic partnerships and clearly demonstrate compliance with sustainable principles. On the multinational enterprises side, SMEs could adopt robust and recognised sustainability standards to join their supply chain. In this sense, SMEs might be more likely to engage in NFR, a key accountability tool for demonstrating the implementation of RI and gaining a competitive advantage (Cohen 2017).

Furthermore, other stakeholders like governments, employees, investors and the broader community, through their expectations and demands, shape the strategic choices of SMEs by expressing expectations and exerting influence (Freeman et al. 2004; Jamali 2008; Shah et al. 2021). SMEs adopting a proactive management approach to sustainability, and specifically to RI, are better positioned to align their strategies with stakeholder expectations, including those related to transparency and accountability through NFR. This strategic alignment enhances SMEs’ sustainable performance and reputation, namely, critical intangible assets in the competitive arena.

Thus, we assume that SMEs prioritising RI are often more inclined to release nonfinancial reports, in order to meet and anticipate stakeholder expectations. This approach fulfils the growing demand for pertinent nonfinancial information, strengthens stakeholder engagement and enhances firms’ reputation. Based on these insights, we postulate the following hypothesis:

Hypothesis 1b. *RI positively affects SMEs’ propensity to engage in NFR.*

2.3 | Environmental Innovation Ambidexterity

EIA is defined as ‘the ability to simultaneously achieve efficient exploitation and effective exploration to pursue environmental protection in the context of international subcontracting relationships’ (Chang and Gotcher 2020, 2). Therefore, EIA covers two primary dimensions: exploration and exploitation. The former involves the firm’s ability to adapt, reconfigure and derive new applications from existing knowledge, resulting in incremental advancements that enhance innovative performance. The second one pertains to the firm’s capacity to generate, nurture and leverage new technological knowledge and resources, thereby further enhancing its innovative performance (He and Wong 2004).

In the light of DCT (Teece 2018), EIA can be framed as a key dynamic capability as it allows firms to gain greater competitive advantages in a rapidly evolving business environment (Xin et al. 2022). Specifically, EIA serves as a ‘facilitator’ in the baseline relationship between RI and the propensity to engage in NFR. In the implementation process of RI practices, EIA furthers the firm’s propensity to engage in NFR. The reasons behind this behaviour have been extensively discussed in the academic debate. For instance, Eccles et al. (2014: 2836) explain: ‘High sustainability companies not only measure but also disclose relatively more nonfinancial data’. Consequently, when firms undertake initiatives for the environment and society at large, they tend to be more inclined to externally disclose their efforts. In this regard, the primary decision-makers of the firm should commit to developing an effective business model that promptly addresses current challenges and adapts processes, routines and capabilities to the changing environment. This is particularly relevant for SMEs, where resources and knowledge constraints require a stronger effort to align sustainability strategies to the firm’s strategic goals. Otherwise, there is a risk of decoupling. Sustainability initiatives, therefore, might lose their connection with the firm’s core business activities and reduce their effectiveness (Hutzschenreuter and Kleindienst 2006). Furthermore, SMEs’ propensity to engage in NFR is driven by several factors, such as competitive advantage, stakeholder pressure, stakeholder engagement and legitimacy (Lisi et al. 2024). In this scenario, EIA emerges as a source of sustainable business strategy, aiding firms to face changing environments by balancing exploitation and exploration and optimising environmental impacts and fulfilling ecoinnovation outcomes (Gibson and Birkinshaw 2004; O’Reilly and Tushman 2008). Based on these insights, we posit the following hypothesis:

Hypothesis 2. *EIA positively mediates the relationship between RI and SMEs’ propensity to engage in NFR.*

2.4 | Entrepreneurial Orientation

EO can be defined as the tendency of a firm towards innovativeness, risk-taking, proactiveness, competitive aggressiveness and autonomy in the development and implementation of strategies (Lumpkin and Dess 1996). A pronounced EO incorporates the attitude to develop dynamic capabilities useful to effectively identify environmental changes, seize new opportunities and adapt

their resources to changing market conditions (Abu-Rumman et al. 2021; Ferreira et al. 2020; Swoboda and Olejnik 2016). Thereon, EO refers to the strategic approach of the firm to innovation and market entry (Lumpkin and Dess 1996). This is especially true for SMEs, which are often recognised as lagging behind larger firms due to specific factors, such as limited resources and capabilities (Madrid-Guijarro et al. 2009). Besides, in the SME universe, managers may struggle to properly capture and evaluate market opportunities and threats (Van Doorn et al. 2017).

Being associated with dynamic capabilities, EO makes market change recognition and resource reconfiguration for innovation easier (Teece 2016), thereby raising SMEs’ sensitivity to the evolving environment. Based on our integrated theoretical framework, it is reasonable to surmise that EO enables SMEs to dynamically drive the transformation of organisational processes and systems to attain sustainable competitive advantages (Jiang et al. 2018; Rehman et al. 2020), among which is NFR engagement. Furthermore, the extant literature points out that EO represents a specific driver for financial and non-financial performance (Centobelli et al. 2019). Accordingly, EO can conceivably enhance the propensity of SMEs to engage in NFR.

Many scholars have examined the relationship between EO and RI and its impact on firm performance (Keh et al. 2007; Rosenbusch et al. 2013; Zhang et al. 2021). These studies frame EO as a dynamic capability that allows firms to better face market changes, manage resources and promote innovation strategies (Teece et al. 1997). For SMEs, where resources are often limited and decision centralised, EO might help managers to meet stakeholder pressure by leveraging innovativeness and managerial proactiveness. EO may also have the potential to facilitate the integration of RI into the core firm strategy, consequently improving the SMEs propensity to engage in NFR. The alignment between innovation efforts and sustainability strategies increases the likelihood that RI practices are formalised and disclosed by means of nonfinancial reports. Thus, we posit the following hypothesis:

Hypothesis 3. *EO positively mediates the relationship between RI and SMEs’ propensity to engage in NFR.*

3 | Methodology

3.1 | Data Collection

Following the European Union definition of SMEs as firms with 250 or fewer employees (European Commission 2015) and prior studies adopting similar sampling criteria, the empirical research relies on a survey designed to collect data from SME managers operating in the manufacturing industry (Balzano and Marzi 2023; Marzi et al. 2023). The sector includes a broad range of high-tech and low-tech firms, and it is supported by legislative initiatives aimed at fostering open innovation and digital transformation (Balzano and Marzi 2023; Department for Business, Energy and Industrial Strategy 2021). The sample reflects the heterogeneity of the manufacturing sector, including SMEs active in areas such as general manufacturing,

computer and electronics manufacturing and other manufacturing industries.

A preliminary version of the questionnaire was drafted on the basis of the extant literature and the expertise of the authors in the field. The accuracy of the questionnaire was verified through testing by a panel of SME executives and researchers involved in the research domain of RI and NFR. We carefully refined the questionnaire according to their feedback before disseminating it (Groves et al. 2009; Marzi et al. 2023). A total of 560 questionnaires were gathered during the data collection process. One questionnaire was excluded, as the respondent failed to pass the instrumental manipulation checks, which comprised nonsensical tasks deliberately designed to ensure participants' continued attention throughout the survey (Groves et al. 2009; Marzi et al. 2023). Accordingly, the final dataset comprised 559 respondents, as detailed in Table 1.

The gathered sample includes a diverse group of experienced managers, spanning across SMEs of varying sizes and various sectors within the manufacturing industry. This approach ensured the avoidance of single-source bias (Caputo et al. 2019; Marzi et al. 2023).

To prevent biased or directional responses, a common issue of self-administered surveys, even though the research project was declared to investigate the propensity of SMEs to engage in NFR, no explicit mention of the conceptual model reported in Figure 1 was shown to respondents (Groves et al. 2009).

The purpose of this strategic choice was to minimise the risk of specific relationships influencing the answers provided by respondents. We implemented two additional prevention tools. First, we arranged the questions into distinct sections in order to prevent respondents from developing their own theories about possible cause-and-effect relationships. Second, we included reverse-coded items in the survey to mitigate the risk of directional responses (Groves et al. 2009; Marzi et al. 2023).

3.2 | Measures

The scales utilised in this study were derived from pertinent published research to ensure their validity (see Table 2). Each item was evaluated using a 7-point Likert scale, where 1 corresponded to *Strongly disagree* and 7 indicated *Strongly agree*.

Stakeholder pressure (SP) was measured through a 9-item scale proposed by Singh et al. (2022). The scale includes items belonging to three different dimensions of stakeholder pressure: regulatory stakeholder pressure (reg_sp), community stakeholder pressure (comm_sp) and organisational stakeholder pressure (org_sp). By rating these items, respondents identify stakeholders perceived as capable of exerting a stronger influence on decision-making than other kinds of stakeholders.

The 6-item scale by Adomako and Tran (2022) was employed to measure *Responsible innovation* (RI). This variable expresses the sustainable and ethical development of innovative ideas and technologies able to satisfy societal needs and take into account potential risks and long-term effects descending from the introduction of a given innovation.

TABLE 1 | Sample characteristics.

	Freq.	Perc.
<i>Age</i>		
18–30	123	22.00%
31–45	277	49.55%
46–60	138	24.69%
More than 60	21	3.76%
	559	100%
<i>Gender</i>		
Female	133	23.79%
Male	423	75.67%
Other	3	0.54%
	559	100%
<i>Professional experience</i>		
Less than 1 year	14	2.50%
1–5 years	173	30.95%
6–10 years	140	25.04%
More than 10 years	232	41.51%
	559	100%
<i>Education</i>		
Doctoral degree	14	2.50%
Master's degree	132	23.62%
Undergrad/degree	296	52.95%
Other	117	20.93%
	559	100%
<i>Industry</i>		
Manufacturing	482	86.22%
Computer and electronics manufacturing	46	8.23%
Other manufacturing	31	5.55%
	559	100%
<i>Size</i>		
10–20	135	24.15%
21–50	321	57.42%
51–250	559	100%
<i>Operational market</i>		
Business to business	435	77.82%
Business to consumer	124	22.18%
	559	100%
<i>Technology level</i>		
Low-tech	300	53.67%
High-tech	259	46.33%
	559	100%

Source: Authors' elaboration.

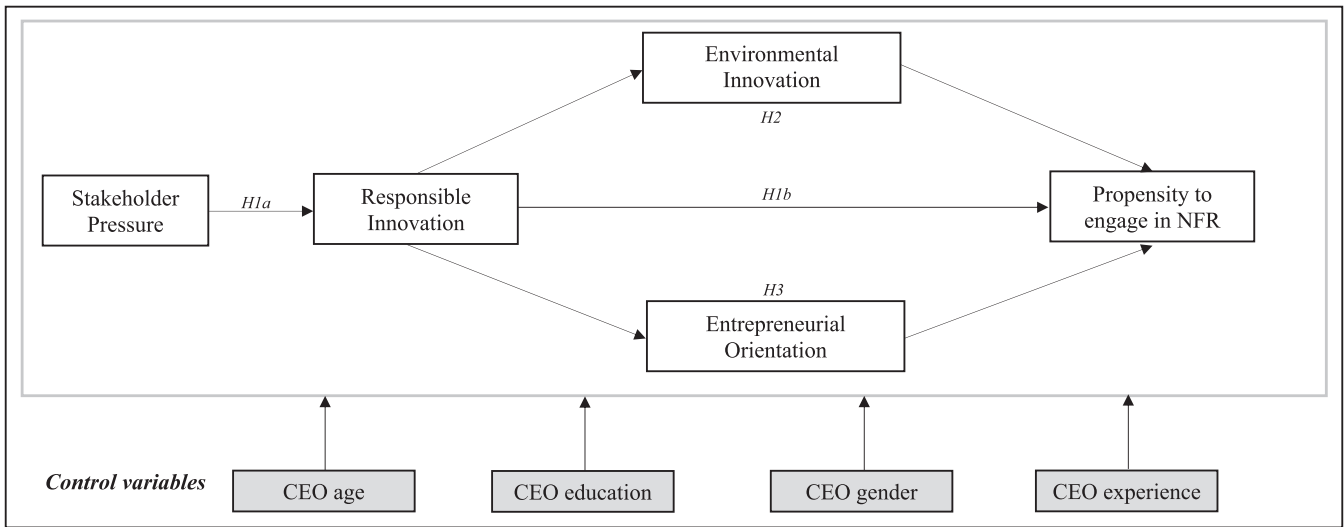


FIGURE 1 | Theoretical model. Source: Authors' elaboration.

Environmental Innovation Ambidexterity (EIA) was measured using a 6-item scale from Chang and Gotcher (2020). It includes the dimension of *Exploitation* (exploit), referring to the utilisation of technologies with a pollution-prevention scope, and the dimension of *Exploration* (explorat), assessing the innovation of proprietary technologies with a pollution-prevention scope.

Entrepreneurial orientation (EO) was assessed through a 9-item scale aimed at capturing the strategic design of a firm (Nakku et al. 2020). The scale encompasses five dimensions: *Innovativeness* (innov), *Risk-taking* (risk_tak), *Proactiveness* (proact), *Autonomy* (aut) and *Competitive aggressiveness* (comp_aggr).

To measure the *Propensity to engage in NFR* (PNFR), a 4-item scale developed by Thoradeniya et al. (2015) was applied. This variable captures the propensity of respondents to produce and publish a nonfinancial report, as well as perceptions regarding the intrinsic value of NFR and the perceived benefits that the firm could obtain as a result of issuing the NFR (Thoradeniya et al. 2015).

A set of control variables was introduced to consider their potential effect on the propensity to engage in NFR (Perrini 2005; Turzo et al. 2022). They are *CEO Age* (age), which is equal to the age of the respondents; *CEO Education* (ceo_educ), given by the educational attainment of the respondents; *CEO Gender* (gender), which asks respondents to declare their gender; and *CEO Experience* (experience), which is a quantitative variable measuring the length of the professional tenure of respondents.

3.3 | PLS-SEM

The model presented in Figure 1 was tested by applying the PLS-SEM method. This statistical method holds two main advantages. First, it is useful for theory testing, as it makes the estimation of relationships between observed and latent variables possible, while prioritising explained variance (Hair et al. 2021). Second, it enables the inclusion of different kinds of variables and nonlinear terms, thus presenting the adequate flexibility required for the exploration and validation of complex models.

The PLS-SEM analysis was performed by using SmartPLS version 4.0. This analysis followed two key steps. The first one consists of the assessment of the measurement model, while the second one refers to the evaluation of the structural model.

4 | Results

4.1 | Assessment of the Measurement Model

The assessment of the measurement model showed the satisfactory fulfilment of all the statistical criteria (Rasoolimanesh et al. 2021). The reliability indicators for every construct included in the analysis are presented in Table 2. As all the Cronbach's alpha values exceed the conventional threshold of 0.70, the constructs present acceptable internal consistency (Hair et al. 2021). Furthermore, as all values of average variance extracted (AVE) are above the threshold of 0.50, the convergent validity of the construct measurements was validated (Hair et al. 2021).

Two criteria were considered to test discriminant validity: the heterotrait–monotrait ratio of correlations (HTMT) and the square root of the AVE. The HTMT should be below the threshold of 0.85 (Henseler et al. 2015), while the square root of the AVE for every construct should be higher than the correlation among the constructs included in the analysis (Fornell and Larcker 1981). As shown in Table 3, both discriminant validity criteria were met.

Furthermore, the Harman's single-factor test was conducted in order to test the potential impact of common method bias. The results proved that the first unrotated factor accounted for 39.57% of the total variance. As it is below the threshold of 50%, the common method bias did not represent a major concern in this study (Podsakoff et al. 2003).

4.2 | Results of PLS-SEM Analysis

The path coefficients and their corresponding significance levels were considered in the construction of the structural model. To evaluate the significance of these paths, a bootstrap analysis

TABLE 2 | Constructs, items and reliability indicators.

Constructs and items	Cronbach's alpha	AVE
<i>Propensity to engage in NFR (PNFR)</i>	0.97	0.91
PNFR1	My company is committed to engage in or continue SR	
PNFR2	My company plans to engage in or continue SR	
PNFR3	My company has intention to engage in or continue SR	
PNFR4	My company is willing to engage in or continue SR	
<i>Stakeholder pressure (SP)</i>	0.89	0.82
<i>Regulatory stakeholder pressure (reg_sp)</i>		
reg_sp1	Regulatory stakeholder pressure	
reg_sp2	Government regulator	
reg_sp3	Trade association	
<i>Community stakeholder pressure (comm_sp)</i>		
comm_sp1	Competitor	
comm_sp2	Community stakeholder pressure	
<i>Organisation stakeholder pressure (org_sp)</i>		
org_sp1	Environmental organisation	
org_sp2	Community/society	
org_sp3	Organisational stakeholder pressure	
org_sp4	Customer; supplier; shareholder; employee	
<i>Responsible innovation (RI)</i>	0.89	0.65
RI1	Our company produces new products/services that demonstrate a willingness to add value to customers' well-being	
RI2	On average each year we introduce new products/services that provide social welfare needs of our customers	
RI3	Industry experts would say that we are more prolific when it comes to launching products that aim at implementing resource conservation and environmental protection	
RI4	Our new product offerings offer solutions for a better future	
RI5	Our company has introduced new products/services that capture the responsible side of innovation	
RI6	Our company is good at introducing responsible solutions to a meaningful problem	
<i>Environmental innovation ambidexterity (EIA)</i>	0.91	0.92
<i>Exploitation (exploit)</i>		
exploit1	We refine existing pollution-prevention technologies	
exploit2	We consider how to improve projects for modifying existing pollution-prevention technologies	
exploit3	We improve efficiency in our pollution-prevention cost in-process by recycling/recovery	

(Continues)

TABLE 2 | (Continued)

Constructs and items		Cronbach's alpha	AVE
<i>Exploration (explorat)</i>			
explorat1	We introduce new generations of pollution-prevention technologies		
explorat2	We mainly enter new technological fields of pollution-prevention		
explorat3	We quickly assimilate changing pollution-prevention technological		
<i>Entrepreneurial orientation (EO)</i>		0.86	0.65
<i>Innovativeness (innov)</i>			
innov1	In our firm, we always encourage new product ideas		
innov2	In our firm, we believe that innovativeness for international market opportunities is greater than that in domestic markets		
innov3	In our firm, we look for innovative ways of exploiting opportunities		
<i>Risk-taking (risk_tak)</i>			
risk_tak1	In our firm, we invest in high-risk projects with high returns		
risk_tak2	In our firm, we invest in risk-taking opportunities in international markets		
<i>Proactiveness (proact)</i>			
proact1	In our firm, we believe that being the lead market player is necessary to achieve company goals		
proact2	In our firm, we ensure that we are the first business to introduce new products and administrative techniques compared to our competitors		
<i>Autonomy (aut)</i>			
aut1	In our firm, we encourage employees in our firm to act independently to carry out business ideas from beginning to completion		
aut2	In our firm, employees have access to all vital information needed to carry out their tasks		
aut3	In our firm, employees are given freedom and independence to decide on their own on how to go about doing their tasks		
<i>Competitive aggressiveness (comp_aggr)</i>			
comp_aggr1	In our firm, we initiate market actions to which competitors respond		
comp_aggr2	In our firm, we enhance our competitive position by taking lead steps to achieve competitive goals in target markets		
comp_aggr3	In our firm, we react to competitors' actions with wide-ranging actions that are necessary to achieve the firm's objectives		

Source: Authors' elaboration.

involving 5000 subsamples was performed to compute *p*-values. This procedure was aimed at ensuring the robustness and stability of the findings (Carrión et al. 2016). Additionally, to test whether there is a direct or mediated relationship between RI and the propensity of NFR engagement, a mediation analysis was conducted. Figure 2 presents an explanatory summary of the derived structural model from the PLS-SEM analysis. The figure reports path coefficients, the associated significance levels and the coefficient of determination *R*², i.e., power of the model to explain the variance in the dependent variables. The consistently low mean variance inflation factors (VIFs) were below the established threshold of 5, thus indicating that the collinearity within each set of predictors was not an issue in our analysis (Hair et al. 2011).

In order to evaluate the model fit, the standardised root mean square residual (SRMR) was computed. The SRMR is defined as the dissimilarity between the observed correlation matrix and the correlation matrix implied by the model. Accordingly,

TABLE 3 | Discriminant validity.

	PNFR	RI	SP	EIA	EO
Fornell–Larcker criterion					
PNFR	0.955				
RI	0.545	0.809			
SP	0.558	0.420	0.904		
EIA	0.631	0.615	0.477	0.961	
EO	0.522	0.729	0.389	0.518	0.808
HTMT					
PNFR	—				
RI	0.582				
SP	0.601	0.466			
EIA	0.669	0.674	0.529		
EO	0.567	0.816	0.455	0.576	—

Source: Authors' elaboration from SmartPLS version 4.0.

the model fit was evaluated on the basis of the average magnitude of discrepancies between observed and expected correlations (Henseler et al. 2014). SRMR is also known to be a goodness-of-fit measure for PLS-SEM, as it is able to detect potential model misspecifications (Henseler et al. 2014). The SRMR value for our model was equal to 0.05. This value is below the threshold of 0.10, thus indicating a robust model fit. A summary of the direct effects, along with their significance levels, was reported in Table 4. Entries in bold identify statistically significant pathways, while the others indicate nonsignificant paths.

The results set out in Table 4 emphasise RI's direct and significant role in influencing the propensity to engage in NFR among SMEs. The other direct effects demonstrate that RI has a significant and positive impact on both EIA and EO, with the influence on RI itself arising from stakeholder pressure. Additionally, the results confirm that EIA and EO exert a direct and significant effect on the propensity to engage in NFR. Among the control variables, while the age and professional experience of surveyed managers fail to significantly impact PNFR, their gender and educational attainment reveal influential factors.

4.2.1 | Mediation Analysis

Table 5 summarises the mediation analysis, with the paths highlighted in bold indicating those of high significance.

RI has a total indirect effect on the propensity to engage in NFR ($\beta=0.420$; $p=0.000$) and two specific indirect effects on EIA and EO (RI → EIA → PNFR; $\beta=0.285$; $p=0.000$; RI → EO → PNFR; $\beta=0.136$; $p=0.001$). The effect mediated by EIA is particularly robust, with a narrow 95% confidence interval [0.232, 0.339], indicating consistent magnitude and stability across the sample. The EO-mediated path also shows a significant and nonnegligible effect, with a 95% CI of [0.071, 0.206]. This indicates a substantial relationship between RI and the propensity to engage in NFR. The relationship between RI and the propensity to engage in NFR also holds when the total indirect effect of stakeholder pressure

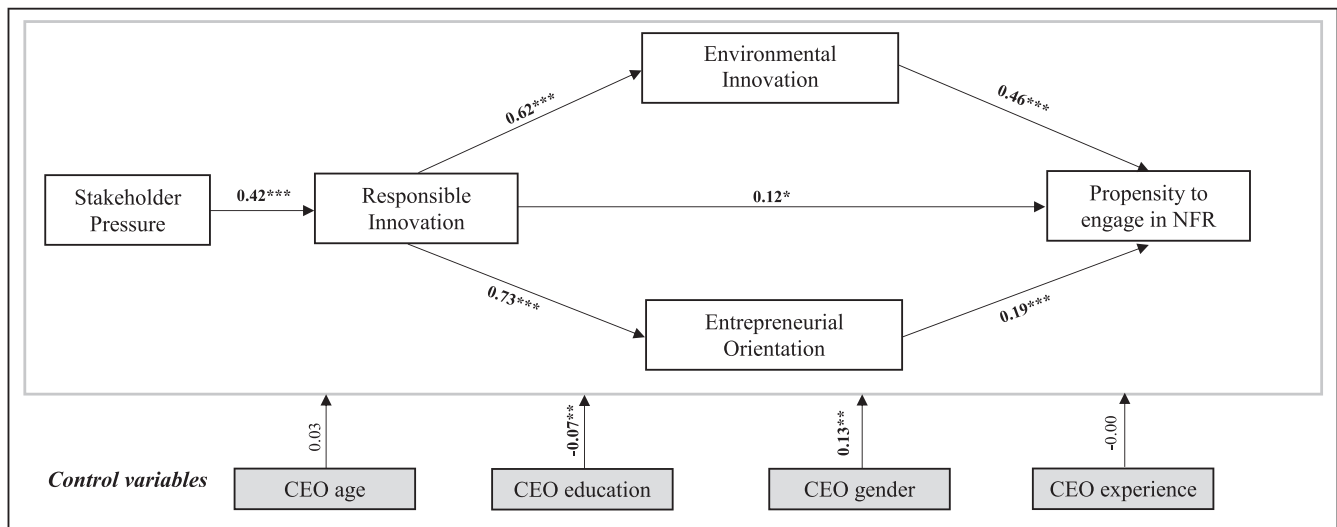


FIGURE 2 | PLS results. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Source: Authors' elaboration from SmartPLS version 4.0.

TABLE 4 | Direct effects.

Relationships	Std. beta	Std. error	t-Value	p-Value	95%CI LL	5%CI UL
RI → PNFR	0.120	0.064	*1.891	0.059	0.227	0.017
RI → EIA	0.615	0.030	***20.686	0.000	0.664	0.565
RI → EO	0.729	0.025	***29.226	0.000	0.770	0.687
SP → RI	0.420	0.038	***11.201	0.000	0.482	0.360
EIA → PNFR	0.463	0.047	***9.929	0.000	0.538	0.383
EO → PNFR	0.186	0.055	**3.402	0.001	0.280	0.098
age → PNFR	0.034	0.035	0.960	0.337	0.092	-0.024
experience → PNFR	-0.004	0.036	0.099	0.921	0.057	-0.060
gender → PNFR	0.130	0.034	***3.893	0.000	0.185	0.075
ceo_educ → PNFR	-0.066	0.032	**2.040	0.041	-0.013	-0.119

Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Source: Authors' elaboration from SmartPLS version 4.0.

TABLE 5 | Path analysis.

Relationships	Std. beta	Std. error	t-Value	p-Value	95%CI LL	5%CI UL
RI → EIA → PNFR	0.285	0.032	***8.831	0.000	0.339	0.232
RI → EO → PNFR	0.136	0.041	***3.342	0.001	0.206	0.071
SP → RI → PNFR	0.051	0.029	*1.767	0.077	0.100	0.007
SP → RI → EIA → PNFR	0.120	0.017	***7.084	0.000	0.149	0.093
SP → RI → EIA	0.259	0.029	***9.046	0.000	0.307	0.214
SP → RI → EO → PNFR	0.057	0.017	**3.265	0.001	0.088	0.030
SP → RI → EO	0.307	0.031	***9.959	0.000	0.359	0.258

Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Source: Authors' elaboration from SmartPLS version 4.0.

is included in the analysis. In particular, stakeholder pressure has a total indirect effect on the propensity to engage in NFR ($\beta = 0.227$; $p = 0.000$), alongside an indirect effect on RI (SP → RI → PNFR; $\beta = 0.051$; $p = 0.077$) and two indirect effects on EIA and EO (SP → RI → EIA → PNFR; $\beta = 0.120$; $p = 0.000$; SP → RI → EO → PNFR; $\beta = 0.057$; $p = 0.001$). The strongest indirect path here is through RI and EIA (95% CI [0.093, 0.149]), whereas the EO-mediated path, though statistically significant, displays a narrower effect size (95% CI [0.030, 0.088]), suggesting more limited influence.

4.2.2 | Heterogeneity Testing: FIMIX Analysis

The unobserved heterogeneity was investigated by the Finite Mixture Partial Least Squares (FIMIX-PLS) procedure using SmartPLS. The FIMIX-PLS segmentation method was employed to unveil the latent heterogeneity within the underlying (structural) model (Hahn et al. 2002). This method allows heterogeneity to be captured through the estimation of the probabilities of segment memberships for each observation and the simultaneous derivation of path coefficients for all segments (Sarstedt et al. 2020). After the application of this method to our

dataset and the evaluation of the segment sizes, the FIMIX-PLS outcomes prove that unobserved heterogeneity is not an issue in our analysis (Sarstedt et al. 2020) (Table 6).

5 | Discussion

Our findings align with the extant literature and emphasise the relevance of sustainable and ethical innovation practices in the field of management (Adomako and Tran 2022). They also underscore the link between innovation, transparency and sustainability (Zhang et al. 2023). Specifically, our study explores how and to what extent RI fosters SMEs' propensity to engage in NFR. In addition, we identify stakeholder pressure as an antecedent of RI, which sets the stage for a ripple effect on NFR engagement within SMEs. In this relationship, EIA and EO are revealed as significant mediators.

The integrated theoretical framework adopted in this study provides a useful lens to interpret these findings. In detail, DCT posits that the firm's competitiveness and survival in dynamic markets depend on its ability to develop and reconfigure its competencies (Teecce 2018). The current research supports this

TABLE 6 | Discrete segment assignment.

	comp_										ceo_				risk_				Discrete segment								
	aut	comm_sp	aggr	exploit	explorat	innov	org_sp	proact	reg_sp	tak	age	educ	experience	gender	PNFR1	PNFR2	PNFR3	PNFR4	RI1	RI2	RI3	RI4	RI5	RI6	assignment		
aut	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
comm_sp	0.14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
comp_aggr	0.51	0.32	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
exploit	0.39	0.34	0.48	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
explorat	0.34	0.41	0.46	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
innov	0.64	0.26	0.69	0.47	0.46	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
org_sp	0.28	0.72	0.34	0.43	0.46	0.35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
proact	0.49	0.25	0.72	0.38	0.39	0.71	0.29	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
reg_sp	0.19	0.70	0.30	0.41	0.44	0.28	0.75	0.24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
risk_tak	0.35	0.35	0.47	0.27	0.34	0.55	0.38	0.47	0.39	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
age	-0.02	-0.12	0.02	0.13	0.05	0.01	-0.09	-0.01	-0.09	-0.23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ceo_educ	0.04	-0.03	0.04	0.10	0.06	-0.02	-0.01	0.03	-0.02	-0.13	0.08	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
experience	0.02	-0.10	0.00	0.11	0.02	-0.02	-0.06	-0.08	-0.10	-0.17	0.51	0.14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gender	0.07	0.05	0.07	0.01	-0.01	0.06	0.13	0.05	0.08	0.03	0.04	-0.03	-0.09	1	0	0	0	0	0	0	0	0	0	0	0	0	0
PNFR1	0.39	0.42	0.46	0.63	0.59	0.49	0.55	0.44	0.49	0.31	0.08	-0.01	0.01	0.14	1	0	0	0	0	0	0	0	0	0	0	0	0
PNFR2	0.37	0.44	0.45	0.59	0.55	0.46	0.56	0.39	0.53	0.33	0.06	-0.01	0.03	0.14	0.89	1	0	0	0	0	0	0	0	0	0	0	0
PNFR3	0.36	0.45	0.42	0.60	0.56	0.46	0.56	0.38	0.52	0.33	0.07	-0.04	0.00	0.16	0.91	0.92	1	0	0	0	0	0	0	0	0	0	0
PNFR4	0.38	0.35	0.41	0.58	0.52	0.47	0.49	0.40	0.43	0.29	0.05	-0.03	0.00	0.16	0.85	0.86	0.86	1	0	0	0	0	0	0	0	0	0
RI1	0.43	0.27	0.56	0.36	0.35	0.53	0.24	0.48	0.20	0.30	-0.03	0.05	-0.06	0.06	0.38	0.34	0.34	0.35	1	0	0	0	0	0	0	0	0
RI2	0.39	0.34	0.50	0.48	0.53	0.51	0.34	0.50	0.32	0.36	-0.05	-0.02	-0.08	0.02	0.44	0.40	0.41	0.39	0.56	1	0	0	0	0	0	0	0
RI3	0.36	0.38	0.52	0.52	0.56	0.46	0.41	0.50	0.33	0.30	-0.05	0.10	-0.06	0.04	0.5	0.46	0.45	0.44	0.51	0.59	1	0	0	0	0	0	0
RI4	0.47	0.28	0.57	0.47	0.47	0.57	0.32	0.50	0.28	0.30	0.03	0.03	-0.03	0.08	0.45	0.42	0.41	0.43	0.64	0.52	0.55	1	0	0	0	0	
RI5	0.44	0.35	0.59	0.49	0.51	0.60	0.35	0.52	0.27	0.32	0.00	0.06	0.00	0.05	0.46	0.45	0.44	0.44	0.61	0.56	0.62	0.64	1	0	0	0	
RI6	0.48	0.26	0.58	0.49	0.47	0.58	0.28	0.52	0.25	0.25	0.04	0.07	-0.01	0.07	0.43	0.40	0.38	0.40	0.61	0.50	0.54	0.66	0.65	1	0	0	
Discrete segment assignment	-0.12	-0.24	-0.12	-0.28	-0.03	-0.14	-0.28	-0.09	-0.33	-0.25	0.02	0.01	0.05	0.05	-0.18	-0.20	-0.20	-0.18	-0.06	-0.19	-0.16	-0.11	-0.09	-0.09	-0.09	1	

Source: Authors' elaboration from SmartPLS version 4.0.

view by showing that EIA functions as a dynamic capability (Xin et al. 2022), allowing SME managers to adapt their sustainability practices. Such reconfiguration stems from an increased inclination to release nonfinancial reports (Eccles et al. 2014). Similarly, the strategic decision-making of SMEs deeply impacts how EO shapes the firms' approach to NFR. In these firms, the emphasis of their primary decision-makers on innovativeness and proactiveness, rather than high-risk endeavours (Kreiser et al. 2013), emerges as a driver for ensuring effective NFR engagement. This innovation-driven approach enhances the firm's alignment with sustainability and transparency goals. Such alignment is relevant for SMEs, as engaging in NFR demonstrates compliance with stakeholder expectations and reflects the firm's broader commitment to sustainability.

In line with ST assumptions, stakeholders significantly influence the firm's strategy and behaviours, particularly in sustainability strategies (Fassin 2012; Wood and Jones 1995). Our findings frame stakeholder pressure as an antecedent of RI and demonstrate how the propensity of SMEs to engage in NFR is directly related to their level of RI. These findings highlight that stakeholder pressure influences the sustainability strategies of the firm by motivating managers of SMEs to adopt RI practices. Two main reasons foster this behaviour: to meet stakeholder expectations and to demonstrate the commitment of the firm to sustainability. RI requires integrating sustainability within the innovation process, resulting in products or services contributing to the firm's growth and addressing environmental and social issues. To prove they are implementing RI, managers become more likely to engage in NFR as a strategy to effectively respond to stakeholder pressure. Accordingly, SMEs achieve higher levels of innovation and sustainability, enhanced transparency, improved accountability and reinforced stakeholder trust and loyalty (Guerrero-Baena et al. 2024). Furthermore, the specific features of the firm's decision-makers (e.g., education and gender) are determinants driving SMEs towards RI and effective NFR engagement (Amran et al. 2014). These traits influence the perception, development and implementation of RI strategies, as well as the commitment of the firm to sustainable and accountable practices like NFR (Amran et al. 2014; Javed et al. 2023).

In light of our integrated theoretical framework, the relationships examined in this study provide evidence on the complex connection existing between stakeholder pressure and the strategic mindset of SME managers. ST helps explain how stakeholder pressure shapes RI practices within SMEs (Freeman et al. 2004) and encourages their NFR engagement to build robust communication channels with stakeholders (Fassin 2012; Lee et al. 2018). DCT clarifies how dynamic capabilities enable SMEs to face stakeholder pressure effectively (Eccles et al. 2014; Teece 2018). Integrating these two theories offers a more comprehensive understanding of how stakeholder pressures affect strategic firm behaviours and managerial decision-making. Consistently, EO fosters innovation and proactiveness of SMEs (Kreiser et al. 2013), while EIA allows them to seize new market opportunities (Lumpkin and Dess 1996; Teece 2016). The integrated theoretical framework points out a combined effect: stakeholder pressure acts as an antecedent to RI. In turn, RI promotes the propensity of SMEs to engage in NFR. EIA and EO, representing dynamic capabilities and strategic orientation of firms, further promote SMEs' engagement in NFR.

Furthermore, the integrated theoretical framework, in addition to providing a deeper understanding of the analysed relationships, contributes to bridging the complementary fields of management, accounting and environmental studies.

6 | Implications

The implications of our findings enrich the growing body of literature on SMEs' strategic decisions, highlighting how implementing RI affects the propensity to adopt NFR practices. Both theoretical and practical implications are discussed below.

6.1 | Theoretical Implications

Our integrated theoretical framework is applied to jointly analyse two distinct research strands, RI and NFR.

From the ST perspective, the findings reinforce the assumption that stakeholder pressure strongly influences strategy, especially regarding sustainability (Fassin 2012). Specifically, the present study proves how stakeholder pressure stimulates RI in SMEs, leading to enhanced transparency and accountability, as evidenced by the increased propensity to engage in NFR.

From the DCT outlook (Teece 2018), the study corroborates this theoretical rationale by positioning EIA as a dynamic capability. EIA balances innovation processes and promotes transparency in sustainable practices through a greater propensity for NFR adoption (Xin et al. 2022). Furthermore, EO can be framed as a support to innovation attitude that, once stimulated by RI, helps to increase the propensity of NFR engagement. Thus, the findings highlight the significant mediating effect of EO in the baseline relationship. This expands our knowledge within the DCT framework, as it figures out that the firm's strategic orientation towards innovation and adaptability might allow it to instrumentally leverage RI to enhance NFR practices.

Combining ST and DCT under an integrated theoretical framework offers a more articulated explanation of how stakeholder pressures affect strategic behaviour. Our study underscores the relevance of strategic integration and stakeholder pressure as a comprehensive approach useful in the improvement of sustainable business practices. Additionally, insightful evidence regards the attitude of decision-makers in the management of the relationship between RI, EIA, EO and NFR. Managers' strategic decisions influence these interactions, emphasising the need to align the firm's capabilities with stakeholder pressure in order to achieve sustainable outcomes. Therefore, the findings corroborate the core assumptions of ST and DCT and demonstrate that applying them together under an integrated framework strengthens their explanatory power in the context of innovative sustainable strategies.

6.2 | Practical and Policy Implications

The empirical evidence offers interesting implications for both primary decision-makers of SMEs and policymakers, as it points

out the relevance of RI, EIA and EO in fostering the propensity of SMEs to engage in NFR practices. Decision-makers are responsible for integrating RI into the strategic pathway of the firm by promoting an organisational culture that prioritises innovation and sustainability. When they succeed in the incorporation of RI into the business model and effectively address stakeholder pressure, sustainability turns into a core pillar of the strategy (Magni et al. 2022). Consequently, the implementation of sustainable practices, including NFR, becomes more likely.

However, the development of such practices requires the intentional building of internal capabilities. In SMEs, this process can start with the introduction of specific operational mechanisms that support RI. For instance, assigning explicit responsibility for RI-related tasks to one or more employees can help establish internal accountability for sustainability initiatives. Managers can also promote the integration of sustainability practices into routine activities, project planning and product development. Over time, this approach should facilitate the internalisation of RI among the basic strategic principles of the firm. Targeted training on stakeholder engagement, ethical risk and environmental evaluation, whether tailored to the SMEs' features, can gradually improve internal coordination and raise awareness of such firms around RI and NFR.

SMEs can also obtain support from intermediary organisations. Local chambers of commerce, regional innovation hubs and sector-specific associations may favour NFR engagement by equipping SMEs with standardised reporting tools, technical advices or training programmes. They can also facilitate connections between SMEs and external resources, including peer-learning networks and funding schemes. Thus, intermediary organisations make policy expectations more accessible for SMEs.

In addition, SME managers should foster the development of EIA. By both exploiting existing dynamic capabilities and exploring new opportunities, managers enable the firm to pursue sustainable growth and create the conditions necessary for NFR. The integration of EO, RI and EIA might allow managers to further enhance SMEs' propensity to engage in NFR practices. In detail, EO impels a strategic mindset for innovation and adaptability, which is essential for aligning NFR with the evolution of stakeholders and market requests, thereby ensuring the adoption and continuous refinement of sustainable practices. Such strategic alignment eases compliance with stakeholder expectations and strengthens the SME's reputation and market positioning.

With the adoption of a forward-looking perspective, nonlisted SME decision-makers have the opportunity to anticipate future regulatory shifts. With NFR already mandatory for large firms and listed SMEs by 2028, as mandated by the European NFI and CSRD Directives, nonlisted SMEs will likely face increased expectations for NFR soon. The release of the Voluntary Sustainability Reporting Standard (VSME) in December 2024 represents another move in this direction. The trend towards mandatory NFR reflects the growing stakeholder pressure for intensified sustainability initiatives and related reports. In addition, by proactively releasing nonfinancial reports, managers of nonlisted SMEs can secure first-mover advantages. These

can include differentiation in the marketplace, enhanced stakeholder trust, improved access to capital and higher financial performance (Guerrero-Baena et al. 2024). Policymakers should consider encouraging RI through incentive policies. The diffusion of incentives, such as tax reductions and grants for sustainable innovation projects, might motivate SMEs to enhance their RI and engage in NFR practices. The provision of training and resources might also support SMEs in the understanding and implementation of RI, EIA and EO. To this end, policymakers able to ensure access to knowledge and best practices can allow SMEs to integrate these elements into their business strategies effectively.

Policymakers can also contribute to stakeholder engagement successfully. The creation of platforms capable of stimulating interaction with a wide range of stakeholders (i.e., customers, regulatory bodies and society at large) enables SMEs to elaborate a comprehensive understanding of stakeholders' expectations, which aids in strategic alignment and increases NFR engagement. Moreover, policymakers can contribute to stimulating awareness about the positive outcomes of RI, EIA and EO on NFR engagement and the overall sustainability strategy of the firm. In this regard, policymakers can organise awareness campaigns, workshops and collaborations with industry associations aimed at spreading this information to raise SMEs' propensity to engage in NFR.

Finally, policymakers should take into account the recent release of the VSME standard for nonlisted SMEs. Although it is not legally binding, nonlisted SMEs can immediately adopt the VSME standard as a reference framework for their nonfinancial reports. The VSME standard is also part of the 'Omnibus Package' published in February 2025 by the European Commission. Its inclusion in the most recent normative framework highlights the considerable interest that the policymaker attributes to the establishment of NFR practices among SMEs.

7 | Conclusive Remarks and Limitations

This study explored the impact of RI, shaped by stakeholder pressure, on the propensity of SMEs to embrace NFR practices. Through an integrated theoretical framework and a PLS-SEM analysis, the present study has demonstrated how EIA and EO mediate the relationship between RI and the propensity to engage in NFR. This mediation results in strengthening the propensity of SMEs to release NFR as a transparent accountability tool (Fassin 2012; Lee et al. 2018). Therefore, the findings support the idea that the propensity of SMEs to engage in NFR is the result of a complex decision-making process.

This empirical analysis helps clarify how stakeholder pressure can shape firms' strategic choices when examined through the theoretical lenses of ST and DCT, particularly regarding sustainability initiatives (Artiach et al. 2010). Notably, our study paves new pathways for the integration of RI and NFR research fields, thereby opening some promising future research avenues. Besides the focus on SMEs' propensity to engage in NFR, future research should investigate the effectiveness of RI practices adopted by managers on the current release of nonfinancial reports (Rossi and Luque-Vilchez 2020).

Another promising area for future research is a deeper investigation of the barriers that SMEs face when adopting RI practices (Halme and Korpela 2014). Such obstacles often stem from common SME characteristics, including limited resources, a lack of awareness or expertise in both RI and NFR, cultural and organisational resistance or difficulties in incorporating RI into the firm's existing business model (Wenke et al. 2021). Furthermore, the implementation of RI practices needs financial investments in new technologies and training, which could be unsustainable for SMEs (Halme and Korpela 2014). Similarly, the release of nonfinancial reports requires specialised knowledge and skills that SME employees may lack, necessitating external support to obtain these competencies. Lastly, how RI and NFR align with the current business model should be considered. Indeed, the successful implementation of sustainable initiatives entails a cultural change within SMEs' decision-makers (Wiesner et al. 2018). Understanding similar obstacles might provide valuable insights for developing tailored actions and support systems that facilitate SMEs to integrate RI and NFR into their strategy effectively. Lastly, given that our study was focused on just manufacturing SMEs, it might be insightful to extend the empirical analysis to other industries to explore both sector-specific dynamics and challenges.

The present research is not free of limitations, thus providing insightful avenues for further future research. First, our analysis relies on cross-sectional data collected at a single point in time. While cross-sectional studies are widely accepted in research, they come with inherent limitations, such as the potential for common method bias (Behl et al. 2022). Future studies could apply longitudinal research designs, allowing for the observation of changes over time to offer a more nuanced understanding of the relationship under investigation. Second, while our study investigated the propensity of SMEs to engage in NFR, it is pivotal to acknowledge that the construct is operationalised through perceptual, self-reported data provided by individual managers. As such, our results should be interpreted as reflecting managerial intentions or attitudes rather than confirmed organisational behaviour. This distinction is relevant. Prior research has shown that a firm's stated willingness to adopt sustainability practices does not always translate into consistent reporting, as internal and external barriers may impede implementation (Thoradeniya et al. 2015). The literature on NFR has long emphasised the potential misalignment between stated intentions and actual reporting practices, particularly in contexts where reporting is voluntary (Cho et al. 2015; Laufer 2003; Mahoney et al. 2013). Recognising this gap improves the interpretative clarity of our findings and delineates the empirical boundary of our claims. Future studies could address this limitation by triangulating perceptual data with objective reporting metrics, such as content analysis of published reports or third-party assessments. Third, the study focuses on manufacturing SMEs, and the findings may reflect the specific characteristics of that sector. Sectoral features, such as stakeholder expectations, regulatory exposure or organisational constraints, can influence how SMEs respond to stakeholder pressure and engage with NFR. For instance, service-based SMEs might face different reporting drivers compared to manufacturing firms. Future studies should examine whether the observed relationships hold across different sectors and institutional contexts.

ACKNOWLEDGEMENTS

Open access publishing facilitated by Università degli Studi di Bari Aldo Moro, as part of the Wiley - CRUI-CARE agreement.

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