

Differentiated organisational logics in social and environmental innovation: a comparative analysis between social economy enterprises and conventional enterprises

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Abstract

Purpose – This article examines how digital maturity, social and environmental practices and collaborative openness drive social and environmental innovation under two different organisational logics: social economy enterprises (SEE) and non-social enterprises (NSEE). The aim is to identify which mechanisms are shared and which diverge between SEE and NSEE, as well as the conditions under which external collaboration enhances these mechanisms. In doing so, we provide comparative evidence to guide managerial decision-making and support policies aligned with sustainable transition in European contexts.

Design/methodology/approach – We conduct a cross-sectional comparative study using microdata from Flash Eurobarometer 486 (EU-27). We constructed 1:1 matched subsamples (propensity score) for SEE and NSEE, balancing size, age, turnover, country and sector ($n=578$ per group). We estimate a PLS-SEM model linking digital maturity and social and environmental practices with socio-environmental innovation, incorporating interaction with access to partners and plausible mediations. We report explanatory power and predictive validity and perform sensitivity analyses using alternative model specifications and item inclusion/exclusion).

Findings – The results show that digital maturity and, especially, environmental practices are consistently associated with social and environmental innovation in both groups, with the effect of digitalisation being more intense among social economy enterprises (SEE). Social practices also contribute to innovation, although with varying intensity depending on the type of enterprise. Regarding external collaboration, access to partners has no direct effect, but plays a significant moderating role by strengthening the relationship between social practices and innovation exclusively in SEE.

Originality/value – Using comparable matched subsamples, we demonstrate that the same levers – digital maturity and sustainable practices – generate different returns in SEE and NSEE. We integrate direct and indirect effects, as well as moderation by access to partners, into a single analytical framework, showing that openness adds value only when supported by internal social commitments, particularly in SEE. We therefore reframe social and environmental innovation as a result of contingent combinations of internal practices and external collaboration, as opposed to universal recipes. From a practical perspective, these findings provide managers and policymakers with guidance on how to sequence digital, social, and environmental investments and to design partnership and support policies aligned with the specific organisational logic of SEE and NSEE.

Keywords Social innovation, Environmental innovation, Social economy, Digital maturity, Social and environmental practices

Paper type Research article



1. Introduction

Digitalisation and sustainability are reshaping contemporary societies and economies, with digital technologies increasingly recognised as key enablers of sustainable innovation (Ahmadi-Gh and Bello-Pintado, 2024). Beyond improvements in operational efficiency, digital capabilities and digital maturity play a central role in fostering innovations that address environmental and social challenges (Lei et al., 2024; Vial, 2021). In this context, sustainable innovation integrates social and environmental dimensions by combining mechanisms aimed at well-being and social cohesion with initiatives focused on ecological sustainability and responsible resource use, thereby fostering their mutual reinforcement (Butzin et al., 2014).

Research on the relationship between digitalisation and sustainability reports mixed results and ongoing debate regarding their interaction and impact on innovation outcomes (Ferreira and Santos, 2025; Rahmani et al., 2024). While digital maturity may foster social and environmental innovation, its effectiveness appears to depend strongly on organisational and contextual factors (Hanelt et al., 2021). Recent studies further suggest that digital transformation, sustainability and open innovation are increasingly interconnected (Ardito, 2023), as collaboration with external partners enables organisations to integrate external ideas and skills (Miranda et al., 2023; Oubaziz and Matmar, 2021). Such collaborations support responses to social and environmental challenges and the development of business models that generate economic, social and environmental value (Ciocnitu, 2024).

However, despite the growing recognition of these interconnections, their joint effects remain insufficiently explored, particularly in multi-stakeholder contexts (Miranda et al., 2023), even though they are highly relevant for sustainable development (Ahmadi-Gh and Bello-Pintado, 2024). Moreover, existing research often overlooks key organisational characteristics, such as firm size, type of entity or level of digital maturity (Zhao et al., 2024). This limitation is especially evident in small and medium-sized enterprises (SMEs), including those with a social orientation, where higher digital maturity may simultaneously reinforce sustainability and catalyse social and environmental innovation (Isensee et al., 2020). These observations suggest that the effects of digital–sustainability dynamics vary systematically according to organisational context (Hanelt et al., 2021).

In this regard, social economy enterprises (SEE), which prioritise social and environmental objectives over profit and operate under democratic governance principles (Monzón and Chaves, 2017), face particular challenges and opportunities in their digital transformation processes. From an institutional logics perspective, SEE operate under a mission-oriented logic focused on social and environmental value creation, whereas non-social enterprises (NSEE) are primarily guided by a market-oriented logic centred on efficiency, competition and profitability (Battilana and Lee, 2014; Brülisauer et al., 2020; Thornton et al., 2012). At the organisational level, these broader institutional logics are enacted through distinct organisational logics, which shape how digital maturity, sustainability practices and external collaborations are mobilised to generate social and environmental innovation. In this sense, digital transformation enables SEE to scale their social impact, optimise resources and develop new service models (Chen, 2024), positioning them as key actors in addressing social and climate-related challenges (Largo Avila et al., 2025; Liu and Jung, 2024).

Although sustainability practices have gained increasing academic attention, a critical gap remains in understanding how social dynamics and practices influence environmental behaviours within SEE and NSEE (Igwe et al., 2018), thereby limiting knowledge of their effects on sustainable innovation (Ravazzoli et al., 2021). While some studies suggest that differences between SEE and conventional enterprises may be less pronounced than traditionally assumed — given that social and environmental innovations are often driven by performance optimisation across organisational types (Furmanska-Maruszak and Sudolska, 2016)—, other evidence highlights important divergences in how organisations respond to external pressures. In particular, SEE tend to integrate both internal and external stakeholder influences into their eco-innovations, whereas NSEE respond predominantly to internal

pressures. This contrast reflects the stronger structural commitment of SEE to communities, workers and environmental goals (Carchano *et al.*, 2024).

At the same time, despite substantial progress in the study of innovation in SEE (Duarte Alonso *et al.*, 2020; Juusola *et al.*, 2024) and NSEE (Chesbrough, 2003), comparative analyses examining how external collaborations shape social and environmental innovation across different levels of digital maturity remain scarce. Existing research frequently conceptualises open innovation as a one-dimensional construct, without distinguishing between different forms of collaboration, such as contractual and non-contractual arrangements (Schöggl *et al.*, 2023). Moreover, insufficient attention has been paid to how these collaboration modes are shaped by distinct organisational logics in innovation processes (Taivalasaari and Røhnebak, 2021). Although the enabling role of digital technologies is widely recognised, the mechanisms through which digital maturity interacts with open innovation strategies to promote sustainability remain poorly understood (Lingling and Ye, 2023).

In summary, despite the expanding body of research on digitalisation, sustainability and open innovation, no prior study has systematically compared SEE and NSEE to examine whether digital maturity, sustainability practices and external collaboration mechanisms jointly drive social and environmental innovation differently under distinct organisational logics. Consequently, it remains unclear whether similar internal capabilities and collaborative strategies lead to comparable innovation outcomes in organisations characterised by fundamentally different missions, governance structures and stakeholder orientations.

Based on the current state of affairs, three general research questions arise, which will subsequently guide the formulation of specific hypotheses:

- (1) To what extent does digital maturity influence the capacity of ESEs and NSEE to develop social and environmental innovations?
- (2) How do the social and environmental practices implemented by organisations (SEE and NSEE) impact the generation of social and environmental innovation?
- (3) How do external collaborations contribute to maximising the social and environmental impact of innovations in SEE compared to NSEE?

The answers to these questions are critical to understanding how SEE can leverage these collaborations in unique ways to maximise their social and environmental impact in an increasingly digitalised environment. To contribute to this debate, this article develops a comparative empirical analysis between SEE and NSEE, examining how digital maturity and external collaborations shape their social and environmental innovation processes. The study used microdata from the Flash Eurobarometer 486 survey conducted by the European Commission between 19 February and 5 May 2020. The survey collects information on challenges and opportunities related to innovation and sustainability in 27 EU Member States and 12 additional countries (European Union, 2020). Structural models based on the PLS-SEM approach were used for the analysis. In this way, the study seeks to contribute to the body of literature with a novel perspective on the intersection between digitalisation, external collaboration and sustainable innovation in the field of the social economy, while deriving practical and policy implications relevant to the strengthening of these enterprises in a dynamic global environment.

The structure of the article is as follows: after this introductory section, a review of the literature and research hypotheses is presented. The third section describes the methodology and data used. The fourth section is devoted to the empirical analysis of the results, followed by a discussion in the fifth section, which covers the theoretical and practical implications, the limitations of the study, and suggestions for future research. Finally, the conclusions are presented in the sixth section.

2. Literature review

This section presents the theoretical foundations and previous empirical evidence supporting the research framework. Based on this review, specific hypotheses are formulated to guide the empirical analysis.

From an institutional logics perspective, organisations are guided by socially constructed systems of values, beliefs, and rules that shape strategic priorities and legitimate forms of action (Thornton *et al.*, 2012). These logics influence how enterprises interpret and deploy resources, technologies, and relationships, including digital capabilities, sustainability practices, and collaborative strategies. At the organisational level, these broader institutional logics are enacted through organisational logics, understood as the internally embedded interpretations and practices that guide day-to-day decision-making and shape concrete governance and collaboration choices (Besharov and Smith, 2014; Greenwood *et al.*, 2011)

The conceptualisation of social economy enterprises (SEE) adopted in this study is grounded in the European EMES tradition, which defines social enterprises as organisations characterised by a social mission, participatory governance, and limited profit distribution (Defourny and Nyssens, 2010). In line with the social entrepreneurship literature, these organisations differ from conventional entrepreneurial forms in the relatively greater priority they assign to promoting social value and societal development over capturing economic value (Mair and Martí, 2006). Accordingly, SEE are typically characterised by a mission-oriented logic that prioritises social and environmental value creation, democratic governance, and stakeholder engagement, whereas non-social economy enterprises (NSEE) operate predominantly under a market-oriented logic focused on efficiency, competition, and profitability (Battilana and Lee, 2014). As hybrid or mission-driven organisations, SEE combine economic activity with explicit social and environmental objectives (Lee, 2020), which conditions how they adopt digital technologies, mobilise sustainability practices, and engage in external collaborations.

These distinct organisational logics imply that similar digital and sustainability-related capabilities may generate different innovation outcomes in SEE and NSEE, thereby providing a theoretical foundation for the comparative analysis developed in this study.

2.1 Digital maturity and social and environmental innovation

Sustainable innovation integrates social and environmental dimensions by articulating mechanisms aimed at well-being and social cohesion (Butzin *et al.*, 2014) alongside initiatives focused on ecological sustainability and the responsible use of resources (Jin *et al.*, 2024).

Digital maturity refers to an organisation's ability to integrate digital technologies into its processes, culture and strategies in order to enhance efficiency, competitiveness and innovation (Omol *et al.*, 2025). Beyond operational efficiency, digital maturity plays a critical role in fostering sustainable innovations that address environmental and social challenges (Lei *et al.*, 2024; Vial, 2021). Prior research associates higher levels of digital maturity with more effective sustainability practices and improved social and environmental performance (Feroz *et al.*, 2021; Vial, 2021), consistent with insights from the dynamic capabilities perspective and the resource-based view (RBV) (Zhang *et al.*, 2024). Moreover, digital maturity is linked to sustainable innovation through mediating mechanisms such as digital orientation or Environmental, Social and Governance (ESG) strategies (Lee *et al.*, 2024; Niu *et al.*, 2022), highlighting its contribution to green innovation and environmental performance (Dai and Zhu, 2024). Nevertheless, recent studies also report non-linear or even substitutive effects between digitalisation and ESG criteria in resource-constrained contexts (Lan and Zhou, 2024; Xu *et al.*, 2022).

Within this broader sustainability context, the intersection of environmental sustainability, social innovation and corporate social responsibility (CSR) has been shown to generate positive outcomes within ecological limits. Digital maturity can further reinforce these initiatives by optimising resource use and facilitating collaborative practices (Truong, 2022).

In the context of SEE, democratic governance structures and strong community orientation tend to reinforce social innovation aimed at addressing global challenges and promoting social justice, economic development and environmental sustainability (De Oliveira, 2024). In such organisations, digital maturity facilitates the strategic adoption of technologies that strengthen community networks and organisational resilience, thereby expanding their contribution to sustainable development (Meinhold *et al.*, 2025).

Drawing on the above arguments, the following hypothesis is formulated:

- H1. Digital maturity positively influences social and environmental innovation in both SEE and NSEE.

2.2 Social practices and innovation

Social practices are conceptualised as internal organisational practices related to corporate social responsibility and stakeholder engagement (Carroll, 1991). Phills *et al.* (2008) emphasise that social value creation often arises from the innovative recombination of resources and collaboration across actors, rather than from technological change alone. Social practices encompass activities such as community management, working conditions, inclusion, diversity, and social responsibility (Gomes *et al.*, 2024), and their relevance for innovation has increased in response to growing socio-ecological challenges (Rousselière *et al.*, 2024). Accordingly, the literature has shifted from a technological approach to viewing social innovation as the key to sustainability and climate action (Perinić *et al.*, 2023), albeit with diverse interpretations that call for comprehensive approaches based on community participation and cultural values (Ostos, 2024).

Through these mechanisms, social practices reorient organisational capabilities towards social and environmental solutions, strengthening learning processes and external linkages (Díaz-Perdomo *et al.*, 2021). When institutionalised, they can generate innovations in products, processes, and business models with impacts on value and reputation (Fosu *et al.*, 2024). Community participation and grassroots initiatives are recognised as critical inputs for social innovation (Esteves *et al.*, 2021), while social entrepreneurship offers scalable solutions to specific problems (Bignetti, 2011).

In the context of SEE, practices such as democratic participation, collaboration, and social responsibility generate collective knowledge, commitment to beneficiaries, and relational capital. These features facilitate the identification of needs and the design of transformative solutions (Guzmán *et al.*, 2024). In addition, co-production and inter-organisational networks enable the prototyping, legitimisation, and scaling of service and organisational innovations through processes of activism, collective learning, and co-creation (Perikangas *et al.*, 2024). According to Pérez-Suárez *et al.* (2021), this translates into social innovations (e.g. models of labour inclusion and community services), technological innovations (e.g. digital platforms and community energy projects), and organisational changes related to participatory governance and internal processes.

Based on these arguments, the following hypothesis is proposed:

- H2. Social practices have a positive impact on social and environmental innovation in SEE and NSEE.

2.3 Environmental practices and innovation

Environmental practices are conceptualised as internal organisational practices related to environmental management and sustainability. Within the sustainability and ESG literature, environmental value creation is understood as arising from organisational strategies and management practices aimed at reducing ecological impacts, rather than from isolated technological fixes (Hart, 1995). Such practices comprise policies and actions to reduce ecological impacts, aligned with ESG criteria and corporate environmental management (Gazi

et al., 2024). Their role in innovation has evolved from a focus on ecological product and process transformations towards closer integration with CSR and the digital economy, driving sustainability through green innovation and environmental strategies (Rahmani *et al.*, 2024; Zhao *et al.*, 2024). These practices improve ecological performance, competitiveness, and sustainable industrial transformation in both large firms and SMEs (Abubakar *et al.*, 2024; Orlitzky *et al.*, 2011), and are enhanced by employee involvement and green transformational leadership (Dzage *et al.*, 2024; Singh *et al.*, 2020).

In the context of SEE, environmental practices act as a bridge between social values and innovative capacity (Basterretxea Markaida *et al.*, 2024), turning ethical commitment into a source of sustainable innovation (Carchano *et al.*, 2024). By integrating environmental objectives into its dual social and economic mission, SEE consolidate their position as an agent of sustainable development (Ávila *et al.*, 2021). In this sense, environmental practices serve as strategic drivers that balance efficiency, ethical commitment, and sustainability (Zhou *et al.*, 2023).

Based on the above, the following hypotheses are proposed:

H3. Environmental practices have a positive impact on social and environmental innovation in SEE and NSEE.

2.4 Social and environmental practices

Although many studies integrate social and environmental practices within ESG/CSR strategies, in practice they often require differentiated trajectories, indicators, and resources (Aukhoon *et al.*, 2024). Their effectiveness depends on the coherence between external pressures, internal resources, and organisational attention mechanisms (Gazi *et al.*, 2024). In this context, stakeholder theory explains how the interests and pressures of employees, communities, customers, and regulators influence social and environmental outcomes (Aziz and Hamid, 2023; Danish *et al.*, 2025).

Social practices also shape organisational culture and leadership, favouring innovation processes that drive environmental solutions (Zhang *et al.*, 2023). At the same time, proactive environmental strategies, when combined with CSR, strengthen competitiveness in new product development (Aukhoon *et al.*, 2024; Gazi *et al.*, 2024).

In SEE, social and environmental integration is part of its identity and not merely an add-on strategy, balancing social, environmental, and economic objectives (Bansal *et al.*, 2023). These organisations promote social and environmental innovation practices directly and indirectly in their ecosystems (Rousselière *et al.*, 2024), and their participatory governance and collaborative orientation favour the transition to responsible models through networks and shared resource management (Ambati, 2019). Taken together, these features support crucial innovations in the face of challenges such as climate change, inequalities, and sustainability (Xu *et al.*, 2024).

The following hypotheses are therefore proposed:

H4. Social practices have a positive impact on environmental practices in SEE and NSEE.

H4a. Environmental practices positively mediate the impact of social practices on social and environmental innovation in SEE and NSEE.

2.5 Open innovation and social and environmental innovation

The transition from closed models to collaborative approaches, a hallmark of open innovation, has been widely studied for its relevance to sustainability (Urbinati *et al.*, 2023). Conceived as a process that integrates external and internal knowledge to accelerate development, reduce costs, and expand impact (Abdurrahman *et al.*, 2022), open innovation is enhanced by digital maturity, which enables technological platforms for collaboration, knowledge sharing, and

resource integration (Rengkung *et al.*, 2024). According to Brenner (2018), this synergy fosters sustainable business models aligned with the Sustainable Development Goals (SDGs) and improves sustainable-innovation performance, with positive environmental, social, and economic impacts (Ardito, 2023). In this sense, innovation increasingly relies on external collaborations with public and private actors, while the absence of such collaborations may constrain progress towards sustainability (Santos *et al.*, 2024; Harsanto *et al.*, 2022).

In the context of SEE, where organisational structures are participatory and pursue dual social-impact goals (Harsanto *et al.*, 2022), social practices such as community participation generate localised knowledge and guide social and environmental innovation (Miranda *et al.*, 2023). From the perspective of the RBV, social capital is understood as a key intangible resource for performance and innovation (Jiang *et al.*, 2025). Through open innovation processes, this resource can be mobilised to develop social and environmental solutions and to access to new markets (Kucharska and Erickson, 2022).

Digital platforms and inter-organisational networks reinforce this link, although their effectiveness depends on internal capabilities and the strength of social ties (Yesil and Dogan, 2019). In this regard, cross-sector cooperation and collaborative networks contribute to the consolidation of sustainable social innovation (Borges *et al.*, 2016), providing access to resources, learning, and exchange that support the circular economy and sustainability across its various dimensions (Savga *et al.*, 2023).

Based on these arguments, the following hypotheses are proposed:

- H5. Access to partners for collaboration positively moderates the relationship between digital maturity and social and environmental innovation in SEE and NSEE.
- H6. Access to partners for collaboration positively moderates the relationship between social practices and social and environmental innovation in SEE and NSEE.
- H7. Access to partners for collaboration positively moderates the relationship between environmental practices and social and environmental innovation in SEE and NSEE.

3. Methodology

3.1 Conceptual model

The proposed conceptual model is based on previous literature on digital maturity, sustainability, and social innovation, integrating key variables that enable an understanding of the mechanisms through which organisations can enhance their capacity for innovation in the context of the sustainable economy (Figure 1).

The theoretical model proposes that digital maturity positively influences the development of social and environmental innovation by facilitating the integration of technologies that optimise sustainable processes and promote organisational transformation. Likewise, social and environmental practices create a context in which social and environmental innovation projects are also encouraged. In this regard, the study aims to analyse how the combination of digital maturity and sustainable organisational practices impacts the innovative capacity of SEE, and to compare them with conventional enterprises (NSEE). Furthermore, the study explores the impact that access to external collaborative partners (open innovation) would have on social and environmental innovation. Through these alliances, enterprises could enhance knowledge transfer and the exchange of strategic resources, taking advantage of complementary capabilities and diverse experiences.

3.2 Materials

To analyse the factors driving environmental innovation in social economy enterprises (SEEs), this study uses microdata from Flash Eurobarometer 486 (2020), a European Commission survey focussing on sustainability practices, innovation and digital transformation among

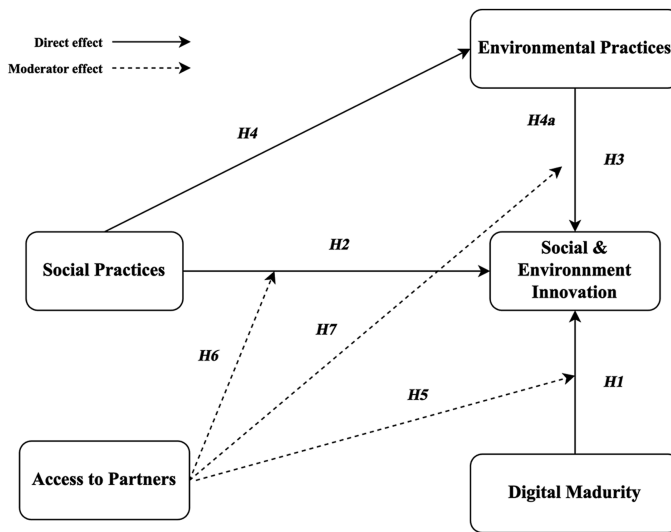


Figure 1. Conceptual model. Source: authors' own work

European SMEs (European Union, 2020). Despite its cross-sectional design, this dataset continues to be widely used in recent empirical research on sustainability-oriented innovation and digitalisation in the European context (e.g. Arroyabe and Arranz, 2026; de las Heras-Rosas *et al.*, 2026; Ferreira *et al.*, 2023; Segarra-Blasco *et al.*, 2024). To ensure analytical homogeneity, observations corresponding to non-European countries were excluded, resulting in an initial sample of 14,720 firms, from which 618 SEEs and 14,102 non-social economy enterprises (NSEEs) were identified. Given the substantial imbalance between the two groups, a propensity score matching (PSM) procedure was applied to construct an appropriate comparison group. Specifically, the probability of belonging to the SEE group was estimated using binary logistic regression based on observable enterprise characteristics (country, economic sector —NACE classification—, firm size and year of establishment). Based on these scores, a nearest neighbour matching (1:1, without replacement) was applied, with a calibrator of 0.20 standard deviations of the logit of the propensity score (Austin, 2011; Caliendo and Kopeinig, 2008). This procedure resulted in two equivalent subsamples of 578 firms each (SEE = 578; NSEE = 578), ensuring comparability between groups and reducing bias arising from observed structural differences.

To evaluate the proposed relationships, the Partial Least Squares Structural Equation Modelling (PLS-SEM) method was used with SmartPLS 4 software. This methodological choice is justified, first, by the exploratory and predictive nature of the study, which seeks to analyse complex configurations of relationships among organisational capabilities, sustainability practices, and social and environmental innovation. Second, the proposed model incorporates multiple mediation and moderation relationships, which makes the use of PLS-SEM particularly appropriate compared to more restrictive confirmatory approaches.

Likewise, PLS-SEM is appropriate for multi-group comparative analysis between social economy enterprises (SEE) and non-social economy enterprises (NSEE), allowing for the evaluation of structural differences between both organisational contexts. In order to ensure the validity of these comparisons, the MICOM procedure was applied to check for measurement invariance between groups, following the usual methodological recommendations in the literature.

3.2.1 Potential common method bias. Given that the central variables of the study come from a cross-sectional survey and a single informant per firm, the possible presence of common method bias was considered. Although this risk cannot be completely eliminated, the comparative design of the study and the application of a propensity score matching (PSM) procedure help to mitigate the probability that the observed effects respond exclusively to systematic biases in the data collection method.

Following recent methodological recommendations in PLS-SEM, common method bias was assessed using alternative approaches to the Harman test. First, indicators of total collinearity (VIF) were examined. The values corresponding to the main effects were clearly below the conservative threshold of 3.3, while the constructs associated with the moderator variable—which had the highest values—remained in all cases below the threshold of 5, considered acceptable in models that incorporate interaction terms (Hair *et al.*, 2022; Kock, 2017). Second, the measured latent marker variable (MLMV) technique was applied (Chin *et al.*, 2013). The effect of the marker variable was not statistically significant and was small in magnitude, without substantially altering either the magnitude or significance of the main effects or the moderating effects. Taken together, these results suggest that common method bias does not condition the conclusions of the study.

3.2.2 Control variables. Control variables were included in this study to adjust the analyses for structural differences that could affect the relationship between the explanatory variables and social and environmental innovation. The variables selected were those that, according to previous literature, have a significant influence on firms' propensity to innovate and, at the same time, could skew the results if not properly controlled.

To isolate structural heterogeneity outside the theoretical model and prevent it from skewing the estimates, we included a set of classic controls: country (dummies by Member State, to capture institutional and regulatory differences in the EU), sector (NACE dummies, for different technological and regulatory intensities), size (number of employees, as a proxy for economies of scale and organisational capacity), turnover (annual sales volume, which approximates resources and market traction), and seniority (age as accumulated experience). These controls are estimated in Models 1 and 2 to frame the context and refine the coefficients; subsequently, in Model 3, they are excluded to maintain the focus on internal mechanisms.

3.2.3 Variables of the proposed model. The main variables in the study are operationalised using dichotomous indicators, as defined in Flash Eurobarometer 486. Although this type of measurement may limit the available variance and reduce sensitivity in capturing gradations in certain organisational practices, its use is common in large-scale survey-based studies and allows for consistent assessment of the adoption of social and environmental innovation practices across firms. Nevertheless, this characteristic must be taken into account when interpreting the magnitude of the estimated effects. Given the cross-sectional nature of the data, the mediation analyses included in the model are interpreted with caution and in associative terms, without assuming causal relationships or a strict temporal order between the variables.

3.2.3.1 Dependent variable. 3.2.3.1.1 . Social and environmental innovation. In this study, the dependent variable is operationalised using two survey indicators: q19.5 (innovations with environmental benefits) and q19.6 (social innovations). Both items are retained in the final specification to preserve the two facets of the concept, and they are analysed jointly in the model to examine the determinants of social and environmental innovation.

3.2.3.2 Independent variables. 3.2.3.2.1 . Digital maturity. Digital maturity is modelled as a second-order construct composed of two first-order sub-constructs: (1) Analytics and intelligence, measured by q23.1 (artificial intelligence) and q23.5 (big data/advanced analytics); and (2) Automation and robotics, measured by q23.3 (robotics) and q23.4 (smart devices/sensors). Conceptually, the first sub-dimension reflects the ability to extract, process, and secure value from data; the second incorporates the ability to sensorise and automate physical processes. Methodologically, the two-stage approach in PLS-SEM was used: first, the first-order composites (Analytics and intelligence; Automation and robotics) were estimated,

and their scores were exported; then, in a second phase, these scores were used as formative indicators of the second-order composite “Digital maturity”. It should be noted that, in the specific case of digital maturity, the available indicators capture only certain functional dimensions of the construct. As a result, they do not fully encompass all the conceptual facets discussed in the literature, which should be taken into account when interpreting the results.

3.2.3.2.2 . Social practices. Social practices encompass corporate actions and policies aimed at improving the well-being of people linked to the organisation and its social environment (e.g. equality, diversity, work-life balance, participation). In this study, they are conceptualised as a first-order formative construct measured by four dichotomous indicators that reflect the effective implementation of these practices within the firm (q24.5, q24.6, q24.7, and q24.8). In the empirical model, the social practices construct serves as an independent variable to explain social and environmental innovation.

3.2.3.2.3 . Environmental practices. They reflect the degree to which measures aimed at environmental sustainability have been implemented within the firm, such as recycling, reducing consumption of natural resources, improving energy efficiency, and the development of sustainable products or services to minimise environmental impacts. They are operationalised using survey indicators q24.1, q24.2, q24.3, and q24.4. In the proposed model, the construct of environmental practices plays a dual role: (1) it acts as an independent variable with a direct effect on social and environmental innovation; and (2) it functions as a mediating variable, capturing part of the effect of the antecedent variable, social practices, that translate into innovation through the adoption of environmental practices.

3.2.3.3 Moderating variable. 3.2.3.3.1 . Access to partners. It measures the degree of openness of the firm to networks and alliances with other firms, universities, research centres, or related organisations that facilitate collaboration, knowledge transfer, and open innovation. Operationally, item q16.4 of the survey is used; the variable was recoded so that higher values indicate greater access to partners. In the model, access to partners is included as a moderating variable to assess whether the presence of collaborative networks moderates the effectiveness of capabilities and practices.

3.2.4 Data analysis. To examine the hypotheses proposed in this research, we applied structural equation modelling (SEM) using partial least squares (PLS-SEM) for estimation. This technique is well-regarded and widely used in the field of business studies (Hair *et al.*, 2022). The model evaluation adhered to established standards to ensure measurement accuracy and reliability. Key aspects such as the consistency and validity of the indicators were assessed to ensure a faithful representation of the theoretical constructs (Hair *et al.*, 2022). The indicators of technology adoption and practices (0/1) were modelled as formative. Dichotomous variables were not artificially transformed or recoded, except for necessary reverse-coding; instead, we retained their observed variation. In addition, the two-stage approach was used for second-order composites to avoid identification problems and to facilitate the calculation of interactions. This combination of procedures ensures an analysis that is consistent with measurement theory and statistically robust (Hair *et al.*, 2022).

4. Results

We approach the results with a comparative SEE–NSEE framework from the outset, but we are deliberate in our interpretation: differences between groups are only discussed once we have verified that the constructs are measured equivalently. To do this, we follow a clear sequence. First, we present the basic descriptive statistics for the main variables, differentiating between social economy enterprises (SEE) and non-social economy enterprises (NSEE). Next, we estimate Models 1 and 2 to frame the context: we control for country and sector and for organisational characteristics (size, turnover, age) in order to rule out the possible effects of variables external to the model before evaluating the internal mechanisms. Next, we check the quality of the formative measurement model (the collinearity between indicators, external weights, and redundancy) so that the composites are solidly defined. On that basis, we verify

the measurement invariance between SEE and NSEE (MICOM) and only then proceed to the multi-group comparison, where we test whether the structural coefficients differ between subsamples (Hair *et al.*, 2022; Henseler *et al.*, 2016). Once these verifications are completed, we present Model 3 by group (SEE/NSEE), which includes the complete output of the model: direct, specific, and total indirect effects, as well as the specified moderation. We conclude the chapter by evaluating the quality and predictive power of the model using R^2 , SRMR, and PLSpredict (Q^2_{predict} , RMSE, MAE), so that the reader has both explanatory evidence and out-of-sample predictive performance.

4.1 Descriptive statistics and preliminary analysis of control variables

The subsamples of social economy enterprises (SEE) and conventional enterprises (NSEE) have very similar profiles in terms of the main control variables. In both groups, the average employee category is around 1.97 (SEE) and 1.95 (NSEE) on a five-category ordinal scale, which corresponds to an average size of between 10 and 49 workers. The average age of the enterprises, measured as the number of years since their creation, is also comparable, with values of 32.8 years for SEE and 31.4 for NSEE.

The sectoral and geographical distribution is broadly homogeneous, with enterprises present in more than 30 countries and 15 sectors in both groups. No major deviations in participation by country or sector are observed, which supports the comparability of the samples. Similarly, the average annual turnover is very similar between the two groups (average = 4.37 in SEE and 4.54 in NSEE, on a nine-point scale), with a similar dispersion pattern and a modal range between €100,000 and €500,000.

4.2 Models 1 and 2: effect of context and organisational covariates

Before delving into the core of the structural model, we estimated two control models to isolate the role of context and certain organisational characteristics on social and environmental innovation (SEI) in SEE and NSEE (Table 1). Model 1 incorporates country dummies (with Spain as the reference category) along with size (number of employees), turnover, and age. Model 2 maintains these controls and introduces sector dummies (with D: electricity, gas, steam, and air conditioning as the reference). The objective is twofold: (1) to detect whether there are systematic shifts by country/sector, and (2) to check whether the organisational covariates already explain differences in SEI before adding the capabilities and practices of Model 3.

The most consistent result in both groups and both models is size: larger organisations show higher levels of SEI ($\beta \approx 0.130\text{--}0.140$; $p < 0.010$ in SEE and NSEE). In contrast, neither turnover nor age appears to be significantly associated ($p > 0.100$), suggesting that organisational aspects carry more weight than mere economic traction or seniority in explaining social and environmental innovation.

In the country block, the pattern is muted: most countries do not differ from the reference category (Spain), in both SEE and NSEE. There are, however, two exceptions in NSEE that remain stable from M1 to M2: Iceland (IS) ($\beta = 0.103$; $p = 0.030$ in M1; $\beta = 0.113$; $p = 0.019$ in M2) and Luxembourg (LU) ($\beta = 0.107$; $p = 0.016$ in M1; $\beta = 0.109$; $p = 0.016$ in M2), with positive and modest coefficients. Some other countries show marginal indications ($p \approx 0.080\text{--}0.100$), such as Malta in NSEE, but without reaching conventional thresholds of significance. In SEE, no country shows conclusive effects ($p > 0.050$), and the signs tend to be small.

When introducing sector dummies into Model 2, the picture does not change substantially: the sector categories do not show robust differences from the reference (several are negative in SEE, e.g. Construction, Transport, and Finance, with p around 0.060–0.100, i.e. marginal but inconclusive signs; in NSEE, there are some positive signs, also not significant). It is important to note that, when moving from M1 to M2, the size coefficient remains the same in magnitude and significance, indicating that the scale-up effect is robust to contextual controls (country/sector).

Table 1. Results of models 1 and 2: effect of control variables on social and environmental innovation in SEE and NSEE

Country	Model 1		NSEE		Model 2		NSEE	
	β	p	β	p	β	p	β	p
AT – Austria	0.023	0.664	-0.065	0.217	0.033	0.551	-0.061	0.263
BE – Belgium	-0.037	0.507	-0.022	0.695	-0.021	0.724	-0.006	0.911
BG – Bulgaria	-0.017	0.709	-0.033	0.456	-0.019	0.684	-0.033	0.459
CY – Cyprus (Republic)	-0.070	0.136	-0.041	0.382	-0.060	0.214	-0.049	0.299
CZ – Czech Republic	0.030	0.556	0.031	0.529	0.038	0.460	0.037	0.473
DE – Germany	-0.085	0.147	0.030	0.599	-0.064	0.311	0.026	0.662
DK – Denmark	-0.058	0.311	0.019	0.731	-0.059	0.318	0.016	0.779
ES – Spain	-	-	-	-	-	-	-	-
FI – Finland	-0.026	0.575	0.007	0.880	-0.003	0.954	0.027	0.573
FR – France	0.006	0.924	-0.059	0.313	0.018	0.767	-0.068	0.257
GB – United Kingdom	0.016	0.782	0.076	0.188	0.028	0.652	0.069	0.264
GR – Greece	-0.058	0.187	0.043	0.320	-0.045	0.321	0.043	0.322
HR – Croatia	-0.078	0.072	-0.036	0.403	-0.068	0.123	-0.028	0.511
HU – Hungary	-0.068	0.115	-0.056	0.189	-0.066	0.125	-0.059	0.164
IE – Ireland	-0.021	0.736	0.030	0.620	0.000	0.995	0.028	0.656
IS – Iceland	0.045	0.350	0.103	0.030*	0.056	0.259	0.113	0.019*
IT – Italy	-0.089	0.056	-0.076	0.096	-0.072	0.143	-0.077	0.102
LT – Lithuania	-0.051	0.228	-0.040	0.335	-0.056	0.199	-0.052	0.226
LU – Luxembourg	-0.034	0.448	0.107	0.016*	-0.015	0.754	0.109	0.016*
LV – Latvia	-0.004	0.939	-0.021	0.685	0.009	0.865	-0.031	0.557
MT – Malta	-0.024	0.579	0.076	0.080	-0.009	0.841	0.076	0.082
NL – The Netherlands	-0.034	0.501	-0.040	0.418	-0.019	0.715	-0.027	0.600
NO – Norway	-0.040	0.425	-0.020	0.676	-0.019	0.714	-0.021	0.685
PL – Poland	-0.026	0.677	-0.063	0.300	-0.019	0.775	-0.057	0.378
PT – Portugal	0.046	0.378	-0.004	0.944	0.052	0.331	-0.011	0.828
RO – Romania	-0.044	0.304	-0.064	0.131	-0.035	0.421	-0.063	0.142
RS-KM – Kosovo	-0.049	0.243	0.037	0.372	-0.045	0.301	0.029	0.499
SE – Sweden	-0.034	0.510	-0.022	0.661	-0.024	0.660	-0.021	0.689
SI – Slovenia	-0.058	0.184	-0.062	0.145	-0.050	0.249	-0.068	0.111
SK – Slovakia	-	-	-	-	-	-	-	-
TR – Turkey	0.019	0.657	-0.010	0.819	0.021	0.619	-0.015	0.728
Number of employees	0.133	0.007**	0.133	0.007**	0.131	0.010**	0.142	0.006**
Turnover	0.010	0.833	0.022	0.654	0.002	0.969	0.016	0.751
Age	-0.006	0.896	-0.003	0.939	-0.008	0.858	-0.026	0.574
C – Manufacturing	-	-	-	-	-0.167	0.182	0.303	0.391
D – Electr.,gas, steam and air ac	-	-	-	-	-	-	-	-
E – Water supply. sew. W-ste manag./ remed.activ	-	-	-	-	0.059	0.269	0.023	0.834
F – Construction	-	-	-	-	-0.148	0.083	0.172	0.483
G – Wholesale % retail trade, repair	-	-	-	-	-0.193	0.159	0.356	0.421
H – Transportation and storage	-	-	-	-	-0.130	0.077	0.131	0.539
I – Accommod. and food serv. activ	-	-	-	-	-0.092	0.316	0.259	0.340

(continued)

Table 1. Continued

Country	Model 1		NSEE		Model 2		NSEE	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
J – Information and communication					-0.116	0.149	0.174	0.395
K – Financial and insurance activ					-0.142	0.064	0.199	0.349
L – Real estate activities					-0.139	0.163	0.215	0.297
M – Profess., scient. and techn.activ					-0.157	0.112	0.175	0.584
N – Administr. and support serv.act					-0.141	0.132	0.141	0.586
P – Education					-0.119	0.118	0.158	0.353
Q – Human health and soc. work act					-0.115	0.210	0.234	0.419
Arts, entertainment and recreation					-0.056	0.354	0.210	0.277

Note(s): **p* < 0.05; ***p* < 0.01. ES (Spain) is excluded as the reference category in the estimation of dummy variables. SK (Slovakia) is omitted due to lack of cases. D (Electricity, gas, steam and air conditioning supply) is excluded as the reference category in the estimation of dummy variables

Taken together, Models 1 and 2 suggest that (1) organisational size is a cross-sectional predictor of higher SEI in SEE and NSEE, (2) differences by country are generally limited, with two positives in NSEE (IS and LU), and no systematic patterns in SEE, and (3) sectoral differences are not decisive once we control for the rest. This contextual evidence narrows the field and supports the move to Model 3, where we analyse the structural role of digital maturity, social and environmental practices, and access to partners, without country/sector dummies to avoid collinearity and maintain the focus on internal mechanisms.

4.3 Model 3: preliminary verification and analysis plan

Once the contextual control analysis (Models 1–2) was complete, we estimated Model 3. Its objective is to estimate, by group (SEE/NSEE), the core relationships between digital maturity (DM), social practices (SP), environmental practices (EP), and the contingent role of access to partners (AP) on social and environmental innovation (SEI). As for the preliminary checks, we first verified the formative measurement model, which exceeds the thresholds (VIF < 3.3; mostly significant weights with absolute loadings > 0.5; see [Appendix, Table A1](#)). On this basis, we enabled the multi-group comparison, which is carried out in two steps: (1) MICOM, to confirm measurement invariance between SEE and NSEE and ensure that the standardised coefficients (β) are comparable; and (2) multi-group testing with Henseler's MGA and the permutation test, in order to evaluate differences in β between groups and locate where they diverge. Once these verifications were completed, we proceeded to estimate Model 3 by group using PLS-SEM with two-tailed bootstrap, reporting direct, indirect, and total effects, and examining the effect of the moderating variable. Finally, we evaluate the quality of the model and its predictive capacity with R^2 , SRMR, and PLS predict (Q^2_{predict} , RMSE, MAE).

4.3.1 Measure invariance between SEE and NSEE (MICOM). Before comparing SEE and NSEE, we verified that the constructs were measured equivalently in both groups, so that any differences in the coefficients would reflect the model relationships rather than measurement discrepancies ([Table 2](#)). To this end, we applied MICOM in three steps: (1) specifying the same model/configuration in both groups; (2) testing compositional invariance via permutation; and (3) assessing equality of means and variances, also via permutation.

Table 2. MICOM: invariance between SEE and NSEE

	Step 2: c	Step 2 (c ≥ 1)	Step 3a (means) p_perm	Step 3b (variances) p_perm	
AP – Access to Partners	1.000	0.451	0.137	0.015	Partial
DM – Digital Maturity	0.995	0.600	0.593	0.312	Full
EP – Environmental Practices	0.987	0.486	0.026	0.612	Partial
SP – Social Practices	0.993	0.726	0.104	0.453	Full
SEI – Social and Environmental Innovation	0.999	0.729	0.01	0.034	Partial

Note(s): MICOM and permutation were estimated with 10,000 permutations, two tails, $\alpha = 0.05$, and a fixed seed

The composites show compositional invariance across all constructs ($c = 0.987\text{--}1.000$; $p_{\text{perm}} \geq 0.451$), which ensures partial invariance and allows for the comparison of β between SEE and NSEE. Full invariance (equality of means and variances) is achieved for digital maturity (DM) ($p_{3a} = 0.593$; $p_{3b} = 0.312$) and social practices (SP) ($p_{3a} = 0.104$; $p_{3b} = 0.453$). For access to partners (AP) ($p_{3b} = 0.015$), environmental practices (EP) ($p_{3a} = 0.026$), and social and environmental innovation (SEI) ($p_{3a} = 0.010$; $p_{3b} = 0.034$) the invariance is partial. Consequently, we compare paths (β) throughout the model, while the comparison of means/variances is restricted to DM and SP.

4.3.2 Comparison of SEE vs NSEE (MGA). Based on the confirmed invariance, we directly compared whether the structural relationships differ between SEE and NSEE (Table 3). The multi-group comparison shows two clear differences and, at the same time, a pattern of continuity in the rest of the model.

Firstly, digital maturity (DM) translates more strongly into social and environmental innovation (SEI) when the organisation is SEE. The effect is higher in SEE ($\beta_{\text{SEE}} = 0.131$) than in NSEE ($\beta_{\text{NSEE}} = 0.073$), and the difference in standardised coefficients is significant ($\Delta\beta = +0.058$; $p_{\text{MGA}} = 0.028$; $p_{\text{perm}} = 0.031$). The interpretation is straightforward: in organisations with a social–environmental purpose, digital technology is better suited to social and environmental innovation objectives and generates a higher return.

The second difference appears in the moderation of access to partners (AP) on the link between social practices and SEI. In SEE, AP enhances this effect ($\beta_{\text{AP} \times \text{SP} \rightarrow \text{SEI}} = +0.077$), while in NSEE no reinforcement is observed (negative and inconclusive coefficient: $\beta = -0.055$). The distance between groups is significant ($\Delta\beta = +0.132$; $p_{\text{MGA}} = 0.035$; $p_{\text{perm}} = 0.038$). In

Table 3. Comparison between SEE and NSEE (MGA)

	β_{SEE}	β_{NSEE}	$\Delta\beta$	p Henseler	p Permutation
AP → SEI	−0.032	0.017	−0.049	0.238	0.233
AP × DM → SEI	0.005	0.015	−0.010	0.594	0.611
AP × EP → SEI	−0.031	0.020	−0.051	0.428	0.444
AP × SP → SEI	0.077	−0.055	0.132	0.035	0.038
DM → SEI	0.131	0.073	0.058	0.028	0.031
EP → SEI	0.206	0.192	0.014	0.838	0.834
SP → EP	0.517	0.484	0.033	0.507	0.484
SP → SEI	0.204	0.262	−0.058	0.255	0.239

Note(s): β are standardised coefficients; $\Delta\beta = \beta_{\text{SEE}} - \beta_{\text{NSEE}}$. Henseler’s MGA (unilateral) and the permutation test (bilateral) were run with 10.000 permutations. two tails. $\alpha = 0.05$, fixed seed; both assess equality of β across groups

practical terms, the network of alliances functions in SEE as an accelerator of the impact of social factors on innovation; in NSEE, this role is not conclusively activated.

For the rest of the trajectories, no reliable differences are detected between SEE and NSEE: EP→SEI ($\Delta\beta = +0.014$; $p_{perm} = 0.834$), SP→EP ($\Delta\beta = +0.033$; $p_{perm} = 0.484$), SP→SEI ($\Delta\beta = -0.058$; $p_{perm} = 0.239$). The direct effect of AP and the other moderations (AP × DM, AP × EP) are of comparable magnitudes. This result supports the idea of common levers—the environmental and the digital push in both contexts—on which different emphases are placed: SEE gets more out of digitalisation and its alliances to transform the social into innovation, while NSEE relies relatively more on the direct social path and the environmental, without AP substantially reconfiguring these relationships.

4.3.3 Estimation of model 3 by groups with basic controls. After verifying measurement invariance (MICOM) and comparing the differences between SEE and NSEE (MGA and permutation), we estimated Model 3 (Table 4). This is a group analysis to present the complete output of the model: direct, specific, and total indirect effects, as well as interactions with access to partners (AP). The country and sector dummies were used in Models 1 and 2, but are excluded here for two methodological reasons: (1) their inclusion together with the structural block generates collinearity and explanatory redundancy that are difficult to interpret in PLS-

Table 4. Estimation of the SEE and NSEE conceptual model

	β_{SEE}	SE	<i>p</i>	β_{NSEE}	SE	<i>p</i>
<i>Direct effects</i>						
AP → SEI	-0.032	0.036	0.183	0.017	0.026	0.514
AP × DM → SEI (H5)	0.005	0.020	0.402	0.015	0.021	0.467
AP × EP → SEI (H7)	-0.031	0.041	0.223	0.020	0.040	0.616
AP × SP → SEI (H6)	0.077	0.045	0.046*	-0.055	0.041	0.173
DM → SEI (H1)	0.131	0.019	0.000**	0.073	0.019	0.000**
EP → SEI (H3)	0.206	0.048	0.000**	0.192	0.041	0.000**
SP → EP (H4)	0.517	0.035	0.000**	0.484	0.036	0.000**
SP → SEI (H2)	0.098	0.046	0.017*	0.170	0.045	0.000**
<i>Specific indirect effects</i>						
SP → EP → SEI (H4a)	0.107	0.026	0.000**	0.093	0.021	0.000**
<i>Total effects</i>						
AP → SEI	-0.032	0.036	0.183	0.017	0.026	0.514
AP × DM → SEI (H5)	0.005	0.020	0.402	0.015	0.021	0.467
AP × EP → SEI (H7)	-0.031	0.041	0.223	0.02	0.04	0.616
AP × SP → SEI (H6)	0.077	0.045	0.046*	-0.055	0.041	0.173
DM → SEI (H1)	0.131	0.019	0.000**	0.073	0.019	0.000**
EP → SEI (H3)	0.206	0.048	0.000**	0.192	0.041	0.000**
SP → EP (H4)	0.517	0.035	0.000**	0.484	0.036	0.000**
SP → SEI (H2)	0.204	0.039	0.000**	0.262	0.039	0.000**
<i>Direct conditional effects</i>						
AP → SP → SEI (Average) (H6)	0.098	0.046	0.034*	0.058	0.028	0.036*
AP → SP → SEI (-1 SD) (H6)	0.021	0.065	0.749	0.172	0.058	0.003**
AP → SP → SEI (+1 SD) (H6)	0.174	0.065	0.007**	0.225	0.064	0.000**
<hr/>						
Model estimation	BIC-SEE					BIC-NSEE
EP	-157.189					-133.528
SEI	-87.677					-65.929
Note(s): * <i>p</i> < 0.05; ** <i>p</i> < 0.01; SE – Standard Error; BIC – Bayesian Information Criterion						

SEM; and (2) although they are relevant as context, they are not part of the theoretical core of internal capabilities and practices that this model tests. This modular approach allows us to clearly separate the contextual effect (Models 1 and 2) from the structural effect (Model 3), avoiding distortions in the coefficients.

Methodologically, Model 3 is estimated with the same specification as in the previous comparison: PLS-SEM by group (SEE/NSEE), two-tailed bootstrap (10,000 resamples; 95% CI), with standardised coefficients (β) to facilitate comparison. Given that the only moderation with empirical evidence is $AP \times SP \rightarrow SEI$, only its conditional effects (simple slopes at -1 SD, mean, and $+1$ SD) are presented. The $AP \times DM$ and $AP \times EP$ interactions are not included in Model 3, as they showed no significance either in the between-group comparison or in the estimates by group.

Firstly, following analysis, it is confirmed in both SEE and NSEE that digital maturity (DM) drives social and environmental innovation (SEI) (H1). However, this drive is significantly greater in SEE: the coefficient reaches $\beta = 0.131$ ($p < 0.001$) compared to $\beta = 0.073$ ($p < 0.001$) in NSEE. The reading is clear: when a firm operates with a social and environmental purpose, digitalisation translates more effectively into innovative results aligned with that purpose.

As for how social practices (SP) drive social and environmental innovation (SEI) (H2), the effect is confirmed in both groups, although with varying intensity: it is greater in NSEE ($\beta = 0.170$, $p < 0.001$) than in SEE ($\beta = 0.098$, $p = 0.017$). In organisations without an explicit purpose, social factors seem to translate more directly into innovation, while in SEE that direct impact is more limited.

With regard to environmental practices (EP), they show a very consistent pattern (H3). In both groups, the effect on SEI is positive and robust (SEE $\beta = 0.206$, $p < 0.001$; NSEE $\beta = 0.192$, $p < 0.001$). This parallelism suggests that, regardless of the type of organisation, work on environmental processes and routines is a direct lever for social and environmental innovation. Furthermore, the link between social and environmental factors is clear and robust in both contexts (H4): $SP \rightarrow EP$ in both SEE ($\beta = 0.517$, $p < 0.001$) and NSEE ($\beta = 0.484$, $p < 0.001$), reinforcing the role of social practices as a driver of the transition to environmental practices.

It should be noted that access to partners (AP) does not have a direct effect on SEI in either group (SEE $\beta = -0.032$, $p = 0.183$; NSEE $\beta = 0.017$, $p = 0.514$). Its role, rather than being a driving force in itself, is contingent: it activates or moderates other relationships. It is precisely in the area of moderation that the relevant differential nuance emerges. Neither the interaction $AP \times DM \rightarrow SEI$ (H5) nor $AP \times EP \rightarrow SEI$ (H7) reaches significance in SEE or NSEE; in other words, the weight of digitalisation and environmental practices does not depend on the level of access to partners. In contrast, the interaction $AP \times SP \rightarrow SEI$ (H6) is significant in SEE ($\beta = 0.077$, $p = 0.046$) and not in NSEE ($\beta = -0.055$, $p = 0.173$) (consistent with MGA, see Table 3). This means that the greater the access to partners, the more the effect of social practices on innovation intensifies. The analysis of simple slopes illustrates this well: in SEE, the $SP \rightarrow SEI$ effect goes from non-significant at low AP ($\beta = 0.021$, n.s.) to significant at the medium level ($\beta = 0.098$, $p = 0.034$) and more intense with high AP ($\beta = 0.174$, $p = 0.007$). In NSEE, the slopes are positive at all three levels, but as the interaction is not significant, we cannot infer a real modulation by AP: there is an SP effect, yes, but it does not change conclusively with access to partners.

In terms of mediation, the $SP \rightarrow EP \rightarrow SEI$ route (H4a) is significant in both groups and of comparable magnitude (SEE $\beta = 0.107$, $p < 0.001$; NSEE $\beta = 0.093$, $p < 0.001$). In other words, part of the impact of social practices operates through environmental improvements, both in SEE and NSEE. Given that the $AP \times EP$ interaction is not significant, moderated mediation is not supported: the indirect effect does not depend on AP, although in SEE it appears to lose weight when access to partners is very high (a descriptive pattern consistent with the slight drop in $EP \rightarrow SEI$ at $+1$ SD of AP).

If we look at the total effects on SEI, the picture becomes clear. DM maintains a higher total impact in SEE (0.131 vs 0.073), EP shows very similar totals between groups (0.206 vs 0.192), and SP registers a higher total in NSEE (0.262 vs 0.204) because the direct effect is higher there and the indirect effect via EP is also present. In SEE, the SP total is more moderate, but it grows when access to partners is high, precisely because of the positive moderation described above.

Overall, the evidence points to two complementary mechanisms. On the one hand, there are common drivers: environmental and digital factors drive social and environmental innovation in both groups. On the other hand, different emphases emerge: in SEE, digital maturity generates greater innovative returns and access to partners (AP) accelerates the impact of social practices (SP); in NSEE, the impetus comes mainly from the direct social path (SP) and environmental practices, without access to partners conclusively modifying these relationships. The practical implication is clear: for SEE, the combination of social and environmental practices plus good access to partners is particularly fertile for innovation (in addition to the impetus of digitalisation). For NSEE, it is advisable to leverage the direct effect of social practices and sustain it with solid environmental practices, while digitalisation continues to play an important, albeit somewhat more limited, role. Table 5 summarises the hypotheses.

4.3.4 Model quality and predictive power (SEE vs NSEE). After comparing differences between SEE and NSEE and presenting Model 3 by group, we evaluate the extent to which the model explains and predicts (Table 6). We combine three complementary approaches: (1) the explained variance (R^2) in the endogenous constructs (SEI and EP), which indicates how much of the phenomenon our relationships capture; (2) overall fit (SRMR), to verify that the model adequately reproduces the observed covariances; and (3) out-of-sample predictive validity

Table 5. Results obtained for the proposed hypotheses

Hypotheses	SEE	NSEE
H1: Digital maturity has a positive impact on social and environmental innovation in SEE and NSEE	✓	✓
H2: Social practices have a positive impact on social and environmental innovation in SEE and NSEE	✓	✓
H3: Environmental practices have a positive impact on social and environmental innovation in SEE and NSEE	✓	✓
H4: Social practices have a positive impact on environmental practices in SEE and NSEE	✓	✓
H4a: Environmental practices positively mediate the impact of social practices on social and environmental innovation in SEE and NSEE	✓	✓
H5: Access to partners for collaboration positively moderates the relationship between digital maturity and social and environmental innovation in SEE and NSEE	×	×
H6: Access to partners for collaboration positively moderates the relationship between social practices and social and environmental innovation in SEE and NSEE	✓	×
H7: Access to partners for collaboration positively moderates the relationship between environmental practices and social and environmental innovation in SEE and NSEE	×	×

Table 6. Quality and predictive capacity by group

Grupo	R^2 (SEI)	R^2 (EP)	Q^2_{predict} (SEI)	Q^2_{predict} (EP)	RMSE (SEI)	RMSE (EP)	MAE (SEI)	MAE (EP)	SRMR
SEE	0.212	0.253	0.377	0.652	0.473	0.553	0.350	0.458	0.052
NSEE	0.182	0.222	0.382	0.594	0.423	0.578	0.324	0.48	0.047
Δ (SEE – NSEE)	0.030	0.031	–0.005	0.058	0.050	–0.025	0.026	–0.022	–

(PLSpredict), which summarises predictive relevance (Q^2_{predict}) and error precision (RMSE/MAE). This allows us to balance explanation (R^2) and prediction (PLSpredict), while maintaining basic fit control (SRMR). As a reminder, some simple assessment rules apply: SRMR < 0.08 is usually considered a good fit; $Q^2_{\text{predict}} > 0$ implies predictive relevance; and lower RMSE/MAE denote better prediction accuracy.

5. Discussion

The overarching message of this study is that digital maturity, sustainability practices, and external collaboration are systematically associated with social and environmental innovation, while the strength and configuration of these relationships vary according to organisational logics. In particular, the findings indicate that SSE, operating under a mission-oriented logic, leverage digitalisation and partnerships differently from NSEE, resulting in distinct innovation patterns. Using data from Flash Eurobarometer 486 and a PLS-SEM analysis on matched samples, the results suggest the existence of distinct patterns between the two types of enterprises: digital maturity shows a stronger association in the SEE; social practices have a relatively greater direct effect in the NSEE, while environmental practices are strongly related to innovation in both groups; there is a positive synergy between social and environmental practices; and external collaborations show no direct effects, although they seem to play a moderating role in the relationship between social practices and innovation exclusively in the SEE. These results partially support the hypotheses: H1, H2, H3 and H4 (including H4a) are validated in both groups, while H5 and H7 are not, and H6 is only validated in SEE.

Beyond validating the established relationships, the findings contribute to a differentiated reading of the field by highlighting the existence of different organisational logics. In this study, organisational logic is understood as the set of priorities, decision-making criteria and value orientations that guide the mobilisation of resources and the evaluation of innovation results. From this perspective, SEEs operate under a rationality oriented towards public and transformative ends, where internal and external factors are integrated to amplify a sustainable impact, while NSEEs follow a competitive logic, with more segmented and direct effects. This distinction qualifies the universalist approaches in the literature on sustainable innovation (Ardito, 2023; Rousselière *et al.*, 2024), suggesting important implications: social and environmental innovation does not arise from isolated capacities, but from assemblages of digital maturity, social and environmental practices, and, where appropriate, external collaborations. The effectiveness of these assemblages is conditioned both by the institutional framework and by the dominant organisational logic, understood as the prevailing orientation towards public or competitive objectives. In this sense, the results do not point to a redefinition of the sector, but rather to an explanatory reframing that highlights the need for contextual perspectives to understand differentiated innovation trajectories in social economy and conventional enterprises. In particular, they suggest moving towards research approaches that prioritise the comparative and contextual analysis of organisational configurations, since the same resources and practices do not generate homogeneous effects, but rather differentiated trajectories of social and environmental innovation.

5.1 Interpretation of findings

The positive association between digital maturity and social and environmental innovation in both types of enterprises is consistent with previous literature (H1), although with significantly greater intensity in SEE. This difference qualifies the thesis on sustainable digital transformation, which often presents technology as a neutral and universal enabler (Lei *et al.*, 2024; Vial, 2021). In SEE, digitalisation is not only linked to process optimisation but also to a structural orientation towards the common good, which appears to amplify its transformative potential, as reflected in higher coefficients in the model.

Contradicting studies that emphasise linear effects in competitive contexts (Niu *et al.*, 2022), the results suggest that the role of digital maturity is conditioned by organisational logic; in NSEE it is mainly associated with operational complementarity, whereas in SEE it is more closely linked to ESG-oriented innovation, extending previous findings in sustainable SMEs (Isensee *et al.*, 2020).

Social practices are positively associated with innovation, validating H2, but with different dynamics: a stronger direct effect in NSEE, where they act as disruptors in competitive frameworks, and a more moderate effect in SEE, possibly diluted by their inherent institutionalisation. This supports approaches that link social practices to climate innovation (Perinić *et al.*, 2023), but contradicts assumptions of universality, showing that their effectiveness depends on context (Gomes *et al.*, 2024). Similarly, environmental practices show a positive and consistent association with social and environmental innovation in both groups (H3), in line with evidence on their role in ecological performance (Rahmani *et al.*, 2024; Singh *et al.*, 2020). The synergy between social and environmental practices, which validates H4 and H4a, suggests a positive mediation, where the social reinforces the environmental to drive integrated innovation. This relationship extends systemic ESG models (Aukhoon *et al.*, 2024; Gazi *et al.*, 2024), highlighting that sustainability arises from cross-cutting interactions, not isolated dimensions, with novel comparative empirical evidence in European contexts.

A particularly relevant finding concerns external collaborations. Access to partners (AP) does not show significant direct association with innovation in either group (SEE/NSEE). Nor is its moderating effect confirmed in the relationships between digital maturity and environmental practices with social and environmental innovation (H5 and H7). On the other hand, it does positively moderate the impact of social practices on social and environmental innovation, only in SEE, so H6 is partially supported. This challenges the paradigm of open innovation (OI) as an autonomous driver (Chesbrough, 2003), extending adaptations to sustainable contexts where OI is conditional (Miranda *et al.*, 2023; Harsanto *et al.*, 2022). The results indicate a structural distinction: in competitive logics (NSEE), alliances operate directly for economic gains, while in public logics (SEE), they act as amplifiers only if there are consolidated social practices, aligning with frameworks that emphasise interdependencies in sustainable open innovation (SOI) (Urbinati *et al.*, 2023). This comparative empirical evidence, based on matched samples, qualifies open innovation for transformative purposes, suggesting that its impact depends on internal alignments, not openness *per se*.

Likewise, the absence of significant direct effects associated with access to partners may be partially conditioned by the dichotomous nature of the indicators used, which capture the existence of collaborations but not their intensity, depth or quality. This limitation in the available variance could contribute to attenuating these relationships. In both groups, these results are consistent with a contingent view of open innovation, according to which mere external openness does not automatically guarantee higher levels of innovation. The literature has shown that the relationship between openness and innovation can be non-linear and exhibit diminishing returns when the costs of searching for, coordinating and appropriating external knowledge exceed the expected benefits, especially in the context of SMEs (Laursen and Salter, 2006; Love *et al.*, 2014).

From this perspective, the absence of significant direct effects of access to partners in SEEs can be interpreted as the result of more instrumental or transactional collaborations, which do not necessarily translate into social and environmental innovation when internal capacities to absorb and integrate external knowledge are insufficient, as highlighted in the literature on open innovation (Bogers *et al.*, 2017). In the case of SEEs, the results suggest that open innovation does not act as an autonomous driver, but rather as an amplifying mechanism whose effect depends on alignment with consolidated internal social commitments, in line with approaches to hybrid organisations and multiple logics (Battilana and Lee, 2014).

5.2 Theoretical contributions

This study expands on dynamic capabilities theories (Teece, 2007) by demonstrating that digital maturity and sustainable practices do not operate as universal resources, but rather that their reconfiguration and effectiveness vary according to organisational logic, suggesting the need for a more contextual reading of dynamic capabilities theories and RBV, especially in hybrid organisational environments (Battilana and Lee, 2014). By differentiating between SEE and NSEE, a conceptual extension is proposed: sustainable innovation as a relational assembly, where internal (practices) and external (collaborations) factors are differentially articulated, enriching resource-based views (RBV) with institutional dimensions (Zhang *et al.*, 2024).

Regarding open innovation, the results relativise its universality (Chesbrough, 2003), proposing a bifurcation: open innovation for economic purposes versus conditional open innovation in social and environmental innovation, expanding the adaptations of sustainable open innovation (Miranda *et al.*, 2023; Chesbrough and Di Minin, 2014). These results qualify the more universalist applications of stakeholder theory (Freeman, 1984) by showing that external pressures only translate into social and environmental innovation when they are aligned with internal commitments and the organisational logic of the firm, extending its applications to social economies (Aziz and Hamid, 2023; Danish *et al.*, 2025).

The novelty lies in the comparative empirical evidence, which reveals divergent regimes of meaning in innovation: competitive (efficiency) versus public (transformation), questioning one-dimensional approaches and defending contextual perspectives at the digital–sustainability intersection (Ardito, 2023; Hanelt *et al.*, 2021), not to question the general validity of existing theoretical frameworks, but to highlight the limits of their undifferentiated application across different types of organisations.

5.3 Practical implications

For SEE managers, the results suggest prioritising the integration of digital maturity with established social practices before seeking external partnerships, as these only amplify innovation if there is internal coherence (Miranda *et al.*, 2023). From the fundamentals of social economy, this greater effectiveness of digital maturity can be explained by the fact that technology is adopted as a means to serve social mission and collective value, and not solely as an instrument of efficiency, which facilitates its translation into social and environmental innovation (Defourny and Nyssens, 2017; Battilana *et al.*, 2015). For example, implementing digital platforms for community networks can scale impact, but only after institutionalising inclusive practices and avoiding fragmented approaches (Kraus *et al.*, 2022). In NSEE, it is suggested to adopt social practices as direct disruptors for innovation, complementing them with standardised environmental practices, with an emphasis on synergies for sustainable competitiveness (Gomes *et al.*, 2024; Singh *et al.*, 2020). Managers should evaluate digital maturity not as an end in itself, but as an operational enabler, integrating it into ESG strategies to mitigate segmented effects (Niu *et al.*, 2022). Both types of enterprises may benefit from measuring relational impacts, incorporating learning and cultural transformation indicators, to make sustainable processes visible beyond commercial metrics (Nielsen *et al.*, 2024; Ravazzoli *et al.*, 2021).

5.4 Social implications

From a broader social perspective, the study's findings highlight the potential of social economy enterprises as particularly conducive spaces for co-creating value with marginalised or vulnerable communities. The greater effectiveness of digital maturity in these organisations, when combined with established social and environmental practices, is linked to their mission orientation and forms of governance aligned with social and collective logics, which reinforce trust and social capital (Battilana and Lee, 2014; Cajaiba-Santana, 2014). At the same time, digital maturity expands the capacity to articulate participatory processes and collective

initiatives, facilitating the involvement of local actors in social and environmental innovations based on co-creation and collective value (Mair and Martí, 2006; Dentoni *et al.*, 2016). From this perspective, the co-creation of value is not conceived as an automatic result of digitalisation, but as a socially mediated process consistent with the participatory and common good-oriented logic that characterises the social economy (Cajaiba-Santana, 2014).

5.5 Implications for public policy

Policies should promote SEE as transformative platforms, recognising their potential to align digitalisation and sustainability with public impacts (Bansal *et al.*, 2023). Tax incentives or subsidies for digital maturity in SEE could amplify socio-environmental synergies, prioritising contexts with strong internal practices (Rousselière *et al.*, 2024). It is recommended to review innovation metrics, abandoning approaches focused on technological outputs and replacing them with indicators that capture ethical and relational trajectories, facilitating inclusive assessments (Mio *et al.*, 2022). It is advisable to avoid the generic promotion of collaborations, opting instead for ecosystems conditioned by internal alignments, in order to prevent symbolic alliances (Nielsen *et al.*, 2024; Miranda *et al.*, 2023). In the EU, integrating these insights into frameworks such as the Green Deal could strengthen social economies, fostering inclusive transitions through selective cross-sectoral networks (Savga *et al.*, 2023).

5.6 Limitations and future research directions

However, this study has some limitations that should be taken into account when interpreting the results. First, the use of cross-sectional data prevents the establishment of causal relationships or the analysis of temporal dynamics, so the results should be interpreted in terms of associations (Hanelt *et al.*, 2021). Secondly, the use of self-reported survey data may lead to perceptual biases and possible common method variance; however, measures have been taken to mitigate this risk and the corresponding diagnostic checks have been performed. Thirdly, dichotomous measures of practices restrict nuances regarding intensity, suggesting more granular scales in future studies (Isensee *et al.*, 2020). The SEE/NSEE dichotomy obscures hybridisations, ignoring internal tensions or transitions (Battilana and Lee, 2014).

These limitations point to avenues for future research based on longitudinal designs that could track these processes or the use of objective data at the firm level, as well as qualitative approaches that explore the underlying mechanisms in specific contexts (Ravazzoli *et al.*, 2021). Future lines of research include multi-level analysis with global data, integrating variables such as cultural diversity (Xu *et al.*, 2024), or studies on OI in hybrids, extending the competitive–public logic distinction (Urbinati *et al.*, 2023).

6. Conclusions

This research analyses how digital maturity, social and environmental practices, and external collaborations relate to social and environmental innovation in social economy enterprises (SEEs) and conventional enterprises (NSEEs). The results show that, although both types of enterprises can generate sustainable innovation, the underlying mechanisms differ systematically: in SEEs, digitalisation and collaboration act as amplifiers of a transformative purpose, while in NSEEs the effects are more direct and consistent with a competitive logic.

Taken together, the findings underscore that social and environmental innovation does not respond to universal approaches, but rather depends on the dominant organisational logic. From a theoretical perspective, the study contributes to the literature on sustainable innovation by highlighting that impact emerges from organisational and relational configurations rather than isolated capabilities.

Overall, this study indicates that organisational purpose plays an important role in how digitalisation, sustainability practices, and collaboration are aligned with social and

environmental innovation. By shedding light on these relationships, it offers insights for organisations and policymakers seeking to support more inclusive and resilient economic models in an increasingly digitalised context.

Appendix

Table A1. Reliability and validity measures

	SEE β_w	SD	<i>p</i>	VIF	NSEE β_w	SD	<i>p</i>	VIF
<i>Environmental and social innovation</i>								
Q19.5	0.728	0.080	0.000**	1.071	0.705	0.076	0.000**	1.053
Q19.6	0.523	0.086	0.000**	1.071	0.568	0.085	0.000**	1.053
<i>Digital maturity</i>								
Dm_1	0.484	0.114	0.000**	1.091	0.552	0.144	0.000**	1.073
Dm_2	0.746	0.090	0.000**	1.091	0.702	0.124	0.000**	1.073
<i>Environmental practices</i>								
Q24.1	0.252	0.089	0.005**	1.252	0.404	0.080	0.000**	1.258
Q24.2	0.328	0.081	0.000**	1.439	0.356	0.082	0.000**	1.405
Q24.3	0.252	0.084	0.003**	1.387	0.129	0.088	0.143	1.324
Q24.4	0.549	0.071	0.000**	1.182	0.502	0.076	0.000**	1.153
<i>Social practices</i>								
Q24.5	0.229	0.091	0.012*	1.252	0.183	0.099	0.063	1.524
Q24.6	0.397	0.087	0.000**	1.439	0.454	0.092	0.000**	1.553
Q24.7	0.471	0.079	0.000**	1.387	0.536	0.075	0.000**	1.151
Q24.8	0.299	0.083	0.000**	1.182	0.197	0.082	0.017*	1.233

Note(s): **p* < 0.05; ***p* < 0.01. Dm_1 = Analysis and intelligence; Dm_2 = Automation and robotics. All VIFs < 3.3. Weights (β_w) < 0.5 and/or not significant (*p* < 0.05) have been retained due to their high absolute load > 0.50 and the relevance of their content

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