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The role of sustainability and high-tech sector affiliation in shaping equity crowdfunding success: An AI perspective

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ABSTRACT

Equity crowdfunding (ECF) has emerged as an essential funding tool for sustainability-oriented ventures (SOVs). This study examines the relationship between sustainability orientation, high-tech sector affiliation such as information technology, pharmaceuticals, electronics, and telecommunications, and ECF campaign success in the Italian market. We analyze 140 ECF projects from 2017 to 2023, employing artificial intelligence techniques to classify campaign sustainability orientation. We examine the impact of SOVs on various ECF success metrics, including total funds raised, success ratio, and normalized success. Moreover, we explore the potential moderating role of high-tech sectors on the effect of sustainability orientation on campaign performance. Results reveal that SOVs have a significant positive impact on ECF success across multiple metrics, with the positive contribution of high-tech sector affiliation amplifying this effect.

1. Introduction

Over the past few years, equity crowdfunding (ECF) has emerged as an important resource for financing small and medium enterprises (SMEs), drawing significant attention from both scholars and legislators (Baber and Fanea-Ivanovici, 2022). Sustainability has emerged as a critical factor influencing investor decisions in ECF campaigns. In the context of ECF, sustainability encompasses environmental, social, and governance (ESG) factors that contribute to long-term value creation (Vismara, 2019). Research indicates that sustainability-oriented ventures (SOVs) can attract more investors due to their alignment with ethical values and social impact (Calic and Mosakowski, 2016). However, the relationship between sustainability orientation and ECF success is complex. Recent research by Cumming et al. (2024) indicates that while sustainability can significantly increase attractiveness, its effectiveness varies based on communication and cultural context.

Despite the growing body of research on equity crowdfunding (ECF), there remains a significant gap in understanding how sustainability orientation interacts with high-tech sectors to influence ECF success. While studies such as those by Bade and Reichenbach (2025) have explored the impact of sustainable development goals on crowdfunding success, and Capolupo et al. (2024) have examined the role of family governance and sustainability in ECF, the specific intersection of sustainability orientation and technology in this context has not been fully addressed. This paper aims to fill this gap by analyzing the main effect of sustainability orientation on ECF success and investigating how high-tech sectors can amplify this effect. By doing so, it contributes to a deeper understanding of

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how these factors interplay to enhance the appeal and effectiveness of SOVs in ECF campaigns.

Leveraging signaling theory, we argue that declaring sustainability commitments in ECF campaigns acts as a positive signal to potential investors, reducing information asymmetry and enhancing campaign appeal (Ahlers et al., 2015; Butticè and Vismara, 2022). This paper explores the relationship between SOVs and the success of ECF campaigns while examining the moderating role of high-tech sectors. Our findings reveal that SOVs significantly impact ECF success across multiple metrics, including total funds raised, success ratio, and normalized success. Furthermore, we demonstrate that combining sustainability with high-tech sectors amplifies this positive effect, suggesting a synergistic relationship.

This paper contributes to existing literature in several ways. First, we confirm the positive effect of SOVs on the success of ECF campaigns, extending this evidence to the Italian market. Second, we extend our understanding of how sustainability-orientation and high-tech sector affiliation jointly influence ECF outcomes, providing new insights into the positive effects of these factors. Third, we explore the application of AI in predicting the sustainability-orientation of campaigns, offering a novel approach to campaign analysis that enhances objectivity and scalability in sustainability assessments. These insights provide valuable guidance for entrepreneurs seeking to optimize their fundraising strategies in an increasingly competitive ECF environment, particularly in the Italian high-tech sector. Our findings underscore the importance of effectively communicating sustainability initiatives and leveraging technological innovations to enhance campaign success.

The paper is structured as follows. Section 2 presents the literature review and develops our hypotheses. Section 3 describes our data and methodology, including our AI-based approach to classify sustainability orientation Section 4 provides descriptive statistics of our sample. Section 5 presents our empirical analysis, including the interaction graphs that demonstrate how high-tech sector affiliation moderates the effect of SOVs. Section 6 discusses our findings and their implications for theory and practice, while also acknowledging limitations and suggesting directions for future research.

2. Literature review and hypothesis development

Crowdfunding is the innovative means of gathering resources from a mass of people, which individuals and entities use to secure financial support through digital platforms (Mollick, 2014). As Butticè and Vismara (2022) articulate that crowdfunding helps entrepreneurs reach out to a wider class of investors than the traditional actors in venture capital. The benefits brought forth by crowdfunding are not limited to just facilitating the raising of funds but bringing interaction between the community and the validation of new ideas (Calic and Mosakowski, 2016). Crowdfunding appears among new ranges of financing sources, such as peer-to-peer lending, internet banking, mobile payments, robot-advisory, insurTech, blockchains, or cryptocurrencies, to name just a few (Fasano and Cappa, 2022). Even though crowdfunding is a concept in evolution, it remains a very alternative way of financing an entrepreneurial project compared to more traditional methods such as bank loans, equity injections from shareholders or cash holdings as an alternative to bank debt (Fasano and Deloof, 2021; Fasano and La Rocca, 2023).

Crowdfunding represents several models, each suited to specific funding needs and investors' motivations. The main types of crowdfunding, as identified by (Mollick, 2014), are donation-based, reward-based, equity-based, and lending-based crowdfunding. In ECF, investors receive equity in return for their contributions compared to other forms where returns may be nonfinancial or debt-based. This structure allows for a more engaged investor community, motivated by both financial returns and social impact (Mochkabadi and Volkmann, 2020).

Signaling theory offers a widely recognized framework for analyzing the dynamics of equity crowdfunding (ECF) campaigns (Pommet et al., 2023; Yáñez-Valdés and Guerrero, 2023). This theory posits that ventures can communicate their quality through observable characteristics "such as sustainability commitments" to potential investors (Spence, 1978). Boosting on the sustainability quality of the project in the campaign, highlighting the social benefits of the idea, build benevolence effect in the community, fostering support among backers who appreciate their efforts to make a positive impact. According to Vismara (2019), declaring a sustainability commitment in an ECF campaign acts as a positive signal toward potential backers, increasing the likelihood of short-term success by reducing information asymmetry. Moreover, sustainable projects are often perceived as less risky in the long run. Investors may see them as more adaptable to regulatory changes and better positioned to thrive in an evolving market where sustainability becomes a standard expectation.

2.1. The relationship between sustainability orientation and ECF

Sustainability orientation has emerged as a critical factor influencing investor decisions in equity crowdfunding (ECF) campaigns (Vismara, 2019). Through the lens of signaling theory, we can understand how sustainability-oriented ventures (SOVs) leverage their commitment to environmental, social, and governance (ESG) factors as a powerful signal to potential investors (Pommet et al., 2023; Yáñez-Valdés and Guerrero, 2023). The mechanism through which sustainability orientation influences crowdfunding success can be explained as follows. A sustainability commitment signals that the venture is forward-thinking, adaptable, and aligned with growing market trends. This perception of quality can attract investors who view sustainability as an indicator of long-term value creation (Vismara, 2019). Investors may perceive sustainable projects as less risky in the long run, viewing them as more adaptable to regulatory changes and better positioned in an evolving market where sustainability is increasingly important (Calic and Mosakowski, 2016).

SOVs can attract a wider investor base that values both financial returns and positive societal impact. This expanded set of potential investors increases the likelihood of campaign success (Bento et al., 2019). By clearly communicating sustainability initiatives, ventures provide additional information about their values, operations, and long-term strategy. This transparency helps reduce

information asymmetry, a key challenge in ECF (Vismara, 2018). In a crowded marketplace, sustainability orientation can serve as a differentiating factor, helping ventures stand out and capture investor attention.

Recent research has provided further evidence of the importance of sustainability orientation in crowdfunding at the platform level, providing additional context for our campaign-level analysis. Farè et al. (2024) analyzed 573 platforms across 37 countries and found that social-oriented platforms outperform their counterparts, particularly in attracting investors. This underscores the growing importance of sustainability orientation in crowdfunding success. Cumming et al. (2024) highlighted that ESG criteria impact crowdfunding platform performance, with platforms integrating sustainability approaches tending to perform better. Adding to this evidence, Bade and Reichenbach (2025) examined 25,799 Indiegogo campaigns and found that campaigns with stronger emphasis on sustainable development goals (SDGs) in their descriptions raised 17.3 % more funding and attracted 8.3 % more backers. Their study particularly highlighted that campaigns focusing on climate, energy, sustainable societies, and responsible consumption were more successful in their fundraising efforts.

Based on this literature and the underlying signaling theory, we hypothesize:

H1. SOVs positively impacts the success of equity crowdfunding campaigns.

2.2. The moderating role of high-tech sectors affiliation

Building on signaling theory, we propose that high-tech sector affiliation strengthens the effect of sustainability orientation on equity crowdfunding (ECF) success through several key mechanisms.

First, high-tech sector affiliation amplifies the quality signal of sustainability orientation by demonstrating concrete technological capabilities to implement sustainable solutions. The combination of sustainability commitment and high-tech expertise can signal to investors that a venture is well equipped to address complex environmental and social challenges through innovative means (Yáñez-Valdés and Guerrero, 2023). This synergy may enhance the perceived quality and potential impact of the venture in investors' eyes, as technological capabilities provide tangible evidence of the venture's ability to execute on its sustainability orientation goals (Vacchi et al., 2021). Second, high-tech sector affiliation can help reduce information asymmetry, which is a crucial challenge in ECF (Vismara, 2018). By combining sustainability orientation with high-tech capabilities, ventures provide additional concrete information about their ability to achieve sustainability goals through technological innovation. Information asymmetry is especially prominent for unsophisticated investors trying to evaluate innovative companies (Johan and Zhang, 2021). Recent evidence from Italy shows that ventures located in innovative areas have higher probability of ECF success (Battaglia et al., 2022). The combination of sustainability and high-tech signals may offer investors a clearer picture of the venture's potential, making investment opportunities more transparent and easier to evaluate. Third, the interaction between sustainability orientation and high-tech sector affiliation creates a unique signaling effect that enhances the perceived long-term viability and scalability of ventures. In rapidly changing markets, investors seek ventures that can evolve and scale their sustainable solutions over time (Mochkabadi and Volkmann, 2020). High-tech capabilities signal a venture's ability to innovate continuously and adapt to emerging environmental challenges and regulatory requirements. This technological adaptability is particularly appealing in the context of SOVs, where solutions often need to evolve in response to changing environmental conditions and societal needs. High-tech SOVs can demonstrate their potential for scalable impact through technological solutions, which is especially important in crowdfunding where investors seek both social and financial returns (Vismara, 2019). For ECF investors, who may have a longer-term investment horizon, the combination of sustainability orientation and high-tech sector affiliation suggests a venture that is not only committed to addressing current sustainability issues but also equipped to tackle future challenges through technological innovation. This dual signaling approach helps ventures stand out in a crowded marketplace while providing concrete evidence of their ability to deliver on sustainability promises and adapt to future challenges, thereby strengthening the positive effect of sustainability orientation on ECF success.

These mechanisms suggest that the interaction between sustainability orientation and high-tech sector affiliation creates a powerful combined signal in the equity crowdfunding context. For effective signaling, signals need to be both observable and costly to imitate (Di Pietro et al., 2023). The combination of high-tech capabilities and sustainability orientation meets both criteria, as it requires substantial investment in both technological development and sustainable practices.

Based on these theoretical arguments and the potential interactions between high-tech sector affiliation and sustainability orientation, we hypothesize:

H2. High-tech sector affiliation positively moderates the effect of SOVs on the success of equity crowdfunding campaigns.

This hypothesis proposes that the positive impact of sustainability orientation on ECF outcomes will be more pronounced for ventures in high-tech sectors compared to those in non-high-tech sectors, reflecting the synergistic effect of combining technological capabilities with SOVs.

3. Sample, model and variables

Italy has been a pioneer in regulating equity crowdfunding (ECF), enacting Law Decree no. 179/2012, known as Decreto Crescita Bis (Growth Bill 2). This legislation aimed to support innovative startups by providing alternative financing avenues. The regulatory framework has evolved through several amendments by the Italian Securities and Exchange Commission (Consob), culminating in Regulation no. 21,259 in 2020 (Caputo et al., 2022). Given this supportive regulatory environment, ECF platforms have flourished, with MamaCrowd emerging as a key player in the market.

Our analysis utilizes data from MamaCrowd, Italy's largest ECF platform, which launched its first campaign in 2016 and has since facilitated numerous funding projects for innovative startups and SMEs. The dataset comprises 140 ECF projects initiated by Italian firms between 2017 and 2023, with 7 projects deemed unsuccessful due to not meeting their minimum funding goals. For each firm involved in ECF campaign we collected also accounting data. Our analysis involves extracting comprehensive financial and accounting data from the ORBIS by Bureau Van Dijk database, a robust data resource on private companies that provides financial insights related to approximately 180 million entities, individuals, banks, and insurance companies globally.

To validate our hypotheses, we employed the following empirical models. With regards to hypothesis 1 (H.1) we tested this model

ECF success = f(SOVs, control variables)

Moreover, to verify the validity of our second hypothesis (H.2) we introduced in previous model a variable related to high-tech sectors and its interaction with SOVs as it follows:

ECF success = f(SOVs, high-tech sectors, SOVs × high-tech sectors, control variables)

Table 1 synthetizes the variables included in the models.

This study employs three different types of dependent variables to assess the success of ECF campaigns, as reported in Table 1. The success ratio is a commonly used metric in the literature, providing a straightforward measure of campaign performance. It is typically calculated as the amount raised divided by the funding goal (Yáñez-Valdés and Guerrero, 2023). We also use the natural logarithm of the total amount raised, allowing for a more normalized comparison across campaigns of varying sizes (Vismara, 2019). Additionally, we utilize a normalized success index, which standardizes success metrics across campaigns with different funding goals, enabling direct comparisons regardless of scale. By adjusting for variability in campaign objectives, the normalized success index provides a fair assessment of campaign effectiveness.

Another critical variable is the Dummy Sustainability, which indicates whether a campaign incorporates sustainability-oriented practices. This variable is essential for understanding how SOVs influences investor decisions and overall campaign success (Calic and Mosakowski, 2016). To enhance our analysis further, we explore the use of artificial intelligence (AI) to detect and classify the sustainability orientation of ECF campaigns and the innovation inside the offer proposed to the market.

Our analysis deepens its focus on SOVs by utilizing AI to classify the sustainability orientation of equity crowdfunding (ECF) campaigns. With sustainability becoming increasingly vital in the investor decision-making process (Belleflamme et al., 2014), it was necessary to develop a model that could predict if a campaign promotes sustainable behavior or not. We employed a pre-trained BERT (Bidirectional Encoder Representations from Transformers) model for this task (Devlin, 2018). BERT and its variants process text input bidirectionally, allowing for a more nuanced understanding of context compared to previous unidirectional models (Kurakin et al., 2016).

We fine-tuned the BERT model on our corpus of labeled campaign descriptions as "sustainable" or "not sustainable". This allows the model to learn context-specific signals for sustainability within the text, without relying on explicit keyword matching (Liu et al., 2019). To prepare the data, we tokenized and encoded the campaign descriptions using BERT's tokenizer. This process enables the model to handle out-of-vocabulary words effectively. We then fed these encoded texts into the model along with their corresponding sustainability labels. During training, the model learns to associate certain linguistic patterns and contextual cues with sustainability, rather than relying on a predefined list of keywords. This approach allows for a more flexible and nuanced classification that can capture implicit sustainability themes (Vig, 2019).

The fine-tuned model achieved an accuracy of 95 % on our test set, demonstrating its effectiveness in classifying sustainability orientation. This AI-powered categorization not only automates the process but also creates a more accurate product due to reduced human bias (Kurakin et al., 2016). The resulting sustainability dummy variable was then incorporated into our regression models to analyze its influence on ECF campaign success.

4. Descriptives

Table 2 presents the descriptive statistics for various variables associated with equity crowdfunding campaigns. The average total raised amount, measured in natural logarithm, is approximately 12.87. success ratio averages 0.72, suggesting that most campaigns

Table 1
Variables description.

Variables	Description
Success Ratio	The success of ECF projects calculated as follow: Total raised / Maximum funds goal.
Normalized Success	The success of ECF projects calculated as follow: (TotalRaised - MaximumGoal) / (MaximumGoal - MinimumGoal).
Ln Total Raised	The natural log of the total funds raised by an ECF project.
Dummy Sustainability	Dummy variable equal to 1 if the project is sustainable and 0 otherwise.
Dummy HighTech	Dummy variable equal to 1 if the firm sector is high-tech and 0 otherwise.
Minimum deposit	The minimum amount that an investor can invest in the ECF project.
Number Investments	The natural log of the Number of Investments.
Size	Natural log of Total Assets
Age	Firm's age in years
Debt	Long-term Debt and Short-term Debt scaled by Total Assets
Tangibility	Tangible Fixed Assets scaled by Total Assets
Industry Sales Growth	Sales t minus sales t-1 scaled by sales t-1

achieve a significant portion of their funding goals, while the normalized success metric has a mean of 0.55, reflecting variability in campaign performance.

Table 3 reports the correlation matrix for all the variables related to equity crowdfunding campaigns. Notably, the *Dummy Sustainability* variable shows a moderate positive correlation with the *Success Ratio* (0.20) and *Normalized Success* (0.24), suggesting that SOVs may enhance overall funding performance, while the *Dummy High-tech* variable appears to have a negative correlation with success metrics, indicating that high-tech projects may not always align with higher crowdfunding success rates.

Table 4 compares various metrics between sustainable (*Dummy Sustainability* = 1) and non-sustainable (*Dummy Sustainability* = 0) crowdfunding campaigns. Overall, the results indicate that SOVs tend to perform better across several key metrics compared to their non-sustainable counterparts.

5. Empirical results

Table 5 presents the main regression results examining the impact of sustainability orientation on equity crowdfunding (ECF) success across three dependent variables: the natural logarithm of total raised funds, the success ratio, and normalized success. The *Dummy Sustainability* variable shows a significant positive effect on all three metrics, indicating that campaigns with sustainability orientations tend to raise more funds and achieve higher success rates. Additionally, the number of investments and minimum deposit requirements also demonstrate strong positive correlations with campaign success.

Table 6 explores the interaction between SOVs and high-tech sector affiliation in ECF campaigns. The results indicate that the *Dummy HighTech* variable shows a significant negative relationship with all three dependent variables, suggesting that high-tech projects may face challenges in attracting funding. However, the interaction term (*Dummy HighTech x Dummy Sustainability*) reveals a significant positive effect across all metrics, indicating that projects combining sustainability orientation with high-tech sector affiliation are particularly successful in securing funding and achieving higher success rates. Overall, these findings highlight the importance of integrating sustainability and technology to enhance ECF outcomes.

To further illustrate the moderating effect of high-tech sector affiliation on the relationship between SOVs and ECF success, we present moderation graphs for each of the three-success metrics (Fig. 1).

Fig. 1 displays the interaction effects between sustainability orientation and high-tech sector affiliation for (a) total amount raised, (b) success ratio, and (c) normalized success. These graphs provide a visual representation of how the impact of sustainability orientation on ECF success varies between high-tech and non-high-tech firms.

Panel (a) shows that for non-high-tech firms, sustainability orientation has a minimal effect on the total amount raised. However, for high-tech firms, sustainability orientation has a substantial positive effect, indicating that SOVs is particularly beneficial for fundraising in high-tech sectors. Panel (b) illustrates that sustainability orientation has a positive effect on the success ratio for both high-tech and non-high-tech firms, with a slightly stronger effect for non-high-tech firms. Interestingly, high-tech firms without a sustainability orientation have the lowest success ratio, while those with a sustainability orientation perform similarly to non-high-tech sustainable firms. Panel (c) demonstrates that sustainability orientation positively impacts normalized success for both high-tech and non-high-tech firms, with a notably stronger effect for high-tech firms. High-tech firms with a sustainability orientation achieve the highest normalized success, while high-tech firms without a sustainability orientation perform less well.

These graphs visually confirm our regression results and provide additional insights into the nuanced relationship between sustainability orientation, high-tech sector affiliation, and ECF success. They highlight that while sustainability orientation generally has a positive impact on ECF outcomes, this effect is particularly pronounced for firms in high-tech sectors.

6. Discussion and conclusion

This research provides compelling evidence for both the positive impact of sustainability orientation on ECF success and the synergistic effect of matching SOVs with high-tech sector affiliation. Our findings indicate that SOVs are more successful on every count. This corroborates the recent literature indicating a growing trend towards ethics informing investment choices. This indeed is

Table 2
Descriptive statistics.

Variables	Mean	Std. Dev.	Min	P25	P50	P75	Max
Success Ratio	0.717	0.277	0.032	0.49	0.77	0.99	1
Normalized Success	0.545	0.438	-0.971	-0.19	0.65	0.99	1
Ln Total Raised	12.867	0.931	9.185	12.17	12.96	13.59	15.38
Dummy Sustainability	0.42	0.494	0	0	0	1	1
Dummy HighTech	0.527	0.499	0	0	1	1	1
Number Investments	4.416	0.939	1.099	3.85	4.43	4.91	7.635
Minimum deposit	6.181	0.797	4.605	5.52	6.21	6.21	9.903
Size	6.181	1.63	1.195	5.26	6.23	7.25	10.486
Age	3.571	3.011	1	0	1	4	15
Debt	0.107	0.176	0	0	0	0.17	0.72
Tangibility	0.062	0.123	0	0.002	0.015	0.05	0.906
Industry Sales Growth	0.272	0.909	-1	0.08	0.17	0.30	11.81

Table 3
Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	Max VIF
1 Success Ratio	1.000												
2 Normalized Success	0.93	1.000											
3 Ln Total Raised	0.56	0.52	1.000										
4 Dummy Sustainability	0.20	0.24	0.27	1.000									1.08
5 Dummy HighTech	−0.13	−0.09	−0.17	−0.06	1.000								1.16
6 Number investments	0.24	0.46	0.53	0.08	−0.08	1.000							1.54
7 Minimum deposit	0.12	−0.05	0.04	0.13	−0.00	−0.46	1.000						1.05
8 Size	0.09	0.07	0.32	0.11	−0.16	0.29	0.02	1.000					1.67
9 Age	−0.09	0.02	0.04	0.00	−0.04	0.15	−0.07	0.56	1.000				1.79
10 Debt	−0.02	−0.03	0.07	−0.04	−0.11	0.11	−0.08	−0.09	−0.01	1.000			1.11
11 Tangibility	0.06	0.11	0.11	0.13	−0.18	0.15	−0.07	0.05	0.00	0.11	1.000		1.11
12 Ind. Sales Growth	0.03	−0.02	−0.02	0.02	0.07	−0.06	0.06	−0.31	−0.33	0.06	-0.00	1.000	1.33

Table 4
T-Test results comparing key variables by sustainability status.

	Dummy Sustainability =0 (mean)	Dummy Sustainability =1 (mean)	Diff	t/test *(p/value)
Success Ratio	0.65	0.79	−0.13	t = -10.80 (0.0000)
Normalized Success	0.45	0.66	−0.20	t = -10.06 (0.0000)
Ln Total Raised	12.65	13.15	−0.50	t = -11.62 (0.0000)
Number Investments	4.34	4.51	−0.16	t = -3.65 (0.0003)
Minimum deposit	614.81	1173.08	−558.26	t = -5.73 (0.0000)
Size	5.98	6.40	−0.42	t = -3.70 (0.0002)
Age	2.51	2.65	−0.14	t = -1.00 (0.3144)
Debt	0.10	0.11	−0.01	t = -0.85 (0.3940)
Tangibility	0.05	0.07	−0.01	t = -1.77 (0.0756)
Industry Sales Growth	0.31	0.33	−0.02	t = -0.39 (0.6928)

Table 5
The effect of sustainability orientation on equity crowdfunding success: main regression results.

	(1) Ln Total Raised	(2) Success Ratio	(3) Normalized Success
Dummy Sustainability	0.208***	0.073***	0.079***
	(0.049)	(0.018)	(0.028)
Number investments	0.604***	0.106***	0.219***
	(0.033)	(0.012)	(0.019)
Minimum deposit	0.268***	0.073***	0.089***
	(0.039)	(0.014)	(0.023)
Size	0.118***	0.013*	0.003
	(0.021)	(0.008)	(0.012)
Age	−0.086***	−0.024***	−0.021***
	(0.013)	(0.005)	(0.007)
Debt	0.124	0.013	0.040
	(0.133)	(0.048)	(0.075)
Tangibility	0.016	0.043	0.216
	(0.255)	(0.093)	(0.144)
Industry Sales Growth	−0.079	0.022	0.053
	(0.146)	(0.053)	(0.084)
Constant	7.646***	−0.079	−0.615
	(0.750)	(0.273)	(0.425)
R^2	0.452	0.178	0.224
Observations	745	745	736

Notes: For the description of the variables, see Table 1. Dummy year are included in the model but not reported in the table. Robust standard errors are reported in brackets. ***: denotes significance at the 1 % level; **: denotes significance at the 5 % level; *: denotes significance at the 10 % level.

part of a larger trend of responsible investment whereby the investors progressively attach as much importance to social and environmental impact as they do to financial return. The success of SOVs in ECF campaigns also supports the results of Vismara (2019), who demonstrated that sustainability orientation acts as a positive signal for potential investors, reducing information asymmetry and therefore increasing campaign appeal. Indeed, this interaction of sustainability orientation with high-tech sector affiliation appeared to be very effective in attracting funding, thereby supporting signaling theory as both sustainability orientation and high-tech sector affiliation serve as powerful complementary signals to potential investors. Such a combination creates a unique value proposition that appeals to those investors who look for both financial returns and social impact.

Table 6
The effect of sustainability on equity crowdfunding success: interaction with high tech sector.

	(1) Ln Total Raised	(2) Success Ratio	(3) Normalized Success
Dummy Sustainability	−0.002	0.058**	0.024
	(0.081)	(0.026)	(0.042)
Dummy HighTech	−0.430***	−0.084***	−0.142***
	(0.078)	(0.025)	(0.040)
Dummy HighTech x Dummy Sustainability	0.601***	0.060*	0.189***
	(0.112)	(0.036)	(0.058)
Minimum deposit	−0.140***	0.007	−0.068***
	(0.038)	(0.012)	(0.020)
Size	0.233***	0.031***	0.049***
	(0.023)	(0.007)	(0.012)
Age	−0.086***	−0.021***	−0.021***
	(0.016)	(0.005)	(0.008)
Debt	0.244	0.047	0.074
	(0.156)	(0.050)	(0.081)
Tangibility	0.282	0.038	0.275*
	(0.303)	(0.097)	(0.158)
Industry Sales Growth	−0.084	0.011	0.040
	(0.175)	(0.050)	(0.092)
Constant	12.977***	0.619***	1.375***
	(0.819)	(0.084)	(0.423)
R^2	0.242	0.101	0.100
Observations	745	745	736

Notes: For the description of the variables, see Table 1. Robust standard errors are reported in brackets. ***: denotes significance at the 1 % level; **: denotes significance at the 5 % level; *: denotes significance at the 10 % level.

Our AI-based SOVs classification represents a new frontier in the realm of ECF studies; it follows from the increasing tendency to apply machine learning methods to financial analysis. This method is to provide a more objective and scalable way of assessing sustainability orientation and may reduce biases innate in manual classification. The use of AI in the ECF context is also supported by other recent studies, such as Gunduz (2024), which demonstrated the efficiency of machine learning for ECF success prediction.

Our study makes several distinct contributions to the literature. We provide the first empirical evidence of how high-tech sector affiliation moderates the effectiveness of SOVs signals in ECF, demonstrating that the impact varies significantly between high-tech and non-high-tech sectors, as clearly shown in our interaction graphs. Our AI-based approach to sustainability classification opens new possibilities for more sophisticated and objective analyses in ECF research. Additionally, our findings provide actionable insights for entrepreneurs, particularly in high-tech sectors, about how to effectively signal their sustainability orientation to potential investors. These findings underscore the importance of considering both sustainability orientation and sector characteristics when developing ECF strategies. We suggest that high-tech firms may benefit significantly from emphasizing the sustainability initiatives in the crowdfunding campaigns.

While our study provides some useful evidence in this respect, we are aware of certain limitations. Our focus on the Italian market, while providing deep insights into a specific context, limits the generalizability of our findings. Future research could examine how these relationships vary across different institutional and cultural contexts. Additionally, while we examined high-tech sectors as a group, future studies could measure the actual innovation level within ECF campaigns to better understand the moderating role of innovation intensity rather than just sector affiliation. Several other limitations suggest directions for future research. Investigating the long-term performance of sustainability-oriented ECF campaigns could provide insights into whether initial funding success translates into sustainable business growth. Moreover, examining how different types of sustainability initiatives (e.g., environmental vs. social) impact funding outcomes could offer more nuanced guidance for entrepreneurs. Finally, exploring the role of investor characteristics in sustainability-oriented ECF could provide further insights into this growing market segment.

In conclusion, our study advances understanding of sustainable finance in ECF by revealing not just that sustainability matters, but how its importance varies across different sector contexts. The clear interaction effects demonstrated in our graphs suggest that the combination of sustainability orientation and high-tech sector affiliation represents a particularly promising avenue for ECF success. These insights contribute to both theory and practice in the rapidly evolving field of sustainable finance and equity crowdfunding.

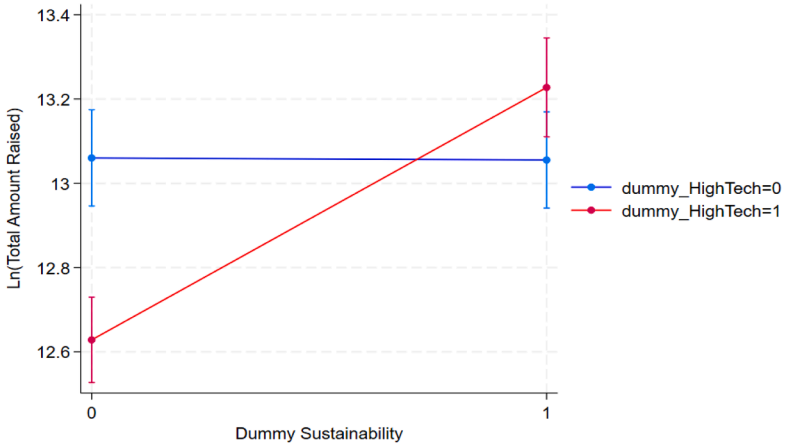
CRediT authorship contribution statement

Yassine Boutouar: Methodology, Formal analysis, Conceptualization. **Maurizio La Rocca:** Validation, Supervision. **Tiziana La Rocca:** Validation, Investigation, Data curation, Conceptualization. **Augusto D'Amico:** Supervision.

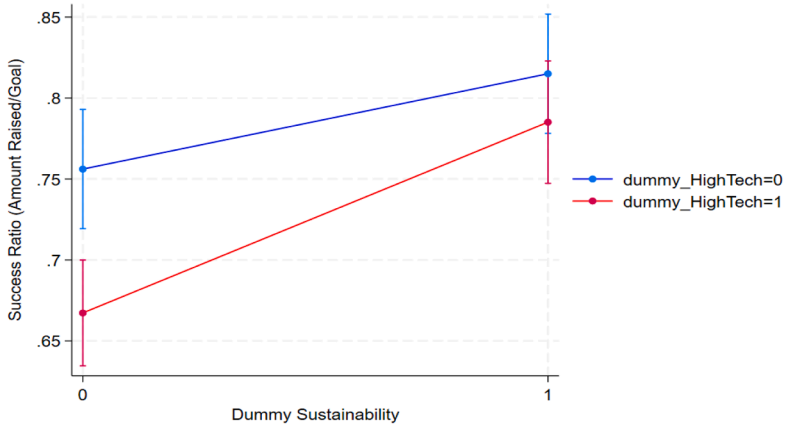
Declaration of competing interest

The authors report there are no competing interests to declare.

(a) Total Amount Raised



(b) Success Ratio (Amount Raised/Goal)



(c) Normalized Success Index

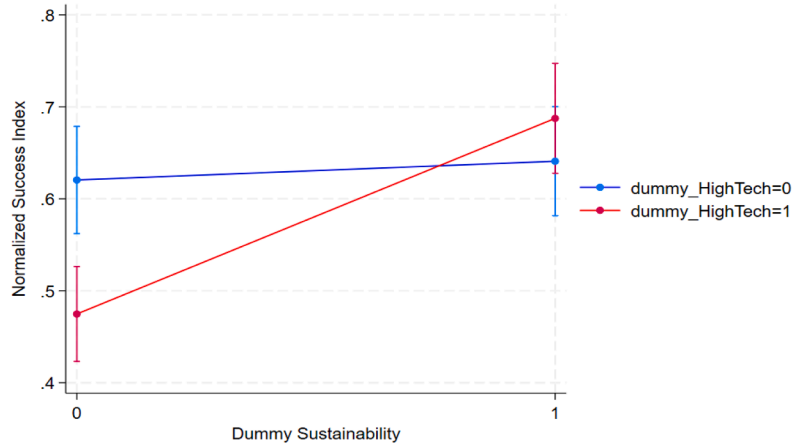


Fig. 1. Interaction Effects of Sustainability Orientation and High-Tech Sector Affiliation on ECF Success Metrics.

Data availability

The authors do not have permission to share data.

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