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Saying enough vs saying too much: Lessons on optimizing project risk description for crowdfunding success in developing countries

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ABSTRACT

Online crowdfunded technology projects offer opportunities for driving sustainable growth in developed and developing countries. However, entrepreneurs propose these projects within a context of information asymmetry and risk uncertainty which prospective backers must grapple with. Although Kickstarter has been requiring technology entrepreneurs to disclose project risk information since 2012, the value of this disclosure remains underexplored amidst controversies in the literature about whether project risk description enhances crowdfunding success. In addressing these issues, this research employs signaling theory and curvilinear analysis to examine what project risk description length and sentiment levels maximize crowdfunding success for technology projects, particularly those in developing countries. Statistical analyses of 1059 campaigns on Kickstarter partly support and challenge this study's theorizations. Risk description sentiment and length have U-shaped and inverted U-shaped effects on crowdfunding success respectively. Although these effects do not differ across projects in developed and developing countries, detailed risk descriptions generally yield better results for projects in developing countries. These insights advance and clarify the underdeveloped literature on the link between project risk description and crowdfunding outcomes and offer guidance on how developing country entrepreneurs can couch project risk statements to optimize crowdfunding success.

1. Introduction

> "What would the world look like if there were Silicon Valleys everywhere? While I am happy for innovative entrepreneurs in Silicon Valley, I am passionately focused on helping to create "the Rise of the Rest" so that entrepreneurs globally can build successful businesses … I believe that crowdfunding has the potential to enable innovative developing economies to leverage the explosion of social media to leapfrog forward to build a network of vibrant entrepreneurial ecosystems."
> - Steve Chase, Chairman and CEO, Revolution; Co-Founder, America Online; Chairman, The Case Foundation (World Bank, 2013)

Kickstarter is the world's largest online reward crowdfunding platform, an important channel for technology entrepreneurs to finance their projects (Shrestha et al., 2023; Wessel et al., 2022), and to drive economic, social, and environmental sustainability outcomes (Böckel et al., 2021; Wehnert and Beckmann, 2021; Kickstarter, 2024a). Kickstarter enables entrepreneurs finance diverse technology projects such as software, gadgets, game consoles, and 3D printers via pledges that backers on the platform can offer in return for various rewards such as discounts to buy the finished product once developed (Popescul et al., 2020; Kickstarter, 2024b). However, many entrepreneurs across the globe struggle to secure funding for these projects, and the overall crowdfunding success rate remains low (Zhang et al., 2023). In 2024, only 24 % of technology projects launched on Kickstarter were successful (Kickstarter, 2024c). Although technology projects may have great prospects, those listed on online crowdfunding platforms are often underdeveloped or unproven (Zhou et al., 2018). Consequently, the high-risk nature of technology projects makes it more challenging for entrepreneurs to persuade potential backers to finance their projects (Zhang et al., 2023; Yáñez-Valdés and Guerrero, 2023).

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Multiple factors contribute to variability in online crowdfunding success, but scholars generally agree that project description is crucial (Li et al., 2023; Cheng and Jang, 2023; Wang et al., 2022). Project descriptions via the medium of text is the primary way entrepreneurs communicate with their audience, allowing them to pitch their ideas and persuade potential backers (Yang et al., 2020; Tajvarpour and Pujari, 2022; Zhou et al., 2018). Therefore, understanding how entrepreneurs can craft and leverage project descriptions to crowdfund their projects is important (Zhang et al., 2023). Several studies in the online crowdfunding literature have examined different aspects of project descriptions, offering valuable insights into the sources of heterogeneity in crowdfunding success (see Table 1 and Section 2.1). Although these studies recognize risk as an underlying mechanism in explaining online crowdfunding success, there is a lack of focused assessment of project risk description and its impact on crowdfunding success (Shrestha et al., 2023). This shortcoming is surprising since project risk description is a unique concept and offers the most direct avenue through which fundraisers address the risk concerns backers often face (Shrestha et al., 2023; Tajvarpour and Pujari, 2022).

Since September 2012, Kickstarter has provided a "Risks and Challenges" section for project creators to provide more information about their projects. This initiative sought to reduce backers' uncertainty, addressing the inherent information asymmetry on online crowdfunding platforms, and improve campaign effectiveness. However, it remains unclear how aspects of project risk description affect crowdfunding outcomes (Shrestha et al., 2023). By largely assuming linear relationships between project description characteristics and crowdfunding success, existing theoretical and empirical analyses lack insight into how these characteristics influence crowdfunding success (Table 1). Given that longer text descriptions signal campaign quality and help to alleviate information asymmetry between project creators and backers (Yang et al., 2020), the crowdfunding literature has generally found a positive linear relationship between project description length and success (e.g., Tajvarpour and Pujari, 2022; Zhou et al., 2018; Yang et al., 2020). The literature has also delved deeper to examine the influence of more substantive aspects of project description such as emotional tone (Zhou et al., 2018), in driving crowdfunding success. However, concerning risk disclosure specifically, linear analysis may mask the nature of the effect of project risk description on crowdfunding success. On one hand, backers may perceive the disclosure of project risks as inherently negative, and suspect entrepreneurs will not fully disclose information that impedes their fundraising ability. On the other hand, risk disclosure could enhance transparency and elicit favorable investor responses (Kravet and Muslu, 2013). While these competing perspectives are interesting, there is a lack of theoretical and empirical evidence that provides an integrative and nuanced understanding to guide entrepreneurs in crafting risk disclosures for technology projects. Consequently, this study analyzes two core aspects of project risk description – length and sentiment – and draws on signaling literature to develop a conceptual model to answer the following question: *what levels of risk description length and risk description sentiment maximize crowdfunding success for technology projects?* Risk description length refers the amount of risk information about a project that project creators provide to prospective backers (Yang et al., 2020; Shrestha et al., 2023), whereas risk description sentiment reflects the extent of positive, reassuring messages about a project's risks (Tafesse, 2021; Shrestha et al., 2023). We theorize that cost-benefit trade-offs are associated with each risk description factor and explain why too little or too much of either factor is associated with lower crowdfunding success.

Another factor which likely impacts crowdfunding success is the project's geography or location. Specifically, our second research objective seeks to understand the influence of project location (i.e., developed vs developing country) on the aforementioned risk description factors' relationship with crowdfunding success. Like many developed countries, the United States in particular has enjoyed positive returns to economic development driven by a rise in technological complexity and patents since the 1990s information technologies revolution (Broekel and Klarl, 2025). Consequently, entrepreneurs from such developed countries benefit from backers' perceptions of their technological legitimacy – technological capabilities which signals the firm's ability to deliver value and drive favorable project quality perceptions – and are more likely to be successful in raising crowdfunding online (Yu et al., 2025). In contrast, developing countries, especially in Africa lag developed countries in advanced technological infrastructure and innovation that can drive economic growth (You et al., 2019). Additionally, developing country entrepreneurs operate in a relatively riskier context than their developed country counterparts, and must navigate a "hostile" environment characterized by resource constraints, underdeveloped and unfavorable financial markets, weak regulations, and limited government support (Abubakar et al., 2019; Hadjimanolis, 1999). Although the rise of rewards-based crowdfunding platforms offers a solution to developing country entrepreneurs whose ventures are hampered by these economic and institutional constraints (Alsagr et al., 2023), they are less likely to receive backing on Kickstarter compared to their developed country counterparts. For example, in June 2024, the total crowdfunding transaction value for the entire continent of Africa was US$ 1.5 million, far behind the United States at US$ 465 million (Statista, 2024). Sustained political and civil unrests in developing countries, such as military takeovers and prosecution of political rivals and associated protests in Africa (UNCTAD, 2025), can negatively impact crowdfunding success on Kickstarter as crowdfunding backers become less certain of receiving rewards from projects based in more politically risky countries (Alsagr et al., 2023).

This negative effect of country risk on crowdfunding success is supported by the fact that the majority of the online crowdfunding market, specifically backers, is concentrated in developed countries – chiefly North America and Europe (World Bank, 2015; Gheith et al., 2025). Hence, the distance between a developed country investor base and developing country entrepreneurs can amplify information asymmetries (Cumming and Sewaid, 2025), presenting a barrier to accessing funding for entrepreneurial projects based in developing countries. Such asymmetries can be more pronounced for technology-based entrepreneurial projects which are commercial (i.e., products with focus on features, specification, and practical benefits) in nature (Cumming and Sewaid, 2025). Despite the great disparity in funding flows to developed vs developing country projects on global crowdfunding platforms, there has been scarce research to understand factors that influence this difference. Many studies in the crowdfunding literature have only explored project location as a control variable (e.g., Deng et al., 2022), with limited implications for crowdfunding in the developing country context. Consequently, we contribute to the literature by explicitly investigating the influence of a country's development classification as an additional quality signaling factor on online crowdfunding platforms, and answer the following question: *How does project location (developed vs developing) moderate the levels of risk description length and risk description sentiment that maximize crowdfunding success for technology projects?*

Understanding factors that influence technology entrepreneurs' access to finance in developing countries is important since technology innovations and complexity can stimulate economic growth (Wang and Chien, 2007; You et al., 2019; Broekel and Klarl, 2025). Furthermore, technological advancement is a focal point of the United Nations Trade and Development agency (UNCTAD), which is promoting economic policies to foster growth in developing countries, especially in the areas of artificial intelligence, Internet of things, and electric vehicles – sectors expected to be worth a US$ 6.8 trillion global market, and where developed countries are already seizing a lion share of the opportunities (UNCTAD, 2023). Since several successful technology brands began as humble startups (e.g., Oculus VR – later acquired by Meta), and benefitted from online crowdfunding to fuel their innovation and growth, understanding factors that facilitate access to finance in the early stages of technology ventures is a worthwhile endeavor with

Table 1
Related studies on project description and crowdfunding success.

Authors (year)	Project description attributes	Methodology	Theory	Data source	Context	Key findings
Anglin et al. (2018)	Positive psychological capital language, length (control)	Linear and moderated linear analysis	Signaling theory	Kickstarter/Kiva	Global (unspecified)	• Positive psychological capital language has a positive relationship with crowdfunding success. • Project description length has a positive relationship with crowdfunding
Zhou et al. (2018)	Length, positive tone, readability.	Linear and curvilinear analysis	Persuasion theory	Kickstarter	Global (unspecified)	• Project description length positively affects crowdfunding success • Positive project description tone has an inverted U-shaped relationship with crowdfunding success • Project description readability has a negative effect on crowdfunding success
Yang et al. (2020)	Length, number of images, number of videos.	Linear and moderated linear analysis	Cognitive load theory	Kickstarter	United States	• Project description length and number of images have positive effects on funding amount and number of backers. • The interactions between these determinants explain additional variations in funding amount and number of backers.
Wang et al. (2021)	Objectivity versus subjectivity.	Linear and moderated linear analysis	Signaling theory	Kickstarter	Predominantly USA (72 %)	• Objective descriptions in titles appeal more to investors than subjective ones. • Compared to subjective descriptions, objective descriptions in detail descriptions generate poorer pledge outcomes. • Objective descriptions placed at the start of the detailed description instead of at the end elicit more positive responses from investors. • Compared to objective descriptions, subjective descriptions in biographical descriptions instead of reward statements are more attractive to investors. • Funding goal does not strengthen the positive effect of objective descriptions on fundraising outcomes.
Tafesse (2021)	Objective information, positive sentiment, vivid message use (photos).	Linear and moderated linear analysis	Signaling theory (assumed)	Kickstarter	Unspecified	• Objective information positively affects campaign success, especially for intangible products rather than tangible ones. • Positive sentiment does not affect campaign success; it only enhances campaign success for intangible products. • The number of campaign photos positively affects campaign success, but effect is weaker for intangible products.
Tajvarpour and Pujari (2022)	Risk rhetoric, reward rhetoric, length (control), punctuation, informal language	Linear and moderated linear analysis	Signaling theory	Kickstarter	Global (unspecified)	• Project description length has a positive relationship with crowdfunding success. • Risk (reward) rhetoric has a negative (positive) relationship with crowdfunding success. • Platform endorsement moderates (+) the effect of risk rhetoric but not that of reward rhetoric. • Past success moderates (+) the effects of risk and reward rhetoric. • Punctuation quality moderates (+) the effects of risk rhetoric and reward rhetoric. • Informal language (−) moderates the effects of risk rhetoric and reward rhetoric.

(*continued on next page*)

Table 1 (*continued*)

Authors (year)	Project description attributes	Methodology	Theory	Data source	Context	Key findings
Zhang et al. (2023)	Exploitation description, exploration description.	Linear and moderated linear analysis	Signaling theory (assumed)	Kickstarter and experimental data	Unspecified	• Exploitation project description drives crowdfunding success, whereas exploratory project description reduces it.
Alsagr et al. (2023)	Narcissistic rhetoric; video pitch, video count, image count, word count (all controls).	Linear and moderated linear analysis	Signaling theory	Kickstarter	Global (19 predominantly developing countries)	• Main effects showed geopolitical risk as a negative driver of campaign success, but moderated (+) by narcissistic rhetoric (ratio of "I" versus "we") in project description. • All control project description variables were positively related to campaign success.
Shrestha et al. (2023)	Risk quantity, risk type (semantic), expressed feelings in risk and project descriptions, video.	Linear, non-linear and moderated linear and non-linear analyses	Decision theory and Signaling theory (assumed)	Kickstarter	Predominantly USA (72 %)	• Risk quantity has an inverted U-shaped link with crowdfunding success. • Risk type (semantic) had heterogenous effects with reward-related risks (+) and project-related risks (−) moderating; and expressed feelings moderating (−) main effects. • Project description has an inverted U-shaped link with crowdfunding success.
Li et al. (2023)	Prosocial description	Interaction analysis	Elaboration likelihood model. Language expectancy theory.	Experimental data (participants from MTurk and Prolific)	American and Chinese participants	• Projects with a low prosocial description on a reward-based platform or those with a high prosocial description on a donation-based platform are likely to attract more funding.
This study (2024)	Risk description length, risk description sentiment	Linear, non-linear and moderated linear and non-linear analyses	Signaling theory	Kickstarter	Global – with developing country (40 %) sample	• Project risk description length has an inverted U-shaped relationship with campaign pledges. • Project risk description sentiment has a U-shaped relationship with campaign pledges. • Project location (developing countries) moderates (+) the linear relationship between project risk description length and pledges.

practical and policy implications. In fact, this potential for startups to grow into important companies that fuel economic development is one of the reasons the United Nations Development Programme (UNDP) launched their Crowdfunding Academy in 2015 (UNDP, 2024) to encourage financing for innovations. Hence, in this study, we particularly focus on implications for startups based in developing countries.

This study offers two major contributions to the literature on the link between project description and crowdfunding outcomes. First, unlike previous studies (e.g., Shrestha et al., 2023; Zhou et al., 2018), we demonstrate that the nature of the curvilinear effect of project risk description varies depending on the aspect of the construct: risk description length has an inverted U-shaped effect, whereas risk description sentiment has a U-shaped effect. These insights clarify the controversies regarding the value of risk disclosure, particularly its effect on stakeholders' assessment of project attractiveness (Kravet and Muslu, 2013; Shrestha et al., 2023), and the assumption that investors prefer a moderate amount of risk descriptions and moderate positive messages (Zhou et al., 2018). Second, the study identifies project location (developed versus developing country) as an essential boundary condition for the main effect of risk description length; and offers policy recommendations to support online crowdfunding efforts particularly for project creators based in developing countries.

2. Theoretical foundation and hypothesis development

2.1. A signaling perspective on crowdfunding success

Signaling theory (Spence, 1973) "*describes how individuals and firms communicate quality and intentions through signals*" (Pan et al., 2024, p.102,988), and has been applied to a myriad of disciplines including medicine, finance, economics, and marketing. Signaling theory is particularly useful in understanding the behaviors of parties involved in exchanges where information asymmetry is of concern, and thus, has been a popular theory adopted in online crowdfunding studies (e.g., Elrashidy et al., 2024; Anglin et al., 2018; Tajvarpour and Pujari, 2022). Prospective backers on online crowdfunding platforms such as Kickstarter face high information asymmetry due to limited regulation of these platforms (Yi et al., 2024; Di Pietro, Grilli, and Masciarelli, 2023; Cascino et al., 2019). Consequently, backers' ability to conduct due diligence and estimate the probability of project success is often constrained on these platforms (Yi et al., 2024; Shrestha et al., 2023). Hence, signaling theory suggests that entrepreneurs seeking online crowdfunding must send *signals* comprising observable, alterable attributes of their projects or themselves to mitigate investment risks and uncertainties that prospective backers may face (Spence, 1973; Li et al., 2022).

This study adopts signaling theory as the theoretical lens to examine how founders on online crowdfunding platforms use risk description to reduce information asymmetry and increase their chances of crowdfunding success. Signals of trust can play a significant role in enhancing the possibility of crowdfunding success (Elrashidy et al., 2024), and can be expressed in project risk descriptions. To build trust and credibility, founders can provide risk descriptions that reflect transparency, thoughtfulness, and risk-mitigation to alleviate concerns that prospective backers might have. This disclosure is crucial as projects that signal higher quality are more likely to be funded (Mollick, 2014).

Accordingly, this study proposes project risk description, a typical attribute of online crowdfunding campaigns, as a signal entrepreneurs use to deal with potential backers' risk and uncertainty concerns (Tajvarpour and Pujari, 2022). However, the signaling literature suggests that not all signals are effective or valuable and that some can be more effective than others (Spence, 1973). Contemporary studies propose that effective signals exhibit at least one of three properties: costliness (Di Pietro, Grilli, and Masciarelli, 2023), observability, and interpretation cost (Drover et al., 2018; Vanacker et al., 2020). Costly signals (e.g., qualification and endorsement) are difficult to imitate and can be trusted (Di Pietro, Grilli, and Masciarelli, 2023). A signal is observable if its intended receiver can easily detect it, and such signals have greater visibility (Drover et al., 2018). Additionally, effective signals have a low interpretation cost, i.e., the receiver requires less cognitive effort to decipher the signal (Vanacker et al., 2020). We contend that while project risk description is generally not costly, its length attribute has observability and interpretation cost trade-offs, whereas its sentiment attribute has varying levels of (mis)trust issues. Thus, we propose that these aspects of risk description have curvilinear relationships with crowdfunding success. Furthermore, signaling theory suggests that, as with signals, unalterable attributes of projects (i.e., indices) can influence backers' beliefs and decisions (Spence, 1973). We investigate project location as one such attribute, as entrepreneurs provide this information when listing on crowdfunding platforms and cannot alter it to change potential backers' decisions. Our conceptual model (see Fig. 1) summarizes our planned investigation of how these various signals interact and relate to crowdfunding success.

2.2. Project risk description aspects and crowdfunding success relationships

Project descriptions on online crowdfunding platforms are similar to traditional business plans, and are the medium fundraisers use to communicate and persuade prospective backers to give pledges (Tajvarpour and Pujari, 2022; Zhou et al., 2018). From a signaling perspective, project descriptions are crucial information that backers use to understand and evaluate a project before making a funding decision (Yáñez-Valdés and Guerrero, 2023; Zhang et al., 2023). Due to limited alternative sources of information for prospective backers to scrutinize campaigns (Zhou et al., 2018), the way project founders describe their projects can have profound consequences on whether their campaigns will succeed (Yang et al., 2020; Tafesse, 2021).

Prior research has considered different attributes of project descriptions such as objectivity (informational) and subjectivity (sentiment) (Wang et al., 2021; Tafesse, 2021); multimedia components (e.g., images, video) (Tafesse, 2021); risk and reward components (Tajvarpour and Pujari, 2022); and exploratory and exploitative aspects of project descriptions (Zhang et al., 2023). These studies offer two major insights: 1) the way project description affects crowdfunding outcomes differs based on the project description attribute under investigation; 2) other traditional quality signals (e.g., endorsement and past success) may moderate the effects of project description variables on crowdfunding outcomes (Tajvarpour and Pujari, 2022). This study focuses on project risk description, which we define as how a campaign communicates project-related risks to potential backers. Building on the above prior studies, we focus on two core aspects of project risk description: 1) risk description length and 2) risk description sentiment. We define the former as the amount of risk information that a campaign conveys to potential backers (Yang et al., 2020; Zhou et al., 2018) and the latter as the extent to which a project risk description invokes a positive, reassuring message (Tafesse, 2021; Zhou et al., 2018).

The number of words founders use in communicating project details to potential backers can signal their preparedness and project quality (Yasar et al., 2022; Jiao et al., 2023) and drive campaign success (Elrashidy et al., 2024). Since technology projects seeking online crowdfunding are often unproven or start-up ideas, investor uncertainty associated with these projects can be much more pronounced (Zhou et al., 2018). Due to limited alternative sources of information for verifying the credibility, risk level, and potential success of these projects, the amount of risk information the fundraiser provides about their projects will likely inform investors' funding decisions (Shrestha et al., 2023). While there are competing views on the implications of risk description length on investor decisions (Shrestha et al., 2023), it is believed that backers prefer projects that they perceive to be less risky (Tajvarpour and Pujari, 2022). However, there is no straightforward answer to how risk description length is related to crowdfunding success (Wang et al., 2021; Shrestha et al., 2023).

The signaling literature suggests that for risk descriptions to be effective, they must be detectable and visible (Drover et al., 2018; Vanacker et al., 2020). Scant risk descriptions offer limited insights regarding the riskiness of a project. In contrast, elaborate risk descriptions generate greater visibility, allowing potential backers to make more informed decisions (Spence, 1973; Drover et al., 2018). Although lengthy risk descriptions might create negative perceptions, such information improves transparency. When there is limited project risk information, investors may have lower trust and confidence, as they may

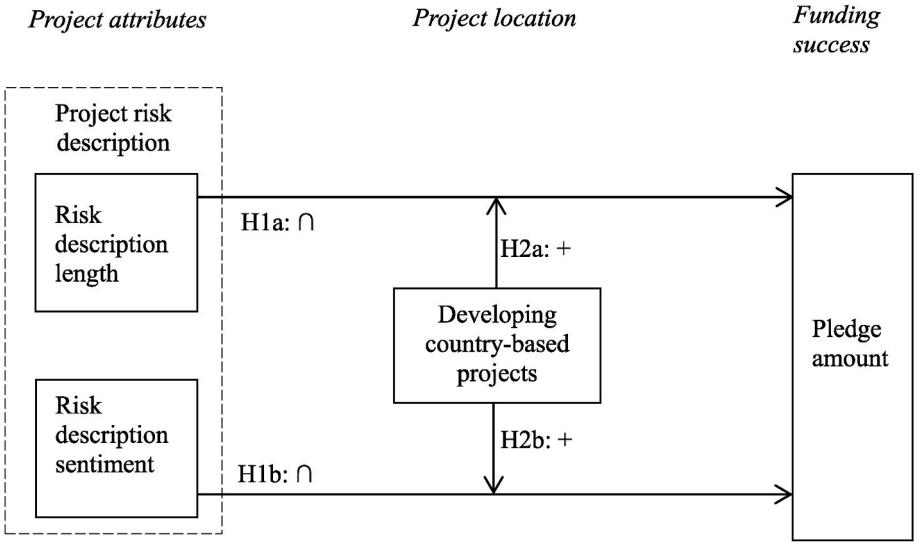

Fig. 1. Conceptual model.

feel the fundraiser is concealing some risk issues (Elrashidy et al., 2024; Yang et al., 2020). Accordingly, we expect that the probability of an online crowdfunded technology project attracting backers will increase with the length of the risk description. This theoretical expectation broadly follows some evidence from prior studies. For example, Yang et al. (2020) find that project description length generates more backers and pledges, whereas Zhou et al. (2018) find that project description length positively affects crowdfunding success.

However, we contend that there is a limit to the value of risk description length. The interpretation cost logic of the signaling literature suggests that lengthy project risk descriptions may have a dark side. The reasoning underpinning the utility of detailed risk description assumes potential backers can readily and meaningfully interpret such information. However, in addition to limited cognitive abilities, the average investor's attention to any issues is constrained by time (Di Pietro, Grilli, and Masciarelli, 2023). The proliferation of and competition among online crowdfunded technology projects creates competing attention for potential backers. This constraint on backers' information processing time and ability suggests they will likely activate selective attention while appraising projects (Drover et al., 2018). Consequently, while mistrust can be much higher for scant risk description projects, backers are likely to prefer and allocate more attention to moderate risk descriptions than extreme ones (Shrestha et al., 2023).

In summary, in an attempt to signal project quality, project creators' lengthy risk descriptions can also increase information overload and interpretation costs (Vanacker et al., 2020), potentially lowering backers' attention and interest. These cognitive obstacles can offset the effectiveness of the visibility and transparency trust signals that lengthy risk descriptions contain. Therefore, compared to too little and too much risk description information, we expect moderate risk descriptions to benefit crowdfunding success more. Formally stated:

H1a. Risk description length has an inverted U-shaped (negative curvilinear) relationship with crowdfunding success.

While we recognize that risk description length is essential, the ability of such information to make a compelling case to potential backers is paramount (Tajvarpour and Pujari, 2022). Positive language is one mechanism through which fundraisers attempt to convince potential funders (Zhou et al., 2018). Positive linguistic cues in campaign descriptions are crucial on online crowdfunding platforms where prospective backers have limited access to other communication cues, such as body language or voice tone, when judging campaign quality (Anglin et al., 2018). Positive narratives give crowdfunding entrepreneurs psychological capital and serve as costless signals that increase a campaign's likelihood of raising funds (Anglin et al., 2018) and can further highlight fundraisers' ability to manage a project successfully (Fellnhofer, 2023). Moreover, backers are more likely to judge campaigns employing positivity as credible and of higher quality since positive language can precipitate feelings of optimism about the project and the likeability of the campaign creator (Moradi and Badrinarayanan, 2021). Consistent with these arguments, prior studies have generally found that positive campaign descriptions often attract more backers and funds (e.g., Tafesse, 2021; Wang et al., 2021; Zhou et al., 2018). Building on this literature, we argue that risk description sentiment can be an influential signal that also drives crowdfunding success.

However, there is evidence to suggest that as entrepreneurs aim to signal trustworthiness and project quality, using moderate positive language rather than too positive or too negative language is the best strategy to attract investors (Parhankangas and Erlich, 2014). For example, Zhou et al. (2018) find that while positive language in project descriptions generally enhances crowdfunding success, extreme levels lower it. Thus, as with risk description length, we expect that the contribution of risk description sentiment to crowdfunding success increases as levels of risk sentiment increase to a moderate level, beyond which further increases will reduce crowdfunding success. Lower extremes of sentiment convey more negative emotions in project descriptions, which can amplify backers' risk concerns and, thus, negative attitudes toward a campaign (Tafesse, 2021). On the other hand, higher extremes of sentiment in project descriptions can invoke mistrust among prospective backers (Anglin et al., 2018). While positive sentiment can be influential by conveying the creators' optimism and confidence in the project, some investors may find such costless signals to be less credible (Anglin et al., 2018); and become more suspicious of a project's quality when campaign descriptions contain a high level of positive language.

In summary, given the information asymmetry that characterizes online crowdfunding platforms, it is difficult for potential backers to verify the integrity of emotional claims in risk descriptions. Hence, despite project creators' attempts to signal trustworthiness and project quality, prospective backers are unlikely to offer pledges to campaigns that overemploy positive language in the project risk description. Accordingly, we argue that a moderate risk description sentiment may benefit crowdfunding success more than when it is low and high. Formally, we hypothesize that:

H1b. Risk description sentiment has an inverted U-shaped (negative curvilinear) relationship with crowdfunding success.

2.3. Boundary condition role of project location

Developing and developed countries differ in several ways that shape investors' decisions. Developed countries tend to have better access to human capital (project team/founder experience and expertise) and venture capital (finance), which can serve as strong signals of project quality (Kleinert et al., 2022). Investors also generally perceive developed countries to have higher technological legitimacy, signaling higher project quality and greater chances of venture success (Yu et al., 2025). On the other hand, developing countries are characterized by resource constraints, weaker markets, and underdeveloped institutional frameworks (Abubakar et al., 2019). They are also disadvantaged by a technological divide – relative underdevelopment in technological environment (infrastructure and innovation) compared to developed countries (You et al., 2019). This lag in technological development is also evident in lower adoption and awareness of digital crowdfunding platforms in developing countries (Gheith et al., 2025). Additionally, the time and monetary costs of doing business and the start-up failure rates are greater in developing countries (World Bank Group, 2020). These concerns amplify the uncertainties and risks associated with online crowdfunding projects based in developing countries compared to those in developed countries. In line with these observations, Alsagr et al. (2023) find that crowdfunding projects located in more geopolitically risky countries are less successful. Additionally, there is evidence in the crowdfunding literature that project location can act as a heuristic cue which signals quality and contributes to crowdfunding performance (Zhu et al., 2023). Therefore, it is reasonable to believe that most backers on online crowdfunding platforms, which tend to be novice investors, will find projects originating in developed countries more attractive because their location represents a quality signal.

Although investors generally favor moderate positive project descriptions (Zhuo et al., 2018), lower certainty and confidence in the project's location context may be offset by more detailed and positive risk descriptions to increase project attractiveness. Since prospective backers considering pledging to projects from developing countries may have pronounced difficulties in accessing multiple and alternative sources of information to determine a project's credibility and odds of success, we argue that entrepreneurs' lengthier risk descriptions, and greater use of positive sentiment in risk descriptions can help to bridge this information asymmetry. In contrast, in developed countries, where online crowdfunding projects face comparatively less uncertainty and risk, investors may be less interested in lengthy risk descriptions or too positive risk narratives. This theorization is consistent with evidence in the literature where moderate levels of project description length and

positive sentiment were more likely to lead to crowdfunding success (e.g., Zhou et al., 2018; Parhankangas and Ehrlich, 2014); with a majority of the project or business sample in these studies based in a developed country context. In essence, backers' project evaluation concerns – such as mistrust and information overload – can be amplified for projects based in developed countries, where uncertainty is relatively limited. However, for developing country projects, whose location is likely to be perceived as a signal of poorer quality, project creators would benefit from lengthier and more positive project risk descriptions to overcome negative perceptions and enhance signals of project quality and trustworthiness. Hence, compared to low levels of risk description length or sentiment, high levels of these factors act as more effective signals in driving campaign success, reducing investors' negative risk perceptions of developing country projects (Alsagr et al., 2023).

Considering these issues, we argue that while the downsides to risk description and sentiment become salient beyond their average levels, their negative effect on crowdfunding success is lower for projects in developing countries than their counterparts in developed countries. Therefore, we hypothesize that:

H2a. Project location moderates the inverted U-shaped relationship between risk description length and crowdfunding success, such that the negative effect of high levels of risk description length is weaker for projects in developing countries than those in developed countries.

H2b. Project location moderates the inverted U-shaped relationship between risk description sentiment and crowdfunding success, such that the negative effect of high levels of risk description sentiment is weaker for projects in developing countries than those in developed countries.

3. Methodology

3.1. Research design and sample

Consistent with the majority of the online crowdfunding literature, we chose Kickstarter as the context of our study because it is the largest online crowdfunding platform (Zhou et al., 2018; Shrestha et al., 2023), and importantly because it provides a section for entrepreneurs to disclose their projects' risks. Technology campaigns tend to attract more funding (Moutinho and Leite, 2013) because they tend to be for-profit entrepreneurial ventures (Scheaf et al., 2018; Defazio et al., 2021). Hence, we believe that the discussion of project risks and challenges will be more pertinent for prospective backers in the Kickstarter context. Since we were interested in investigating the effects of project risk information on crowdfunding success, we only included campaigns that began after September 20, 2012, the day Kickstarter made the Risks and Challenges section of campaign pages mandatory (Shrestha et al., 2023).

We followed examples of related studies to extract secondary data from Kickstarter using a third-party web crawler (Octoparse). Technology projects on Kickstarter are heavily skewed toward developed countries (as defined in the UNCTAD classification – explained further in the variables description section). At the time of data collection for this study in 2024, Kickstarter displayed approximately 52,000 technology projects that were available globally; with 95 % located in a developed country. To ensure we had an adequate number of developing country projects to analyze in comparison to the widely available developed country projects, we employed a stratified disproportionate sampling strategy which is appropriate in contexts where subgroups of interest are a small percentage of a heterogenous and dissimilar population (Passmore and Baker, 2005). Using the search and filter options on Kickstarter, we selected technology projects for each continent where the majority of countries are classified as developing: Africa, Asia, and South America. Additionally, we used the sorted by "magic" filter to reduce any bias in recency or popularity within each location filter; hence ensuring we were able to randomly select projects from the platform. This method of using platform parameters to randomly select project samples is consistent with methodologies in previous studies (e.g., Jiao et al., 2023). Out of the approximately 2600 technology projects available across the developing countries on Kickstarter, we used a final sample of 424 from across 15 countries. The final developing country sample excludes projects lasting less than a week, cancelled projects, and projects with pledge goals less than $USD 500 – restrictions commonly used in previous studies to ensure data quality (e.g., Cornelius and Gokpinar, 2020; Skirnevskiy et al., 2017; Defazio et al., 2021; Tajvarpour and Pujari, 2022). To obtain the developed country sample, we followed a similar sampling strategy. However, because 95 % of the technology projects were based in developed countries, we did not use the location filter. The first 1000 developed country technology projects in the randomly generated results on Kickstarter were chosen to be included in the final sample for analysis. We applied similar data quality restrictions and were left with 635 projects. Hence, our final sample constituted 1059 campaigns based in developing (40 % of the sample) and developed countries. The average duration of the projects was 37 days, and 99 % of the project sample met or exceeded their funding goal, ranging from $USD 641 to $USD 952,380. Additionally, in support of the context driving our research objectives, a one-way ANOVA revealed a statistically significant difference in the average pledges given to developing (~USD$ 221,800) vs developed (~USD$ 300,000) country projects ($F(1, 1057) = [5.185]$, $p = 0.023$).

3.2. Variable operationalization

Table 2 summarizes the study's variables and their operationalization.

3.2.1. Substantive variables

Pledge. Since we collected data from different campaigns raising funds in different currencies, all the data was converted to United States dollars to facilitate comparison. We used historical data from the United States Department of the Treasury (2024), applying an average rate for each of the periods we split the sample into. The different periods and their justifications are explained in the description of the control

Table 2
Variable operationalization.

Variable	Code	Operationalization
Project pledge amount	Pledge	Natural log of pledge amount in USD.
Project pledge effectiveness	Pledge effectiveness	Ratio of pledge to campaign goal.
Project pledge efficiency	Pledge efficiency	Ratio of pledge to duration.
Risk description sentiment	Risk sentiment	The degree of positive emotional sentiment in campaign risk descriptions measured using 'sentimentr' with scores ranging from −1(very negative) to 1 (very positive).
Risk description length	Risk length	Natural log of the number of words in risk description
Platform endorsement	Endorsed	Whether a campaign has been endorsed with "Campaigns We Love" badge by Kickstarter platform (=1) or not (=0).
Project location	Developing country	Whether a project was based in a developing country (=1) or developed country (=0)
Fundraising goal	Goal	Natural log of fundraising goal in USD.
Campaign duration	Duration	Natural log of the number of days of campaign.
Year in which project was lunched	Period	Whether a campaign was launched between 2020 and 2024(=1) or not (=0).
Technology category	Category	Whether a campaign belongs to either of hardware or gadgets subcategories (=1) or not (=0).
Prosocial risk-based statement	Prosocial	Where project's risk statement had elements of prosocial framing (=1) or not (=0).

variables. Due to large variations in the pledge amounts from different campaigns, we performed a log transformation for the analysis. This data treatment is consistent with other recent crowdfunding studies (e.g., Zhu et al., 2023; Yasar et al., 2022; Tajvarpour and Pujari, 2022).

Risk description sentiment. We used the 'sentimentr' package in *R* (Rinker, 2017) to attribute sentiment scores to the Kickstarter campaign risk descriptions. Sentiment analysis has been previously used in crowdfunding studies to determine if the polarity or valence of campaign descriptions has an influence on crowdfunding success outcomes (Tafesse, 2021). The 'sentimentr' package analyzes text and provides a score that ranges from −1.0 to +1.0, with more negative scores denoting negative sentiment, and more positive scores denoting positive sentiment. The 'sentimentr' package also measures the overall polarity of a piece of text by analyzing the polarity of individual words in the text, whilst also taking into account valence shifters, i.e. adjectives and adverbs that affect the polarity of the sentiment expressed in the text (Chen et al., 2023; Li et al., 2023). For example, the sentence, "We did not make a loss in the last financial year" produces a sentiment score of 0.23; "We won't need more funding after this campaign" gives a sentiment score of 0; and "We were allowed to continue trading after losing the court battle" gives a sentiment score of −0.26. Although the risks and challenges section on Kickstarter became mandatory in September 2012, 86 campaigns, comprising 17 % of our sample, did not describe their project risks. For these projects, their risk sentiment was measured as neutral (i.e., 0, being neither negative nor positive).

Risk description length. Due to large variations in different campaigns' risk disclosures, we operationalized this variable as the natural log of the number of words in the description of the campaign's risks section; consistent with previous studies (Yang et al., 2020; Tajvarpour and Pujari, 2022; Calic and Shevchenko, 2020; Tafesse, 2021).

Project location. We used a dummy variable to operationalize project location. We coded projects based in developing countries as 1 and those based in developed countries as 0. We used the United Nations Conference on Trade and Development (UNCTAD, 2023) classification scheme to designate a country as developing or developed, where factors like colonial history, democracy, and income per capita are determinant factors. In total, 40 % of the sample were based in developing countries.

3.2.2. Control variables

While many factors can influence crowdfunding outcomes, this study controls for key theoretically relevant factors that may covary with the variables in our conceptual model (Bernerth and Aguinis, 2016). The control variables are fundraising goal, platform endorsement, campaign duration, project launch year, technology project type, and prosocial nature of risk information.

Fundraising goal. In line with prior research, we controlled for the campaign's fundraising goal, as this has been shown to influence various campaign success outcomes (e.g., Calic and Shevchenko, 2020; Zhu et al., 2023). Due to large variations across the sample, we operationalized fundraising goal as the natural log of the fundraising goal specified in USD.

Platform endorsement. Platform endorsement can be an important asset for signaling campaign quality, hence helping to reduce backers' perceived risk and uncertainty (Yang et al., 2020; Yasar et al., 2022). In line with similar studies, we created a dummy variable to control for the influence of platform endorsement. Campaigns with the "Project We Love" badge on their Kickstarter page received a code of 1, otherwise 0.

Campaign duration. Campaigns that last longer are likely to attract more pledges (Yang et al., 2020; Yasar et al., 2022). Due to the large variation in campaign durations, following prior research, we operationalized this variable as the natural log of the number of days of campaign.

Project launch year. Since the campaigns under investigation in our dataset span from 2012 to 2023, we controlled for time period (Calic and Shevchenko, 2020). Specifically, we controlled for campaigns that occurred between 2020 and 2023, when average monthly pledges on Kickstarter during this period were more than double those during the preceding five-year period (Statista, 2024).

Technology project type. We recognize that the level of project risk and attractiveness may vary by the technology projects (Moutinho and Leite, 2013; Defazio et al., 2021). Our sample comprises largely hardware (22 %) and gadget (23 %) related-technology projects. Thus, we controlled for these subcategories, grouping them and coding these projects as 1, and the remaining ones as 0.

Prosocial framing. Prosocial framing of campaign descriptions has been shown to influence project success (e.g., Defazio et al., 2021). Following the example of Dai and Zhang (2019), we deemed projects that had certain words like "help", "poverty", and "activism" in the campaign risk statement as containing prosocial cues. According to this classification, 41 % of the sample used prosocial cues in their risk statements. Campaign risk statements with prosocial framing were coded as 1, and those without as 0.

4. Data analysis and results

Table 3 details the descriptive statistics and correlations for this study's variables. We used OLS regression analysis in SPSS to test the research model. Additionally, we used Haye's PROCESS (SPSS) and Lind and Mehlum's *utest* (STATA) to analyze the slopes of the moderation and curvilinear relationships respectively.

4.1. Main analysis and hypothesis evaluation

As shown in Table 4, we estimated five hierarchical regression models to isolate the unique effects of the control variables, the substantive variables, the curvilinear effect terms, and the moderated effect terms (Tajvarpour and Pujari, 2022; Yang et al., 2020). The risk sentiment and risk length were mean-centered to facilitate interpretation.

The following equations summarize the regression models that we estimated:

Model 1: Control effects

$$\text{Pledge} = \beta_0 + \beta_1 E + \beta_2 P + \beta_3 D + \beta_4 PR + \beta_5 C + \beta_6 G + \varepsilon$$

Model 2: Main effects of substantive variables

$$\text{Pledge} = \beta_0 + \beta_1 E + \beta_2 P + \beta_3 D + \beta_4 PR + \beta_5 C + \beta_6 G + \beta_7 RS + \beta_8 RL + \beta_9 DC + \varepsilon$$

Model 3: Curvilinear effects

$$\text{Pledge} = \beta_0 + \beta_1 E + \beta_2 P + \beta_3 D + \beta_4 PR + \beta_5 C + \beta_6 G + \beta_7 RS + \beta_8 RL + \beta_9 DC + \beta_{10}\, RS^2 + \beta_{11}\, RL^2 + \varepsilon$$

Model 4: Moderated main effects

$$\text{Pledge} = \beta_0 + \beta_1 E + \beta_2 P + \beta_3 D + \beta_4 PR + \beta_5 C + \beta_6 G + \beta_7 RS + \beta_8 RL + \beta_9 DC + \beta_{10} RS2 + \beta_{11} RL2 + \beta_{12} RS \times DC + \beta_{13} RL \times DC + \varepsilon$$

Model 5: Moderated curvilinear effects

$$\text{Pledge} = \beta_0 + \beta_1 E + \beta_2 P + \beta_3 D + \beta_4 PR + \beta_5 C + \beta_6 G + \beta_7 RS + \beta_8 RL + \beta_9 DC + \beta_{10} RS2 + \beta_{11} RL2 + \beta_{12} RS \times DC + \beta_{13} RL \times DC + \beta_{14} RS2 \times DC + \beta_{15} RL2 \times DC + \varepsilon$$

Where β_0 = regression constant; e = residual term; $\beta_{1\text{-}15}$ = unstandardized regression coefficients; E = endorsed; P = prosocial; D = duration; PR = period; C = category; G = goal; RS = risk sentiment; RL = risk length; DC = developing country; RS^2 = squared risk sentiment; RL^2 = squared risk length; RS × DC = product of risk sentiment and developing country; RL × DC = product of risk length and developing country; RS^2 × DC = product of squared risk sentiment and developing country; RL^2 × DC = product of squared risk length and developing country.

Table 3
Descriptive statistics and correlations.

Variable		1	2	3	4	5	6	7	8	9	10	11	12
1.	Pledge	1											
2.	Pledge effectiveness	0.631**	1										
3.	Pledge efficiency	0.877**	0.532**	1									
4.	Risk sentiment	−0.018	0.055	−0.036	1								
5.	Risk length	0.198**	−0.033	0.208**	0.006	1							
6.	Developing country	−0.305**	0.119**	−0.323**	0.097**	−0.262**	1						
7.	Endorsed	0.481**	0.049	0.461**	−0.063*	0.252**	−0.593**	1					
8.	Prosocial	0.000	−0.044	0.025	0.104**	0.383**	−0.081**	0.046	1				
9.	Duration	0.200**	0.157**	−0.285**	0.037	−0.030	0.050	0.025	−0.056	1			
10.	Period	−0.055	0.367**	−0.064*	0.039	−0.248**	0.331**	−0.322**	−0.069*	0.006	1		
11.	Category	−0.135**	0.111**	−0.173**	0.038	−0.049	0.196**	−0.277**	0.022	0.078*	0.137**	1	
12.	Goal	0.535**	−0.307**	0.489**	−0.081**	0.282**	−0.495**	0.537**	0.050	0.086**	−0.462**	−0.279**	1
	Minimum	1.946	0.146	0.475	−0.424	1.386	0.000	0.000	0.000	1.386	0.000	0.000	6.463
	Maximum	15.644	1.749	4.672	0.922	6.984	1.000	1.000	1.000	4.500	1.000	1.000	13.767
	Mean	11.252	1.139	3.165	0.183	4.821	0.400	0.580	0.575	3.566	0.420	0.233	9.925
	Standard deviation	1.699	0.153	0.482	0.150	0.614	0.490	0.494	0.495	0.261	0.494	0.423	1.214
	Skewness	−0.456	0.006	−0.480	0.147	−0.071	0.407	−0.324	−0.304	−0.027	0.324	1.263	−0.111
	Kurtosis	1.735	4.971	2.013	0.896	1.105	−1.838	−1.899	−1.911	4.588	−1.899	−0.405	−0.084
	N	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059

Model 1 reveals that six control variables explain 42.1 % of pledge variance, making them critical for mitigating potential alternative explanations associated with our conceptual model. We relied on the results from the other regression models to evaluate our hypotheses in the presence of the control variables. Unlike Model 2, Model 3, and Model 4, Model 5 does not account for a statistically unique variance in pledge.

Model 2 shows that the linear relationship between risk sentiment and pledges is positive, albeit insignificant ($\beta = 0.28$, SE = 0.27, $p = 0.30$), whereas the linear relationship between risk length and pledges is positive and significant ($\beta = 0.22$, SE = 0.07, $p < 0.01$). However, Model 3 shows that the quadratic terms of risk sentiment ($\beta = 2.50$, SE = 1.09, $p = 0.02$) and risk length ($\beta = -0.16$, SE = 0.06, $p = 0.01$) have positive and negative effects on pledges respectively. Given the significance of the effects of these quadratic terms, we used the *utest* module in STATA to confirm our curvilinear hypotheses (Lind and Mehlum, 2010). As plotted in Fig. 2a, the results show that pledges increase as risk length increases to 0.78 of its mean-centered scale (equivalent to 270 words). However, beyond this point, further increases in risk length reduce campaign pledges. The results of the slope test in Table 5 indicate that the relationship at the low end of the risk length scale is positive and significant; however, the relationship at the high end of the risk length scale is insignificant. These results largely support the arguments for H1a that there is a limit to the extent to which risk length to drives pledges. In contrast, as plotted in Fig. 2b, the results show that risk sentiment has a negative relationship with pledges up to −0.03 of its mean-centered scale (equivalent to 0.153 on the −1 to +1 'sentimentr' scale); after which, further increases in risk sentiment begin to positively drive campaign pledges. As detailed in Table 4, both the low and high ends of the risk sentiment scale have statistically negative and positive relationships with pledges respectively. These results suggest a U-shaped relationship between project risk sentiment and campaign pledges (Lind and Mehlum, 2010), contrary to H1b, which proposes an inverted U-shaped relationship between these variables.

Model 4 shows that the interaction between risk length and project location positively affects campaign pledges ($\beta = 0.10$, SE = 0.04, $p = 0.02$). As Fig. 3 illustrates, a slope test reveals that the positive relationship between risk length and pledges is stronger for projects in developing countries ($\beta = 0.50$, SE = 0.12, $p < 0.001$) but insignificant for projects in developed countries ($\beta = 0.13$, SE = 0.09, $p = 0.14$). However, Model 5 shows that the interaction between squared risk length and project location does not have a significant effect on pledges ($\beta = -0.17$, SE = 0.16, $p = 0.28$). Thus, there is limited support for H2a. Model 4 also shows that the interaction between project risk sentiment and project location does not significantly impact campaign pledges ($\beta = -0.23$, SE = 0.17, $p = 0.17$). Similarly, Model 5 shows that the interaction between the squared risk sentiment variable and project location does not significantly drive campaign pledges ($\beta = 0.43$, SE = 0.69, $p = 0.54$). Thus, we were unable to find support for H2b.

4.2. Robustness checks

We considered alternative measures for crowdfunding success to assess the robustness of the above results (Tafesse, 2021). While *pledge* is a marker indicator of crowdfunding success (Yasar et al., 2022), it is an absolute indicator and does not account for differences in fundraising goals or the duration a campaign lasts. We addressed these concerns by deriving two indicators for crowdfunding success. The first is *pledge effectiveness*, operationalized as the ratio of the pledge amount to the fundraising goal (Tajvarpour and Pujari, 2022). The second is *pledge efficiency*, operationalized as the ratio of the amount pledged to the campaign duration. The rationale behind these indicators is that successful crowdfunding projects meet or exceed their targets or garner more pledges over a short time. We repeated the main regression analyses using these alternative crowdfunding success indicators. As detailed in Tables 6 and 7, the results regarding the direction of effect and significance level are broadly consistent with those associated with

Table 4
Main results (*dependent variable = pledge*).

	Model 1: Control effects			Model 2: Main effects			Model 3: Curvilinear effects			Model 4: Moderated main effects			Model 5: Moderated curvilinear effects			VIF
	β	SE	p	β	SE	p	β	SE	p	β	SE	p	β	SE	p	
Control variables:																
Endorsed	1.07	0.10	<0.01	1.09	0.11	<0.01	1.08	0.11	<0.01	1.08	0.11	<0.01	1.07	0.11	<0.01	1.82
Prosocial	−0.04	0.08	0.58	−0.15	0.09	0.09	−0.14	0.09	0.10	−0.15	0.09	0.10	−0.15	0.09	0.09	1.20
Duration	0.94	0.15	<0.01	0.93	0.16	<0.01	0.92	0.15	<0.01	0.92	0.15	<0.01	0.92	0.15	<0.01	1.04
Period	0.91	0.09	<0.01	0.93	0.09	<0.01	0.93	0.09	<0.01	0.95	0.09	<0.01	0.95	0.09	<0.01	1.34
Category	0.16	0.10	0.10	0.15	0.10	0.13	0.16	0.10	0.11	0.16	0.10	0.11	0.15	0.10	0.13	1.14
Goal	0.68	0.04	<0.01	0.68	0.04	<0.01	0.69	0.04	<0.01	0.68	0.04	<0.01	0.68	0.04	<0.01	1.81
Substantive variables:																
Risk sentiment (RS)				0.28	0.27	0.30	0.15	0.27	0.58	0.21	0.27	0.44	0.19	0.28	0.49	1.10
Risk length (RL)				0.22	0.07	<0.01	0.25	0.08	<0.01	0.28	0.08	<0.01	0.26	0.08	<0.01	1.47
Developing country (DC)				0.12	0.11	0.26	0.11	0.11	0.29	0.13	0.11	0.22	0.16	0.13	0.20	2.43
RS^2							2.50	1.09	0.02	2.69	1.12	0.02	2.44	1.20	0.04	1.36
RL^2							−0.16	0.06	0.01	−0.14	0.06	0.02	−0.17	0.07	0.01	1.36
RS × DC										−0.66	0.55	0.23	−0.73	0.56	0.19	1.13
RL × DC										0.37	0.14	0.01	0.36	0.15	0.02	1.17
RS^2 × DC													0.92	2.28	0.69	1.79
RL^2 × DC													−0.17	0.16	0.28	1.86
Constant	0.09	0.66	0.90	0.21	0.66	0.76	0.17	0.66	0.80	0.24	0.66	0.71	0.27	0.66	0.68	
R^2	42.1 %			42.7 %			43.2 %			43.7 %			43.7 %			
ΔR^2				0.6 %			0.6 %			0.4 %			0.1 %			
F of R^2	127.34 %			86.71			72.50			62.33			54.06			
F of ΔR^2				3.57			5.33			4.06			0.64			
p of (F of R^2)	<0.001			<0.001			<0.001			<0.001			<0.001			
p of (F of ΔR^2)				0.014			0.005			0.017			0.530			
N	1059			1059			1059			1059			1059			

Notes: β = unstandardized regression estimates, SE = standard error, p = p-value (2-tailed), VIF = variable inflation factor.

the *pledge* indicator.

5. Discussion

This study sought to examine the nature of the relationship between project risk description and crowdfunding success for technology projects, and whether these relationships would differ between projects based in developed versus developing countries. We used signaling theory and data from Kickstarter to examine the moderated curvilinear relationships between two aspects of project risk description (i.e., risk description length and sentiment) and crowdfunding success across these project contexts. In this section, we discuss the key results and their associated theoretical, practical, and policy implications.

5.1. Discussion of results

Our analyses reveal two important findings. *Firstly*, we found that while project risk description has a non-linear effect on crowdfunding success for technology projects, the direction and magnitude of this effect varies based on the risk description aspect. The results indicate that risk description length has an inverted U-shaped (negative curvilinear) relationship with campaign pledges, while risk description sentiment has a U-shaped effect (positive curvilinear) relationship with pledges. These contrasting results complicate our arguments for the curvilinear relationship between project risk disclosures and crowdfunding success.

Concerning risk description length, the main effect results support the assertion that providing backers with more rather than less information about the riskiness of a project facilitates crowdfunding success. This effect is consistent with signaling theory, showing that greater risk disclosure reduces information asymmetry between the project creator and prospective backers, while improving the perceived quality of the project (Di Pietro, Grilli, and Masciarelli, 2023; Spence,2002). This finding reinforces prior evidence showing that detailed project descriptions drive crowdfunding success (Yang et al., 2020; Zhou et al., 2018). However, our results also show that lengthy risk descriptions beyond an optimum level, are negatively related to campaign pledges received. These results are consistent with Shrestha et al. (2023), who found that the quantity of risk disclosure (textual length, information concreteness, and vocabulary richness) had an inverted U-shaped relationship with crowdfunding success. Our results also add credence to our theorization about the trade-off associated with signal observability and interpretation costs. Increasing levels of risk description improve visibility and transparency, instilling potential backers' confidence; however, extreme levels of risk description require greater cognitive effort to decipher. Since the average backer faces attentional and cognitive constraints (Di Pietro, Grilli, and Masciarelli, 2023), excessive risk disclosure becomes less effective at reducing uncertainty; because information load problems can distract backers and divert their attention to alternative projects (Drover et al., 2018; Vanacker et al., 2020).

Regarding risk description sentiment, the main effect results suggest that positive risk description does not significantly impact crowdfunding success in a linear fashion. This finding somewhat contrasts with prior studies that show that entrepreneurs' use of positive sentiment is related to venture success (Zhou et al., 2018; Fellnhofer, 2023). However, our results do lend support to research that suggests that positive sentiment itself does not explain variance in crowdfunding success (Tafesse, 2021). Importantly, this study found that project risk description sentiment has a U-shaped (positive curvilinear) relationship with crowdfunding success. The finding departs slightly from existing claims (see Zhou et al., 2018) that investors prefer a moderately positive project description tone, beyond which increased use of positive sentiment negatively affects crowdfunding success. Generally, risk description sentiment is a costless signal which may lack verifiability; hence too much of it would breed suspicion. However, the technology context of our study may contribute to explaining these counterintuitive findings. Because crowdfunded technology projects are often unproven and involve high risks, more positive sentiment, as opposed to negative, may be required to boost investor confidence (Tafesse, 2021). Greater use of positive

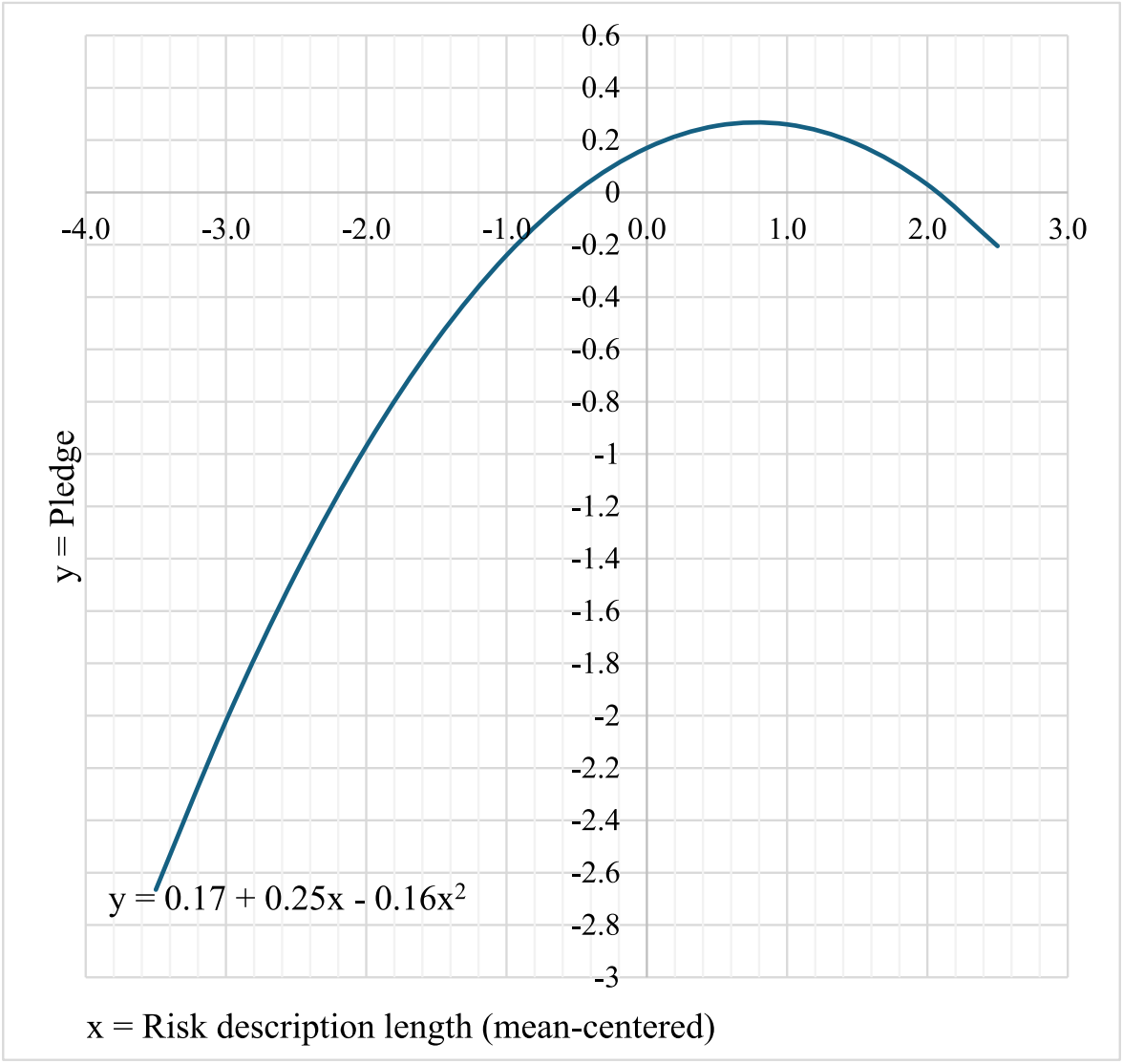

Fig. 2a. Surface of the curvilinear relationship between risk description length and pledge.
Note: The plot is based on the main results.

Table 5
Results for *utest* of the curvilinear effects of risk sentiment and risk length.

Curvilinear relationship between risk sentiment and pledge	When RS is low (=−2.89)	β = −2.89, t = -2.10, p = 0.02
	When RS is high (=3.85)	β = 3.85, t = 2.39, p = 0.01
	Overall test of the presence of a U-shape	t = 2.10, p = 0.02
	Extreme point	−0.03
	95 % Fieller confidence interval for extreme point	(-0.39, 0.10)
Curvilinear relationship between risk length and pledge	When RL is low (=−3.43)	β = 1.34, t = 3.17, p < 0.001
	When RL is high (=2.16)	β = −0.44, t = −1.60, p = 0.06
	Overall test of the presence of inverted U-shape	t = 1.60, p = 0.06
	Extreme point	0.78
	95 % Fieller confidence interval for extreme point	[0.27; 3.33]

Note: RS = risk sentiment; RL = risk length.

sentiment in project risk disclosures can reflect fundraisers' optimism and ability to execute their ideas successfully, making these projects more attractive to prospective backers (Tafesse, 2021).

Finally, this study found limited evidence for the moderating role of project location in the relationship between project risk description (length and sentiment) and crowdfunding success. Using signaling theory, we theorized that technology projects in developing countries, compared to those in developed countries, face greater uncertainties, and thus require stronger quality signals to boost investor confidence (Alsagr et al., 2023). Although we found that the positive linear effect of risk description length on crowdfunding success is stronger for developing country projects (Fig. 2), the results question and complicate our theoretical explanation for why project location would moderate the curvilinear effects of risk description length and sentiment, on campaign pledges. We argued that while risk description length and sentiment are desirable in technology project environments characterized by high investment uncertainties and risks, the diminishing benefits of these aspects of project risk information are less pronounced for projects in developing countries and more significant for those in developed countries. However, our results show that project location does not significantly impact the curvilinear relationships we investigated. A potential explanation is that investors generally prefer investing in less

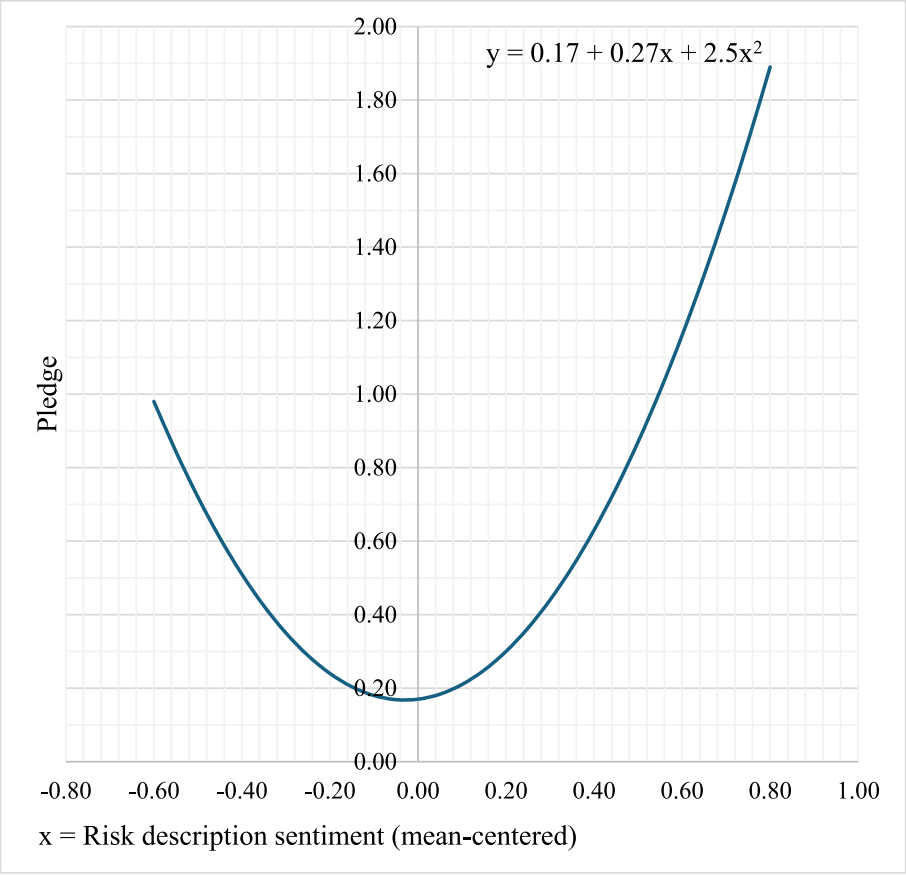

Fig. 2b. Surface of the curvilinear relationship between risk description sentiment and pledge.
Note: The plot is based on the main results.

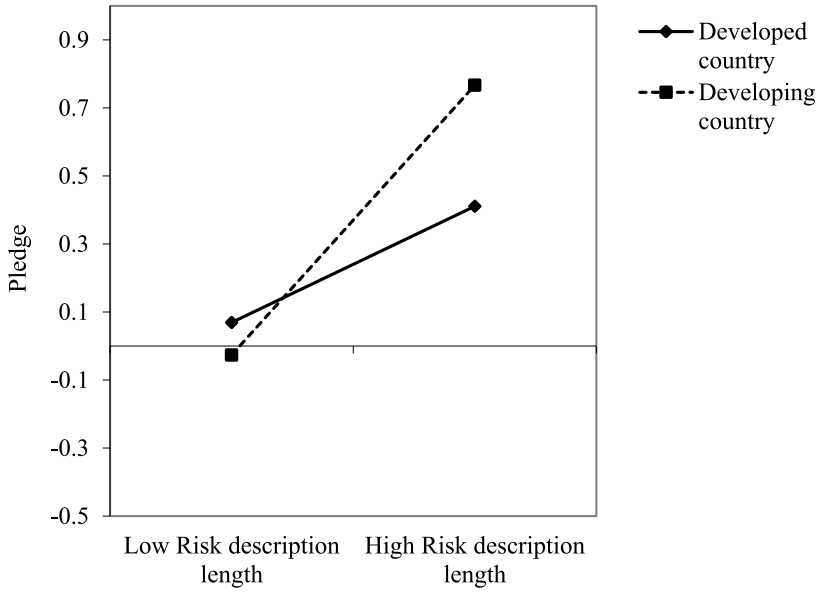

Fig. 3. Surface of the moderation effect of project location.
Note: The plot is based on the main results.

Table 6
Robustness results I (*dependent variable = pledge effectiveness*).

	Model 1: Control effects			Model 2: Main effects			Model 3: Curvilinear effects			Model 4: Moderated main effects			Model 5: Moderated curvilinear effects			VIF
	β	SE	p	β	SE	p	β	SE	p	β	SE	p	β	SE	p	
Control variables:																
Endorsed	0.06	0.01	<0.01	0.08	0.01	<0.01	0.08	0.01	<0.01	0.08	0.01	<0.01	0.08	0.01	<0.01	1.70
Prosocial	−0.01	0.01	0.49	−0.01	0.01	0.20	−0.01	0.01	0.21	−0.01	0.01	0.21	−0.01	0.01	0.18	1.20
Duration	0.08	0.02	<0.01	0.08	0.02	<0.01	0.08	0.02	<0.01	0.08	0.02	<0.01	0.08	0.02	<0.01	1.02
Period	0.13	0.01	<0.01	0.13	0.01	<0.01	0.13	0.01	<0.01	0.13	0.01	<0.01	0.13	0.01	<0.01	1.22
Category	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	0.03	0.01	<0.01	1.11
Substantive variables:																
Risk sentiment (RS)				0.04	0.03	0.17	0.02	0.03	0.43	0.03	0.03	0.34	0.02	0.03	0.42	1.10
Risk length (RL)				0.01	0.01	0.07	0.02	0.01	0.03	0.02	0.01	0.01	0.02	0.01	0.03	1.45
Developing country (DC)				0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	2.37
RS^2							0.30	0.12	0.01	0.31	0.12	0.01	0.27	0.13	0.04	1.36
RL^2							−0.02	0.01	<0.01	−0.02	0.01	<0.01	−0.02	0.01	<0.01	1.36
RS × DC										−0.04	0.06	0.48	−0.05	0.06	0.40	1.12
RL × DC										0.03	0.02	0.05	0.03	0.02	0.07	1.17
RS^2 × DC													0.17	0.24	0.48	1.79
RL^2 × DC													−0.02	0.02	0.22	1.86
Constant	0.75	0.06	0.00	0.76	0.06	0.00	0.76	0.06	0.00	0.77	0.06	0.00	0.77	0.06	0.00	0.77
R^2	19.8 %			21.1 %			22.2 %			22.5 %			22.7 %			
ΔR^2				1.3 %			1.2 %			0.3 %			0.01 %			
F of R^2	51.86			35.04			29.94			25.36			21.87			
F of ΔR^2				5.81			7.75			2.16			0.92			
p of (F of R^2)	<0.001			<0.001			<0.001			<0.001			<0.001			
p of (F of ΔR^2)				<0.001			<0.001			0.116			0.399			
N	1059			1059			1059			1059			1059			

Notes: β = unstandardized regression estimates, SE = standard error, p = p-value (2-tailed), VIF = variable inflation factor.

Table 7
Robustness results II (*dependent variable = pledge efficiency*).

	Model 1: Control effects			Model 2: Main effects			Model 3: Curvilinear effects			Model 4: Moderated main effects			Model 5: Moderated curvilinear effects			VIF
	β	SE	p	β	SE	p	β	SE	p	β	SE	p	β	SE	p	
Control variables:																
Endorsed	0.30	0.03	<0.01	0.28	0.03	<0.01	0.28	0.03	<0.01	0.28	0.03	<0.01	0.28	0.03	<0.01	1.82
Prosocial	0.01	0.02	0.82	−0.03	0.03	0.34	−0.02	0.03	0.36	−0.02	0.03	0.35	−0.03	0.03	0.32	1.20
Period	0.23	0.03	<0.01	0.24	0.03	<0.01	0.24	0.03	0.00	0.24	0.03	0.00	0.24	0.03	<0.01	1.34
Category	0.00	0.03	1.00	0.00	0.03	0.90	0.00	0.03	0.93	0.00	0.03	0.95	0.00	0.03	0.89	1.12
Goal	0.17	0.01	<0.01	0.17	0.01	<0.01	0.17	0.01	<0.01	0.17	0.01	<0.01	0.17	0.01	<0.01	1.77
Substantive variables:																
Risk sentiment (RS)				0.03	0.08	0.72	0.00	0.08	1.00	0.02	0.08	0.82	0.01	0.08	0.91	1.10
Risk length (RL)				0.07	0.02	<0.01	0.07	0.02	<0.01	0.08	0.02	<0.01	0.08	0.02	<0.01	1.47
Developing country (DC)				0.00	0.03	0.90	−0.01	0.03	0.85	0.00	0.03	0.96	0.00	0.04	0.99	2.41
RS^2							0.55	0.33	0.10	0.61	0.34	0.07	0.52	0.37	0.16	1.36
RL^2							−0.04	0.02	0.04	−0.03	0.02	0.08	−0.04	0.02	0.07	1.36
RS × DC										−0.21	0.17	0.20	−0.23	0.17	0.17	1.13
RL × DC										0.10	0.04	0.02	0.10	0.05	0.02	1.17
RS^2 × DC													0.43	0.69	0.54	1.79
RL^2 × DC													−0.04	0.05	0.44	1.86
Constant	1.18	0.13	<0.01	1.26	0.13	<0.01	1.24	0.13	<0.01	1.26	0.13	<0.01	1.27	0.13	<0.01	
R^2	33.7 %			34.3 %			34.6 %			35.1 %			35.1 %			
ΔR^2				0.6 %			0.4 %			0.4 %			0.1 %			
F of R^2	107.00			68.38			55.52			47.08			40.38			
F of ΔR^2				3.00			3.03			3.53			0.46			
p of (F of R^2)	<0.001			<0.001			<0.001			<0.001			<0.001			
p of (F of ΔR^2)				0.030			0.049			0.030			0.633			
N	1059			1059			1059			1059			1059			

Notes: β = unstandardized regression estimates, SE = standard error, p = p-value (2-tailed), VIF = variable inflation factor.

risky contexts (Alsagr et al., 2023); thus, the net benefits of longer risk descriptions or more positive risk descriptions for projects in developing countries may be marginal.

5.2. Theoretical implications and contributions

Our study has two major theoretical contributions. Firstly, we broaden and challenge the extant literature on the link between project

descriptions and crowdfunding outcomes by shedding light on two underdeveloped constructs in the crowdfunding literature: risk description length and risk description sentiment. Although prior studies have investigated related constructs (Table 1), our focus on risk descriptions (instead of general project descriptions) allows us to contribute novel theoretical and empirical insights with broader implications for the crowdfunding literature. A major contribution of this research is revealing the opposing curvilinear effects of risk description length and sentiment on the crowdfunding success of technology projects, contrary to the dominant linear analysis followed in previous studies (e.g., Tajvarpour and Pujari, 2022; Wang et al., 2021; Tafesse, 2021). We applied a cost-benefit trade-off analysis involving signal observation and interpretation cost to explain and demonstrate why risk description length has an inverted U-shaped relationship with crowdfunding success. Hence, this study contributes and clarifies the limited empirical evidence of non-linear relationships between project description and crowdfunding success (Zhou et al., 2018; Shrestha et al., 2023). Insights from this research highlight that non-linear models of project descriptions may offer greater explanatory power and a richer understanding of the effects of such information disclosure on crowdfunding success.

Secondly, while prior studies have examined various contingencies in the linear effects of project description factors (e.g., Yang et al., 2020; Tajvarpour and Pujari, 2022; Tafesse, 2021), the influence of the project's origin has been largely ignored. Although project location has been previously identified as a signal of quality and trustworthiness in online crowdfunding (Elrashidy et al., 2024), there is scant evidence of its effect on crowdfunding success. We investigated project location as a crucial moderator of the linear effect of risk description length on campaign pledges. However, our results suggest that different levels of project description characteristics may be more or less susceptible to the effects of specific moderator variables. In essence, the factors that moderate the linear effect of project description characteristics might not necessarily do so when the nature of the relationship under investigation is curvilinear. Thus, this observation calls for more research into the relevant moderators of the curvilinear effects of project description characteristics, including risk disclosures. Nevertheless, by uncovering project location as a moderator of the main effect of risk description length, this research contributes to the literature on the boundary conditions of project description factors.

5.3. Practical and policy implications

For entrepreneurs seeking online crowdfunding. Our results suggest the need for entrepreneurs to pay attention to both the amount of text describing their project risks and the sentiment used to convey these risks. Generally, entrepreneurs should avoid using too little or too much text in describing risks on crowdfunding platforms. While it is important to focus on the quality and compelling nature of the risk message presented in their campaigns, our results indicate that the optimal word count for a risk description statement on Kickstarter is around 270 words to maximize campaign pledges. However, given that they operate in a riskier context that signals poorer project quality, developing country entrepreneurs should err on the side of caution and give greater details of the risks they face to ease prospective backers' concerns. Given diminishing returns to extreme lengths of project risk descriptions which prospective backers may eventually find unattractive, entrepreneurs should also consider using more positive language in their project risk descriptions. Our analysis reveals just positive statements above a neutral level (i.e., with a value around 0.2 on the 'sentimentr' scale) is the least beneficial for online crowdfunded technology projects. The closer the risk sentiment tends to +1, the better. We recognize that many entrepreneurs may not have the analytics capability, interest, or time to analyze their risk statements to find optimum levels. However, there are now many artificial intelligence tools that can help entrepreneurs craft risk statements that highlight positive aspects of their ventures. In fact, entrepreneurs can now easily prompt any widely and freely available generative artificial intelligence tools to edit their project risk statements to the optimum length, conveying the most desirable sentiment.

For government agencies, development agencies, and other important policy makers. Our study confirms that online crowdfunding platforms are not perhaps the great equalizer that they have the potential to be, enabling funding access to entrepreneurs globally that may experience hurdles in financing technology projects. Our findings further reiterates the need for developing country entrepreneurs to be supported by different policies from their developed country counterparts (Abubakar et al., 2019). Hence, government agencies and non-governmental organizations (NGOs) in developing countries are encouraged to continue to strive for the creation of policies and initiatives that will support financing promising technology projects – since these are key to economic development. As mentioned earlier, digital crowdfunding adoption is relatively lower in many developing countries due to factors such as lack of awareness and supporting infrastructure (Gheith et al., 2025). One solution could be for developing country agencies (government and NGOs) to launch credible crowdfunding platforms that are tailored to developing country backers, along with usage training. This initiative could assist entrepreneurs with establishing a 'home' market for their products, with the potential for making their ventures more attractive to foreign backers in subsequent funding rounds. Furthermore, given the importance of technological innovation to economic development, developing country governments need to continue investing in the requisite infrastructure to facilitate both entrepreneurial innovation and a digital ecosystem that will enable a thriving online crowdfunding market domestically.

Our results also highlight the need to foster an investor-confident business environment that can attract foreign investment. One of the ways that developing country agencies can inspire confidence in foreign investors is encouraging the entrepreneurs they assist or those in technology incubators to provide prospective investors with detailed risk descriptions that address information asymmetries. Providing detailed and clear risk descriptions with a slightly positive tone, especially about the environment developing country entrepreneurs operate in, could help to bridge any distance-related gaps in investors' decision-making framework. For example, in describing risk mitigation strategies as part of their crowdfunding campaign, developing country entrepreneurs should not shy away from describing the environmental challenges they face. However, a slightly positive tone in how they address these challenges will likely inspire confidence in investors. Additionally, our results can be useful to training programs such as the UNDP's Crowdfunding Academy, which provides training for entrepreneurs engaged in innovation projects. We suggest that such training should include how best entrepreneurs from developing countries should communicate risks to prospective backers or investors. On the other hand, less elaborate risk descriptions appear ideal for crowdfunding technology projects in developed countries. Backers in developed countries are likely familiar with common environmental risks that entrepreneurs in those countries may be facing, such that reiterating these in too much detail could negatively impact any intended project quality signals.

For crowdfunding platforms. Given that global consumer wealth is largely concentrated in developed countries, and these consumers are most likely to be prospective backers on online crowdfunding platforms like Kickstarter, our research emphasizes that developing country project creators would benefit from providing more elaborate and positive risk descriptions. This communication strategy is more likely to reassure prospective backers with less access to information about the business context of geographically and psychologically distant developing countries; and in turn, allow developing country project creators adequately signal project quality and compete with their developed country counterparts. Kickstarter offers various resources for project creators including webinars and a course on strategic storytelling. An important part of the training Kickstarter and other online crowdfunding

platforms offer should include the insight that developing country projects can benefit from longer and more positive project risk descriptions, as these are important factors that contribute to crowdfunding success. Although not formally hypothesized, an important finding from our research was the powerful influence of platform endorsement on crowdfunding success – aligned with a recent metanalysis which showed platform endorsement to be one of the strongest positive drivers of crowdfunding success in the literature (Liu et al., 2023). That is, projects with the Kickstarter "projects we love" badge appeared set up for success. Currently, Kickstarter and other platforms do not formally disclose exact criteria that projects need to meet to be awarded this badge. However, recognizing the inequality in funding flows and success between developed and developing country projects, crowdfunding platforms could provide additional resources, education, and information to developing country entrepreneurs on how they can improve their projects and campaign pages to a state that warrants platform endorsement. This endorsement can increase the visibility of developing country projects which may struggle to compete for backers' attention on a competitive platform like Kickstarter, where the majority of the projects are from developed countries. This crucial insight can help crowdfunding platforms improve the success rate of projects for their creators based in developing countries, which also increases the overall pledges and success rate of projects on the platform.

6. Conclusion and opportunities for future research

This study has advanced and clarified the underdeveloped literature on the relationship between project risk description and crowdfunding success, particularly in the context of technology projects. By using curvilinear analysis to examine different aspects of project risk description, we provided a more nuanced understanding of how these variables are linked. Our findings suggest that future research should move beyond linear analysis and focus on specific aspects of project risk description rather than general or abstract operationalizations to generate richer insights. Future research can build on these contributions and implications in several ways.

Firstly, our conceptualization of project risk description advances previous studies on project description (e.g., Shrestha et al., 2023; Tajvarpour and Pujari, 2022; Wang et al., 2021), but there remains many other attributes of project description to explore. The extant literature suggests that other project description attributes such as discrete emotions (e.g., anger, fear, joy, trust), text structural quality, and narrative objectivity can be incorporated in further studies. Future research could consider such variables in elaborating the concept of project risk description and its relationship with crowdfunding success. Secondly, our use of two alternative indicators for crowdfunding success (i.e., pledge effectiveness and efficiency) yielded consistent results with the main indicator (total pledge) commonly used in prior studies. Future research could also consider other success indicators, such as the number of backers and pledge progress (e.g., Wang et al., 2021), to validate our conclusions.

Thirdly, while our study highlights certain peculiarities of technology-related projects, our arguments can also broadly apply to non-technology crowdfunding projects (Shrestha et al., 2023). Therefore, future research could test our conceptual model in different project contexts or examine how the model's explanatory power and effects vary across these contexts (e.g., Tafesse, 2021).

Finally, although we found limited evidence for the moderating role of project location, previous studies reveal various contingencies in the effect of project description variables on crowdfunding outcomes (e.g., Tajvarpour and Pujari, 2022; Yang et al., 2020). Future research could develop three-way interaction models to explore the conditions under which project location influences the relationship between risk description and crowdfunding success. Additionally, scholars can investigate new factors that moderate the linear or non-linear effects of risk descriptions.

CRediT authorship contribution statement

James Adeniji: Writing – original draft, Conceptualization, Data curation. **Dominic Essuman:** Visualization, Investigation, Conceptualization, Writing – review & editing, Methodology, Formal analysis, Writing – original draft. **Oluwaseun E. Olabode:** Writing – review & editing, Data curation, Supervision, Writing – original draft, Conceptualization.

Data availability

Data will be made available on request.

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