International Journal of Software Science and Computational Intelligence
Volume 17 • Issue 1 • January-December 2025

Exploring Risks and Challenges in Crowdfunding Performance Using Text Analytics and Deep Learning

Chengran Xie
https://orcid.org/0009-0006-0142-259X
Shanghai University, China

Chenyang Hou
The Hong Kong University of Science and Technology, Hong Kong

Yanhong Sun
Shanghai University, China

Vijayan Sugumaran
https://orcid.org/0000-0003-2557-3182
Oakland University, USA

ABSTRACT

The inherent delivery risks of crowdfunding campaigns force crowdfunding platforms to take risk disclosure measures to alleviate information asymmetry between creators and crowdfunders. However, creators might perceive such risk disclosures as a threat to crowdfunding success. Based on the language expectancy theory, this study aims to examine how the contextual characteristics of risk disclosure affect crowdfunding performance. By separating the project description and R&C sections of 21,287 projects on Kickstarter from 2009 to March 2022, we find that the two-sided persuasion topics extracted by LDA model from the R&C section have positive impacts on the funding success. This result indicates that providing two-sided persuasion content in the R&C section can increase the credibility of crowdfunding project narratives and thus the crowdfunding performance. Furthermore, by incorporating the R&C text into the prediction models, the prediction accuracy of funding support is improved by 0.9% from 83.9%, and the results have been proven to be robust through cross-validation experiments.

KEYWORDS

Reward-Based Crowdfunding, Risk Disclosure, Two-Sided Persuasion, LDA, LSTM

1. INTRODUCTION

Many start-ups and small enterprises face difficulties in obtaining external funds in the early stages of financing due to the lack of venture capital, poorly prepared operating records, or limited commercial trust, etc. (Kuo et al., 2021). In such cases, the emerging reward-based crowdfunding model provides an important channel for them to raise funds from the crowd by pitching their product ideas and offering early access to their products (Courtney et al., 2017; Mollick, 2014). Despite its popularity, the cruel reality is that most crowdfunding projects end in failure. For example, the success rate of crowdfunding projects on Kickstarter is only 41.9% in February 2025.[1]

DOI: 10.4018/IJSSCI.370002

The low success rate of crowdfunding projects can primarily be attributed to the fact that most crowdfunding products are in their early development stages and are not yet available. Technical uncertainties inherent in the development process, combined with limited experience and resources of the development teams, often pose significant risks to crowdfunding projects (Roma et al., 2018). For instance, campaigns might get delayed or cancelled, promised features might be withdrawn, and the expected product quality might not be met (Jensen & Ozkil, 2018). This is particularly true for highly risky technology-related projects. Over 75% of campaigns on Kickstarter fail to deliver promised rewards to backers on time, even if the funding goals are met (Mollick, 2014). Consequently, investors in reward-based crowdfunding face higher risks of not receiving the rewards compared to regular purchases from e-commerce platforms, which may discourage them from supporting the crowdfunding projects.

Generally, investors can only decide whether to invest based on entrepreneur's project description with uncertain credibility (Courtney et al., 2017; Wang et al., 2021). Given the inherent delivery risks of crowdfunding, Kickstarter has been criticized for allowing entrepreneurs to be vague about their plans.[2] In response, in September 2012, Kickstarter announced changes in its blog post titled "Kickstarter Is Not a Store", requiring entrepreneurs to detail the project's potential risks in the Risks and Challenges (R&C) section.[3] However, despite the introduction of the R&C requirement aimed to enhance transparency, many entrepreneurs provide minimal risk information, revealing a gap between platform expectations and entrepreneurial behaviours. In fact, many entrepreneurs perceive this requirement as a threat rather than an opportunity to enhance crowdfunding success.

The entrepreneurial narrative is crucial in conveying a project's vision and can illuminate potential investors' investment prospects (Luo et al., 2023; Yang et al., 2020), thereby influencing project performance. While prior literature suggests that text descriptions and language features embedded in entrepreneurial narratives can influence investors' behaviour and willingness-to-pay (Wang & Jiang, 2024), little attention has been paid to the impact of risk disclosures in the R&C section on crowdfunding performance.

The aforementioned practical evidence and research gap motivate the following research questions:

(1) *How would the description of the R&C section affect the financing performance of reward-based crowdfunding*?
(2) *How can initiators use risk-related topics to enhance the success rate of crowdfunding?*

Based on the Language Expectancy Theory (LET), we analyze the Story and R&C sections of Kickstarter separately to explore the impact of project language characteristics on crowdfunding performance. The results show that two-sided persuasion in the R&C section can improve crowdfunding performance, illustrating the effectiveness of risk content assessment in crowdfunding projects. Next, we build two typical deep learning prediction models (i.e., doc2vec + CNN and doc2vec + LSTM) to predict the crowdfunding status, and find that by adding the R&C text to the crowdfunding status prediction models, the prediction accuracy is improved by 0.9% from 83.9%. This indicates that the risk disclosure section has direct impact on investors' investment decisions as well as the crowdfunding performance.

The structure of this paper is as follows. Section 2 reviews the related literature. Section 3 presents the hypothesis based on LET. Section 4 introduces the data source, pre-processing and feature engineering methods. Section 5 builds the regression model and tests the hypothesis. Section 6 constructs the crowdfunding status prediction model and compares the model prediction results. Section 7 concludes the study.