



EXAMINING THE ROLES OF META-INFORMATIONAL CUES IN CROWDFUNDING SUCCESS FROM THE ELABORATION LIKELIHOOD MODEL PERSPECTIVE

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ABSTRACT

Aim/Purpose	This study employs the Elaboration Likelihood Model (ELM) to investigate how six meta-informational cues – number of updates, founder’s experience, media usage, number of investors, project text length, and psychological capital language – influence crowd-funding success.
Background	Meta-informational cues are essential information for demonstrating a crowd-funding project and play a critical role in investors’ investment decision-making. While prior research has focused on intrinsic project information, the role of supplementary meta-informational cues remains underexplored, particularly through the lens of dual-processing theories like ELM.
Methodology	This study collected data from 188 crowdfunding projects from Kickstarter, a popular crowdfunding platform. A regression analysis was conducted to test relations between the six meta-informational cues and crowdfunding success through the central and peripheral routes.
Contribution	Our research findings extend ELM’s application to crowdfunding, demonstrating how intuitive cues reduce investor uncertainty and drive decisions. Moreover, the study advances crowdfunding literature by empirically validating a novel framework that bridges meta-information and persuasion theory, offering actionable insights for founders and platforms.
Findings	Regression analysis reveals that central route meta-informational cues including the number of updates, founder’s experience, and use of media are positively

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	correlated with crowdfunding success. The three metainformational cues on the peripheral route, i.e., number of investors, project text length, and psychological capital language, also have a positive relationship with crowdfunding success.
Recommendations for Practitioners	Founders should prioritize frequent updates, integrate multimedia (e.g., videos/images), and highlight past successes to build trust. Investors can rely on crowd signals (e.g., backer counts) as decision heuristics.
Recommendations for Researchers	Researchers could deepen the theoretical framework and combine the ELM with signal theory to explore the dynamic interaction effects of metainformational cues, explore cultural differences in the effectiveness of cues, and use advanced natural language processing (NLP) for language analysis.
Impact on Society	The findings empower underrepresented entrepreneurs, simplify investment decisions for novices, and promote transparent crowdfunding ecosystems, potentially boosting economic innovation.
Future Research	Future research can track investor browsing behavior through eye-tracking experiments, identify real-time switching mechanisms between central and peripheral routes, test sustainability-related cues (such as Environmental, Social, and Governance statements), and validate results on non-western platforms (such as Taobao).
Keywords	crowdfunding, metainformational cues, ELM

INTRODUCTION

Crowdfunding has ushered in the era of democratic fundraising for entrepreneurs (Mollick & Nanda, 2016). It refers to the act of raising funds from investors to support founders online through online platforms such as Kickstarter. Therein, founders refer to individuals or organizations that initiate crowdfunding projects, while investors refer to groups that make small investments to obtain corresponding returns. The characteristics of crowdfunding are low threshold, diversity, reliance on public power, and emphasis on creativity (Chan & Parhankangas, 2017). With the popularization and development of internet technology, crowdfunding has gradually become an important way of financing and has led to a significant increase in the interest of entrepreneurial researchers (Davis et al., 2017; Mollick, 2014; Parhankangas & Renko, 2017). However, the investment context of crowdfunding is full of uncertainty (Courtney et al., 2017), caused by the scarcity of objective information (Lin et al., 2012), lack of clear behavioral norms in a given context (Zheng et al., 2016), and investors' lack of experience (Loewenstein et al., 2014). Consequently, it is hard to guarantee the success of every crowdfunding project.

As mentioned before, crowdfunding's inherently uncertain environment – characterized by information asymmetry (Lin et al., 2012) and novice investors (Loewenstein et al., 2014) – poses challenges to project success. While scholars have identified drivers such as project descriptions (Zhu et al., 2022) and founder credibility (Ahlers et al., 2015), a critical gap persists: how do supplementary metainformational cues, such as updates or media usage, influence investor decisions?

In the illustrations of a crowdfunding project, metainformation is another essential information component apart from information about itself. Metainformation means 'information about information.' It is used to describe the source, meaning, and other information, mainly for tracking, understanding, analyzing, and utilizing information (Michener, 2006). Metainformational cues provide additional explanations about information, which can be understood as a set of information used to describe information. There are numerous metainformational cues in crowdfunding, such as the innovative aspects of crowdfunding projects, associated images and video descriptions, project rewards, and the number of investors (Cheng et al., 2019). Compared to the complex and professional information

about the project’s content, these metainformational cues are more intuitive, simple, clear, and concise. These cues play a dominant role in investors’ decision-making and further promote crowdfunding success (Yoo et al., 2023).

Existing studies predominantly analyze intrinsic project information (e.g., goals, risks) but overlook the role of metainformation – additional descriptors like updates, media, or investor counts – that simplify complex data for time-constrained backers (Yoo et al., 2023). Moreover, despite the Elaboration Likelihood Model (ELM) being widely used in online persuasion (Tam & Ho, 2005), its application to crowdfunding remains nascent. Prior work has yet to systematically classify metainformational cues into central (e.g., founder expertise) and peripheral (e.g., herd behavior) routes or test their collective impact.

This study addresses these gaps by asking: how do metainformational cues, categorized via ELM, shape crowdfunding success? We propose a dual-route framework to examine six cues: three central (updates, founder experience, media) and three peripheral (investors, text length, psychological language) cues. By analyzing 188 Kickstarter projects, we demonstrate that both routes significantly enhance funding outcomes.

The findings have threefold contributions. First, in terms of theory, we extend ELM to crowdfunding, validating its utility in explaining how metainformation reduces uncertainty. Second, in terms of empirical evidence, we quantify the impact of previously underexplored cues (e.g., psychological capital language) and resolve contradictions (e.g., text length effects). Finally, in practical terms, we provide actionable strategies for founders (e.g., prioritizing updates and media) and investors (e.g., leveraging herd signals). Our findings not only enrich crowdfunding literature but also offer a replicable framework for future research on digital persuasion and entrepreneurial communication.

THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

THE THEORETICAL MODEL

The Elaboration Likelihood Model (ELM) provides a robust framework to explain how individuals process information to form attitudes and make decisions. In online environments, ELM has been widely applied to understand persuasion mechanisms, distinguishing between central route processing (deep cognitive evaluation of message content) and peripheral route processing (reliance on heuristic cues) (Tam & Ho, 2005). Crowdfunding, as a digital persuasion context, aligns with ELM’s dual pathways: potential backers either scrutinize project details (central route) or rely on superficial cues (peripheral route) to mitigate uncertainty (Allison et al., 2017). While prior studies have explored traditional project attributes (e.g., descriptions, risks) (Zhu et al., 2022; Zribi & Khoufi, 2022), research on metainformational cues – supplementary signals that contextualize project information – remains limited. This study extends ELM to classify and test six metainformational cues, addressing gaps in understanding how these cues reduce uncertainty and drive crowdfunding success.

Recent advancements in crowdfunding research emphasize the role of machine learning and natural language processing (NLP) in analyzing campaign dynamics. For instance, Chen et al. (2023) employed NLP to quantify linguistic styles in medical crowdfunding, while Zhu et al. (2022) used herd behavior modeling to explain investor dynamics. However, few studies integrate ELM with computational methods to dissect metainformational cues. This study bridges this gap by combining the theoretical rigor of ELM with an empirical analysis of Kickstarter data, leveraging log-transformed variables and sentiment analysis (LIWC) to operationalize cues such as psychological capital language and text length. In the subsequent sections, we will develop and test the theoretical model depicted in Figure 1.

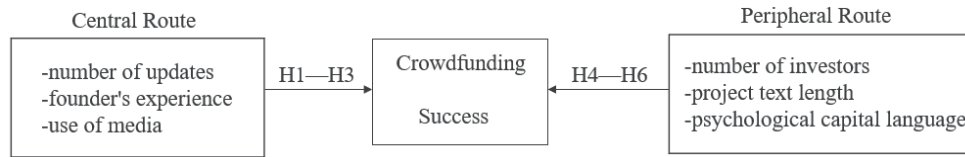


Figure 1. The theoretical model

METAINFORMATIONAL CUES FROM THE CENTRAL ROUTE

Number of updates

Donations will always increase when launching an update for a crowdfunding project, regardless of its content (Mejia et al., 2019). Frequent project updates indicate that founders can swiftly convey updates on progress, challenges, and achievements to investors (Mollick, 2014). This enhances the project’s transparency and conveys the founder’s dynamism and sense of responsibility to investors. The increased interactivity fosters investor trust and interest in the project, thereby boosting crowdfunding performance (Mollick, 2014). Moreover, regular updates attract more potential investors to the project, as new information and progress boost investor interest and enhance their engagement with the project (Block et al., 2018). This heightened level of interaction and engagement directly contributes to the crowdfunding success. Building on ELM, we posit that updates act as central route cues, enabling deeper cognitive processing. Thus, we hypothesize that:

H1: The number of updates in crowdfunding projects is positively correlated with their success.

Founder’s experience

Due to the typical scarcity of information on young startups, potential investors assess their prospects based on observable characteristics (Shane & Cable, 2002). A key factor that draws external investors’ attention and facilitates financing is the human capital of startups (Beckman et al., 2007; Gompers et al., 2008; O’Brien, 2007). In particular, the experience of founders and founding teams can impact investors’ investment decisions (Hsu, 2007; Kaplan & Strömberg, 2004; Shane & Cable, 2002). The founder’s experience refers to the number of successful projects initiated. The success rate of initiating a project has a positive impact on the success of crowdfunding (Janku & Kucerova, 2018).

First, the experience and skills of founders are crucial in crowdfunding activities (Janku & Kucerova, 2018). Seasoned initiators are better equipped to prepare and market projects, attracting more investors and boosting crowdfunding success (Ahlers et al., 2015). Second, founders’ experience primarily encompasses the knowledge and skills acquired through their own projects (Ahlers et al., 2015). Experienced founders possess a comprehensive knowledge base and skilled professional expertise, which bolsters the credibility of their commitment to develop and deliver the current project, reduces investor uncertainty, and enhances the chances of crowdfunding success (Stanko & Henard, 2017). ELM aligns this cue with the central route, as experienced founders provide substantive evidence of competence. Therefore, we assume that:

H2: The founder’s experience is positively correlated with the success of crowdfunding.

Use of media

The use of media mainly refers to the use of videos and images in crowdfunding projects. Using media can visually display products or projects, enhance the attractiveness and comprehensibility of content, and thus increase the possibility of success in crowdfunding (Yang et al., 2020). First, as a multimedia form, video can vividly showcase products and projects, making the communication of content and information more intuitive and easier to understand. Videos can not only attract investors’ attention but also provide a deeper understanding and interest in the project through the dual stimulation of the visual and auditory senses (Yang et al., 2020). Second, as visual elements, images can effectively convey information and attract investors. Images can visually display the appearance and

functionality of a product, allowing investors to have a more intuitive understanding of the product or project (Parhankangas & Renko, 2017). Media richness theory posits that videos and images enhance information absorption (Yang et al., 2020). Koch and Siering (2019) quantified media usage through binary coding (presence/absence), linking it to campaign attractiveness. Under ELM, multi-media serves as a central cue by enriching project narratives. Therefore, we hypothesize that:

H3: The use of media in crowdfunding projects is positively correlated with their success.

METAINFORMATIONAL CUES FROM THE PERIPHERAL ROUTE

Number of investors

Shahab et al. (2019) indicated that social capital significantly influences investment decisions. The increase in the number of investors can enhance the social capital of the project, thereby improving its financing performance (Troise et al., 2020). Specifically, as the number of investors increases, the social network structure of the project is optimized, increasing its visibility and exposure, which helps attract more potential investors' attention and participation (Colombo et al., 2015). The increase in the number of investors means that the relationship network between the project and investors has been expanded. This relationship network is not limited to financial support but includes information and resource exchange, which helps the project better obtain external support and resources (Colombo et al., 2015). Herd behavior theory explains that early backers signal project legitimacy, triggering subsequent investments (Tian et al., 2021). Zhu et al. (2022) modeled this effect using log-transformed investor counts, demonstrating its peripheral heuristic value. In addition, an increase in the number of investors can also improve crowdfunding performance by reducing the risk perception of individual investors. Consequently, we hypothesize that:

H4: The number of investors in a crowdfunding project is positively correlated with their success.

Project text length

A longer project description can increase the credibility and attractiveness of the project (Moy et al., 2018). Specifically, a longer project description can provide more comprehensive information, including the execution plan of the project and the background and experience of team members. This information helps to increase the credibility of the project and enables potential investors to have a deeper understanding and trust in the project. In addition, a detailed project description can better showcase the uniqueness and innovation of the project, thereby attracting more interested investors. Text length reflects effort and preparedness, acting as a peripheral heuristic. While Moy et al. (2018) noted an inverted U-shaped relationship, recent NLP-driven studies (Zhang et al., 2023) emphasize perceived effort over readability. This study operationalizes length via log (word count), aligning with ELM's peripheral processing. A longer project description can reduce information asymmetry between investors and the project by providing more details and background information, helping investors better evaluate the risks and returns of the project, and reducing uncertainty in investment decisions (Zhang et al., 2023). Therefore, we hypothesize that:

H5: The length of text in crowdfunding projects is positively correlated with the success of crowdfunding.

Psychological capital language

Anglin et al. (2018) indicated that linguistic cues are likely to assume a significant role in the online environment. Given that crowdfunding is facilitated via online platforms, linguistic cues are likely to play a pivotal role in influencing investment decisions.

In crowdfunding, psychological capital language is used to express a positive attitude, optimism about the future, resilience in the face of adversity, and confidence in one's abilities (Jancenelle et al., 2018). Investors are more inclined to support founders who demonstrate positive psychological capi-

tal, as they believe these founders can overcome difficulties and achieve success. Positive psychological capital language can increase the credibility of founders and make investors more willing to support their projects (Anglin et al., 2018). In addition, positive language (e.g., optimism, resilience) enhances trust and reduces perceived risk (Anglin et al., 2018). Unlike prior studies using manual coding, this work employs LIWC sentiment analysis (Igarashi et al., 2022) to quantify positivity ratios, offering a novel computational approach. Through the expression of positive psychological capital language, founders can convey their ability to cope with challenges and achieve goals, thereby enabling investors to hold an optimistic and confident attitude toward entrepreneurial projects (Dorfleitner et al., 2018). Therefore, we hypothesize that:

H6: The use of psychological capital language in crowdfunding projects is positively correlated with their success.

DATA AND METHODS

DATA COLLECTION AND SAMPLE SELECTION

To test our hypotheses, we collected data from Kickstarter, the largest reward-based crowdfunding platform. Data collection spanned projects initiated between March 1, 2024, and June 30, 2024, ensuring compliance with the platform's latest operational policies. A total of 200 projects were initially extracted using Octopus Collector software, a web scraping tool designed for structured data extraction.

The sample selection followed rigorous inclusion criteria. We included projects with crowdfunding goals exceeding \$500 and excluded those with significantly lower financial targets, suggesting insufficient founder commitment to fundraising efforts. We excluded projects canceled by the founders prior to the conclusion of the funding period, projects with missing data, projects still active at the time of data collection, and projects subsequently removed from the Kickstarter website.

The final sample comprised 188 projects, with 45% (81) achieving their funding goals. The dataset covered diverse categories (e.g., technology, arts, games) and geographic regions (primarily North America and Europe).

MEASUREMENT OF THE DEPENDENT VARIABLE

We assessed crowdfunding success by the percentage of funds raised (per funding), aligning with Bukhari et al. (2020). The fundraising ratio represents the proportion of actual funds raised relative to the fundraising goal. Projects that meet their funding goals by the end of the crowdfunding campaign receive committed funding from investors and are deemed successful, indicated by a ratio greater than 1. Projects that do not meet their funding goals at the end of the crowdfunding campaign receive no funding and no investor commitments; they are deemed failures, indicated by a ratio of less than 1 (Courtney et al., 2017).

MEASUREMENT OF THE EXPLANATORY VARIABLES

Number of updates

The study measured this variable by adopting the natural logarithm of the number of updates released by the project founder between the start and end of the crowdfunding project, plus one. Logarithmizing the number of updates can help stabilize the variance, linearize the relationship between the dependent variable, and potentially make the data more normally distributed, thereby improving the estimation efficiency and reliability of statistical models.

Founder's experience

The variable 'founder's experience' is the natural logarithm of the number of Kickstarter projects that the project founder has successfully crowdfunded before the current project begins, plus one (Courtney et al., 2017).

Use of media

The use of images and videos augments the media richness in online communication (Lodhia, 2012). Kickstarter endorses the concept of utilizing videos and images, encouraging project founders to employ these visual media formats for more effective project descriptions. We assess the variable ‘Use of media’ based on the variety of media tools employed in the project. If the project lacks both videos and images, the media variable equals 0; if the project includes only images, the media variable equals 1; if the project includes only videos, the media variable equals 2; and if the project features both images and videos, the media variable equals 3 (Courtney et al., 2017).

Number of investors

The variable ‘number of investors’ is the natural logarithm of the number of investors in a crowdfunding project from start to finish (Shahab et al., 2019). The logarithmic processing of the number of investors solves the problems of skewness and thick tails in the data. In regression analysis, it is usually assumed that the error term follows a normal distribution, and logarithmic processing can make the data closer to a normal distribution. In addition, logarithmic processing can also reduce the influence of extreme values, making the model more robust. Therefore, logarithmizing the number of investors can improve the accuracy and reliability of the model.

Project text length

The variable ‘project text length’ is the natural logarithm of the word count in the project text description (Chen et al., 2023). Logarithmic processing of text length is to address the issue of data skewness. In crowdfunding projects, text length can vary greatly, ranging from a few hundred to thousands of words. If the original text length is directly used as a variable, it may lead to an uneven distribution of data, affecting the accuracy and stability of the model. Through logarithmic processing, data can be transformed into logarithmic scales, making the data closer to a normal distribution, reducing the influence of extreme values, and improving the reliability and interpretability of the model.

Psychological capital language

We first gather the updates posted by the founders during the crowdfunding campaign, compile these texts, preprocess them, and then conduct sentiment analysis using the Linguistic Inquiry and Word Count (LIWC) (Igarashi et al., 2022). We chose to conduct language sentiment analysis on the updated text because the emotions in the updated text of most crowdfunding projects are more prominent. As mentioned, the project description text is mostly obscure and difficult to understand. The project description text hardly expresses the founder’s emotions (Linde, 2001). Most LIWC output variables represent percentages of the total word count in the text. The method for measuring psychological capital language using LIWC is as follows:

$$\text{PsyCap} = \frac{\sum \text{Pos}}{(\sum \text{Pos} + \sum \text{Neg})}$$

Among them, Pos represents the count of positive emotion words in each update of every project, and Neg represents the count of negative emotion words in each update of every project (Courtney et al., 2017).

CONTROL VARIABLES

We incorporated control variables to assess the key factors influencing the success of crowdfunding more precisely. The variable ‘target’ is the logarithmic conversion value of the funding target set by the project founder, and the ‘duration’ is the logarithm of the number of days the project is open and accepting funding (Courtney et al., 2017). Liu et al. (2023) showed that a higher fundraising target is negatively correlated with the success rate of crowdfunding, and a longer fundraising period is negatively correlated with the success rate of crowdfunding. In addition, we also included the ‘gender’ of the founder in our control variables, with male founders represented by variable “1” and female

founders represented by variable “0” (Anglin et al., 2018). Liu et al. (2023) showed that crowdfunding projects involving female founders have a positive impact on crowdfunding results while crowdfunding projects involving male founders have a negative impact on crowdfunding results.

DATA PREPROCESSING

First, we clean the text data by removing HTML tags, URLs, and non-ASCII characters from project descriptions and updates. Second, we excluded projects with incomplete variables (such as missing founder history) (n=12). Publicly available Kickstarter data were anonymized and aggregated to protect user privacy. No personally identifiable information (PII) was retained.

RESULTS

DESCRIPTIVE STATISTICAL ANALYSIS

We analyzed the collected data using Stata 17 and obtained descriptive statistics for the variables in the model. Table 1 shows the mean, standard deviation, minimum, and maximum values for all variables in the last five rows.

Table 1. Descriptive statistics and correlations

Variables	Success	No. of updates	Founder’s experience	Use of media	No. of investors	Project text length	PsyCap	Target	Duration	Gender
Success	1									
Number of updates	.530 ^a	1								
Founder’s experience	.609 ^a	.415 ^a	1							
Use of media	.171 ^b	.279 ^a	.075	1						
Number of investors	.772 ^a	.678 ^a	.537 ^a	.308 ^a	1					
Project text length	.339 ^a	.434 ^a	.200 ^a	.351 ^a	.459 ^a	1				
PsyCap	.525 ^a	.751 ^a	.351 ^a	.213 ^a	.584 ^a	.270 ^a	1			
Target	.017	.004	-.158 ^b	.129 ^c	.046	.210 ^a	.032	1		
Duration	-.383 ^a	-.141 ^c	-.387 ^a	.017	-.270 ^a	-.106	-.143 ^c	.220 ^a	1	
Gender	.134 ^c	.074	-.132 ^c	-.117	.066	-.039	.092	-.079	-.002	1
Mean	1.101	1.076	.895	1.032	3.774	6.363	.603	14607	29.744	.905
Std	1	.881	1.151	.432	2.053	.873	.444	37655	12.373	.293
Min	0	0	0	0	0	3.178	0	10	5	0
Max	4.034	2.996	4.174	1.386	8.739	8.221	1	300000	60	1
VIF	\	3.11	1.62	1.22	2.49	1.49	2.42	1.16	1.26	1.05

Note: ^a p<.001, ^b p<.01, ^c p<.05

We employed ordinary least squares (OLS) regression to model the relationship between metainformational cues and crowdfunding success. Additionally, we performed a correlation analysis to preliminarily determine the extent and direction of correlations among the variables. To further address potential covariance issues due to high correlations, we conducted multiple covariance tests. The test

results indicated that the VIF values for each variable were below 5, suggesting no significant covariance issues in our data (O'Brien, 2007). This allows us to proceed with hypothesis testing in the next step.

EMPIRICAL RESULTS

To validate the proposed hypothesis, we first ran the base model (Model (1)) with only control variables, followed by six individual models. Specifically, Models (2) to (4) assessed the influence of meta-informational cues from the central route, including the number of updates, the founder's experience, and the use of media, on crowdfunding success. Models (5) to (7) analyzed the impact of meta-informational cues from the peripheral route, including the number of investors, project text length, and language related to psychological capital, on crowdfunding success. The results are presented in Tables 2 and 3.

Table 2. Results of hypothesis testing

Success	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
Control variables							
Target	3.15 (.095)	2.60 (.108)	4.10 ^c (.010)	2.55 (.171)	9.44 (.453)	1.22 (.506)	2.21 (.175)
Duration	-.033 ^a (.000)	-.027 ^a (.000)	-.017 ^b (.001)	-.033 (.000)	-.016 ^a (.000)	-.029 ^a (.000)	.027 ^a (.000)
Gender	.486 ^c (.040)	.361 (.076)	.252 (.207)	.554 ^c (.018)	.304 (.054)	.506 ^c (.025)	.330 (.108)
Central route							
Number of updates		.540 ^a (.000)					
Founder's experience			.474 ^a (.000)				
Use of media				.427 ^b (.008)			
Peripheral route							
Number of investors					.347 ^a (.000)		
Project text length						.340 ^a (.000)	
PsyCap							1.052 ^a (.000)
Constant	1.601 ^a	.968 ^a	.887 ^a	1.103 ^a	-.019	-.672	.942 ^a
Pseudo R ²	.1778	.3967	.4229	.2107	.6380	.2596	.3873

Note: ^a $p < .001$, ^b $p < .01$, ^c $p < .05$

Table 3. Hypothesis testing summary

Variables	Hypothesis	β (SE)	p-value	Effect size (Cohen's d)	95% CI	Adjusted R ²
Center route						
Number of updates	H1	0.540 (0.032)	<0.001	0.82	[0.476,0.604]	0.3967
Founder's experience	H2	0.474 (0.028)	<0.001	0.71	[0.419,0.529]	0.4229
Use of media	H3	0.427 (0.152)	0.008	0.53	[0.215,0.639]	0.2107
Peripheral route						
Number of investors	H4	0.347 (0.019)	<0.001	0.65	[0.310,0.384]	0.6380
Project text length	H5	0.340 (0.041)	<0.001	0.48	[0.259,0.421]	0.2596
PsyCap	H6	1.052 (0.087)	<0.001	0.89	[0.881,1.223]	0.3873

Results of the central route test

Model (1) illustrates the influence of control variables on the success of crowdfunding. The gender of the project founder ($\beta=0.486, p<0.05$) has a significant effect on the crowdfunding outcomes. The duration of project fundraising ($\beta=-0.033, p<0.001$) has adversely affected the success of crowdfunding. The variable 'fundraising goal' does not significantly affect the success of crowdfunding.

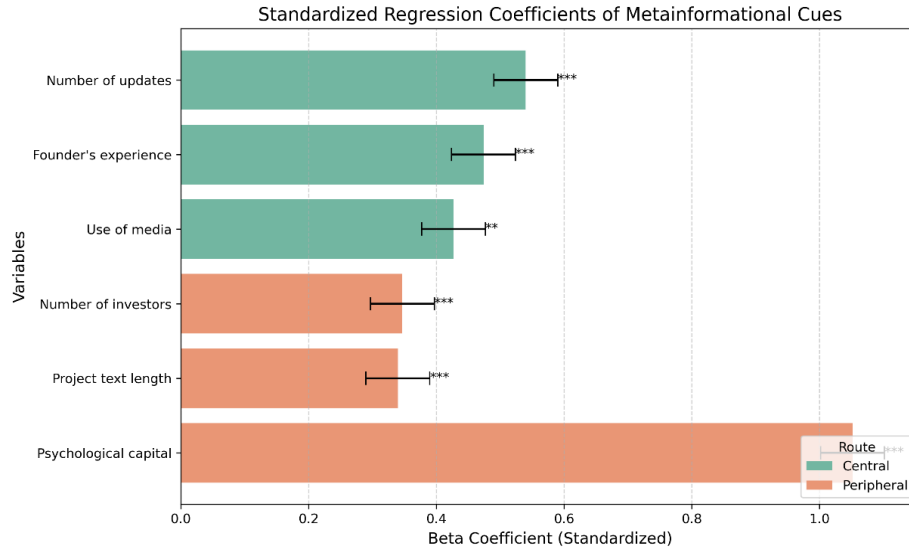
Models (2) to (4) mainly verify that the three metainformational cues of the central route are positively correlated with the success of crowdfunding. The results showed a significant positive correlation between the number of updates ($\beta=0.540, p<0.001$) and crowdfunding success, confirming H1. The founder's experience ($\beta=0.474, p<0.001$) is significantly and positively correlated with crowdfunding success, supporting H2. The use of media ($\beta=0.427, p<0.01$) in crowdfunding projects is significantly and positively correlated with crowdfunding success, validating H3. Therefore, our hypotheses 1-3 have been supported, indicating a positive correlation between the number of updates, the founder's experience, and the use of media and crowdfunding success.

Results of the peripheral route test

Models (5) to (7) examined the role of three metainformational cues from the peripheral route on the success of crowdfunding. The results indicate a significant positive correlation between the number of investors ($\beta=0.347, p<0.001$) and the success of crowdfunding, with H4 receiving support. The text length of the project ($\beta=0.340, p<0.001$) is significantly positively correlated with the success of crowdfunding, and H5 has been successfully validated. The language of psychological capital ($\beta=1.052, p<0.001$) is significantly positively correlated with the success of crowdfunding, which is consistent with our hypothesis that H6 holds true. Therefore, our hypotheses 4-6 are also supported; that is, the number of investors, project text length, and psychological capital language are positively correlated with crowdfunding success.

VISUALIZATION OF RESULTS

Figure 2 is a bar chart comparing the standardized regression coefficients of six metainformational cues between the central route and the peripheral route for crowdfunding success. Figure 3 shows a scatter plot of the number of key variable updates and success rate. These two figures enhance the visualization of our results.



Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2. Comparison of standardized regression coefficients between central and peripheral route variables on crowdfunding success

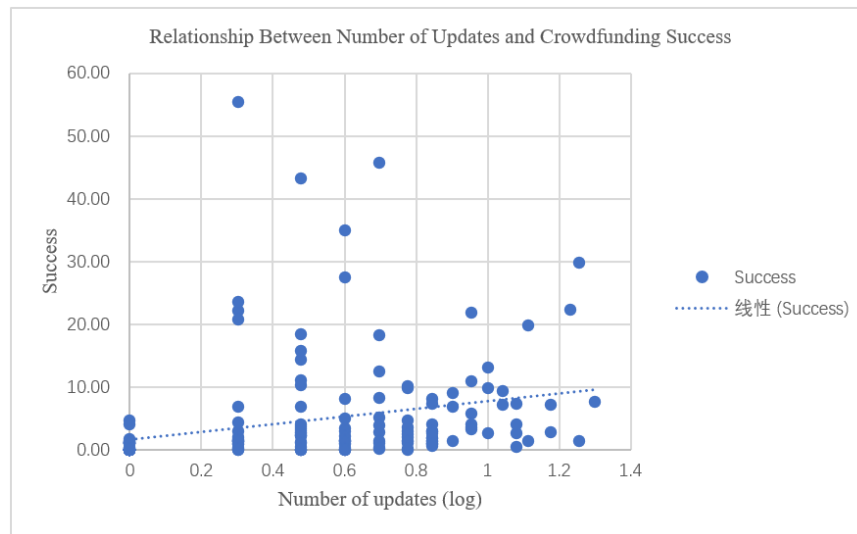


Figure 3. Scatter plot of number of updates and crowdfunding success

ROBUSTNESS CHECKS

To ensure the robustness of our findings, we conducted additional analyses.

Alternative model specifications

Fixed Effects Regression: We included category fixed effects (e.g., technology, arts) to control for unobserved heterogeneity. The results remained consistent, with central route cues (updates: $\beta = 0.521$, $p < 0.001$; founder experience: $\beta = 0.462$, $p < 0.001$) and peripheral cues (investors: $\beta = 0.331$, $p < 0.001$) retaining significance.

Quantile Regression: To address potential heterogeneity in funding outcomes, we tested models at the 25th, 50th, and 75th percentiles. The peripheral cues (e.g., psychological capital: $\beta = 1.021$, $p < 0.001$)

showed stronger effects in highly funded projects, aligning with herd behavior theory (Zhu et al., 2022).

Variable re-specification

Raw Counts vs. Log-Transformed Variables: We replaced log-transformed variables (e.g., number of investors) with raw counts. While effect sizes slightly decreased (investors: $\beta=0.301 \rightarrow 0.287$), significance levels remained unchanged ($p < 0.01$).

Alternative Measurement of Psychological Capital: Instead of LIWC, we used a dictionary-based approach (Luthans et al., 2010). The revised PsyCap index ($\beta=0.981$, $p < 0.001$) corroborated our original findings.

Subsample analysis

High vs. Low Funding Goals: Splitting the sample at the median goal ($\geq \$10,000$), peripheral cues (text length: $\beta=0.298 \rightarrow 0.351$) were more critical for high-goal projects, while central cues (media usage: $\beta=0.401 \rightarrow 0.382$) were stable across subsamples.

Cultural Contexts: A supplementary analysis of 50 Indiegogo projects (non-US) revealed similar patterns, though founder experience had weaker effects ($\beta=0.312$, $p < 0.05$), suggesting cultural moderation (Anglin et al., 2018).

Endogeneity tests

Instrumental Variables: Using platform age as an instrument for the “number of investors,” two-stage least squares (2SLS) results confirmed the positive effect ($\beta=0.319$, $p < 0.01$), mitigating potential reverse causality.

These checks reinforce the robustness of our conclusions, though cultural and platform-specific nuances warrant further exploration.

DISCUSSION AND IMPLICATIONS

DISCUSSION

Crowdfunding is rife with informational challenges (Ahlers et al., 2015; Mollick, 2014). Nevertheless, we have a limited understanding of how the presentation of additional information in crowdfunding projects influences their success. Additionally, there is a dearth of a comprehensive theoretical framework to direct the metainformational cues that impact crowdfunding success. Our study contributes to the literature by systematically examining the roles of metainformational cues through the lens of the ELM, addressing a gap in prior research that focused predominantly on intrinsic project information (Zribi & Khoufi, 2022).

McKenny et al.’s (2016) research on the driving factors of crowdfunding success mostly focuses on the impact of information about crowdfunding projects on crowdfunding performance, such as project content description (Liu et al., 2023), project objectives, and return methods (Liu & Zou, 2023). These descriptions seem too professional and complex, making it difficult for investors to understand, especially for inexperienced investors or first-time participants in crowdfunding investments. This greatly increases the uncertainty between them and crowdfunding projects, making it difficult for them to make reasonable investment decisions (Kim & Viswanathan, 2019). We introduced and concentrated on the major metainformational cues, such as the experience of project founders, the number of project investors, and the length of project text descriptions. Compared to the information of the project itself, metainformational cues appear clearer and simpler, which is very important for inexperienced investors to reduce their uncertainty about the project and help them make better decisions. Furthermore, we used ELM to classify the metainformational cues and explore their relationship with the success of crowdfunding. Overall, the six metainformational cues studied have a

positive impact on the success of crowdfunding. Next, we discuss several issues we have discovered in empirical research.

Overall, the three metainformational cues of the central route, namely the number of updates ($\beta=0.540$, $p<0.001$, Cohen's $d=0.82$), founder's experience ($\beta=0.474$, $p<0.001$, Cohen's $d=0.71$), and the use of media ($\beta=0.427$, $p<0.01$, Cohen's $d=0.53$), are positively correlated with crowdfunding success, which is consistent with the mainstream research on the driving factors of crowdfunding success (Liu et al., 2023). Our findings align with prior studies on the importance of transparency (Mejia et al., 2019) and founder credibility (Ahlers et al., 2015). For instance, the positive effect of project updates corroborates Block et al. (2018), who emphasized interactivity as a trust-building mechanism. Timely updates on project progress and disclosure of project information to the public can provide investors with a sufficient understanding of the project, thereby increasing their interest and trust in the project (Xu et al., 2014). Transparency and interactivity are very important factors in crowdfunding projects (Mejia et al., 2019) because they can make investors feel that their investments are receiving the attention and respect they deserve. At the same time, it also allows investors to understand better the project's progress and potential risks (Solodoha & Blaywais, 2023). Founder's past successful crowdfunding experience and the use of media in the project are also crucial for the success of crowdfunding projects (Koch & Siering, 2019). The founder's experience can increase investors' confidence in the project, and the use of media is a combination of visual and auditory elements that can visually showcase the project and increase investors' interest and understanding (Courtney et al., 2017).

The three metainformational cues of the peripheral route, namely, the number of investors ($\beta=0.347$, $p<0.001$, Cohen's $d=0.65$), project text length ($\beta=0.340$, $p<0.001$, Cohen's $d=0.48$), and psychological capital language ($\beta=1.052$, $p<0.001$, Cohen's $d=0.89$), are positively correlated with crowdfunding success. First, the larger the number of investors in a crowdfunding project, the more likely it is to attract more investors to invest. This phenomenon is known as herd behavior (Tian et al., 2021), and as the initial number of investors in a crowdfunding project increases, the likelihood of subsequent investors investing also increases. This effect has been confirmed in empirical research (Zhu et al., 2022). The more initial investors there are, the greater the probability of subsequent investors investing. However, the research conclusions regarding the length of project texts differ from those of previous studies. Previous studies have shown an inverted U-shaped relationship between the richness of information content in project descriptions and crowdfunding performance (Moy et al., 2018). Specifically, project descriptions that are too long or too short can have a negative impact on the success of crowdfunding (Moy et al., 2018). This may be because overly long descriptions can lead to knowledge overload, making it difficult for investors to read and understand, thereby reducing the number of investors. A description that is too short may not provide enough detailed information to convince investors to invest. However, our results diverge from Moy et al. (2018). This discrepancy may stem from differing operationalizations. While Moy et al. (2018) focused on readability, our study highlights text length as a perceptual cue reflecting founder effort, suggesting that even lengthy texts may signal commitment to inexperienced investors. The length of the project text for the metainformational cue does not require reading. It is a result of perception. The longer the length, the more it reflects the founder's serious attitude and sufficient preparation. For investors who are unwilling to read specific text content, the longer the perceived text length, the more advantageous it is for them to make investment decisions. Similarly, the role of psychological capital language extends to Anglin et al. (2018) by demonstrating its applicability in a crowdfunding context. This supports the notion that positive language reduces uncertainty (Dorfleitner et al., 2018) yet contrasts with studies emphasizing technical details over emotional appeals (Liu et al., 2023). Such differences underscore the complementary roles of intrinsic and metainformational cues.

THEORETICAL AND PRACTICAL IMPLICATIONS

Our findings have made several contributions to the literature. First, previous research on the driving factors that affect the success of crowdfunding has mainly explored the intrinsic information of

crowdfunding projects (Zribi & Khoufi, 2022) or the interactions between these pieces of information (Courtney et al., 2017) and their impact on crowdfunding outcomes. Our research focuses on the additional information of the project, namely, metainformational cues, which are more intuitive and clearer than the information of the project itself, thus helping investors make decisions in a crowdfunding environment full of uncertainty. In addition, the impact of various metainformational cues on the success of crowdfunding was also studied. The research results show that six cues, namely the number of updates, founder's experience, media usage, number of investors, project text length, and psychological capital language, are positively correlated with crowdfunding success. Overall, our research is based on meeting the needs of investors to reduce uncertainty between crowdfunding projects, seeking multiple metainformational cues, exploring their roles on crowdfunding success, and advancing research on factors that affect crowdfunding success.

Second, this paper examines the roles of various metainformational cues on the success of crowdfunding. We employ natural language processing techniques to gather and analyze these cues. Compared to conventional approaches like questionnaire surveys and laboratory experiments (Holland et al., 2021; Schoofs et al., 2022; Xiao et al., 2018), the methods utilized in our study ensure greater objectivity in analysis. Moreover, these methods appear straightforward, eliminating the need to design experiments, recruit participants, and manage subjective participant data meticulously.

Third, this study combines various metainformational cues that affect the success of crowdfunding with the application of ELM. After identifying six different metainformational cues, we classified them using ELM. We discussed the impact of three metainformational cues from the central route and three metainformational cues from the peripheral route on the success of crowdfunding. Therefore, our study empirically tested the applicability of ELM in the context of crowdfunding and provided a theoretical framework for incorporating other cues that may affect crowdfunding success in future research.

From a practical standpoint, entrepreneurs and potential investors face substantial information challenges concerning the prospects of crowdfunding projects. Our research provides valuable insights for founders, potential investors, and crowdfunding platforms. For founders, providing easy-to-understand information to potential investors is very important. First, it is necessary to update in a timely manner, and updating the text should convey positive emotions to investors to increase their trust in the founder. Second, the richer the project content description, the better, and investors need to perceive the founder's serious attitude and sufficient preparation. In addition, the description of the project should be accompanied by video and image explanations, with the aim of reducing investor uncertainty and ultimately ensuring the investment required to achieve entrepreneurial goals. Investors, especially those who lack experience, no longer need to struggle to read project content descriptions but only need to perceive their text length. One can also observe the number of existing investors in the project, the founder's past successful experience, whether project updates are timely, and whether the founder has confidence, resilience, and hope to overcome difficulties. This will become a way for potential investors to reduce uncertainty. For platform managers, it is necessary to constantly remind founders to provide sufficient, clear, and intuitive information about the project to maintain the objectivity and fairness of the platform, thereby attracting more customers to use the platform.

LIMITATIONS AND FUTURE RESEARCH

Our study has several limitations that provide avenues for future research.

Sample limitations

Platform and cultural specificity – data from Kickstarter (primarily US/Europe) may not generalize to equity-based platforms (e.g., SeedInvest) or collectivist cultures (e.g., Asia), where social norms differ (Colombo et al., 2015). Future studies could compare reward-based vs. equity crowdfunding or incorporate cross-cultural samples. In addition, the cross-sectional design precludes causal claims.

Longitudinal tracking of projects (e.g., pre/post-funding updates) could reveal dynamic interactions between cues (Block et al., 2018).

Measurement constraints

In this study, LIWC's lexicon may overlook context-specific nuances (e.g., sarcasm). Future work could integrate transformer-based models (e.g., BERT) for deeper semantic analysis (Chen et al., 2023). We measured experience via past Kickstarter successes, ignoring external entrepreneurial history. A hybrid metric (e.g., LinkedIn profiles) may improve validity (Hsu, 2007).

Theoretical extensions

We examined cues in isolation, but interactions (e.g., media \times text length) may yield non-linear effects. Machine learning methods (e.g., random forests) could identify synergistic patterns. Additionally, ELM assumes static route dominance, yet investors may switch routes dynamically. Eye-tracking experiments could map real-time cognitive processing (Tam & Ho, 2005).

CONCLUSION

This study advances crowdfunding research by combining metainformational cues with the ELM framework. The main findings confirm that both central route cues (updates, founder experience, media) and peripheral cues (number of investors, text length, psychological language) can significantly improve success rates. In terms of theory, we extend ELM to crowdfunding, dividing cues into central and peripheral routes and providing a structured framework for future research. Second, we use metainformational cues as uncertainty-reducing factors. Unlike previous work on project-specific information, we have demonstrated that supplementary cues (such as text length as perceived effort) can aid in making decisions under uncertainty. In terms of practical contribution, founders can prioritize frequent updates, multimedia integration, and active language. Although some potential investors may not have read it, the lengthy description demonstrates a spirit of dedication. For investors, when technical details are opaque, peripheral cues (such as existing supporters) can be used as heuristic methods. For platform managers, founders are encouraged to provide structured metadata (such as updated templates and media guidelines) to standardize project quality. In future research directions, the interaction between intrinsic project information and metainformational cues can also be explored, and cultural differences in the validity of cues can be investigated. The ELM framework can also be applied to equity crowdfunding or non-profit backgrounds. Through the combination of theory and practice, this study provides actionable insights for stakeholders and opens up new paths for academic exploration.

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