

**SOCIAL INTERACTION AND CROWDFUNDING PROJECT SUCCESS:  
MODERATING ROLES OF PRODUCT DEVELOPMENT STAGE AND PRODUCT  
INNOVATIVENESS**

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## ABSTRACT

In recent years, crowdfunding has gained a lot of popularity as it helps to leverage the power of the crowd in the development and commercialization of new products. Thus, scholars are encouraged to explore factors that could enhance the success of these crowdfunding projects. Our study investigates the impact of social interaction (i.e., proactively updating the potential funders and seeking their feedback) on the success of the crowdfunding project among technology ventures. Moreover, we examine the moderating role of the product characteristics, i.e., product development stage and product innovativeness, on the relationship between social interaction and crowdfunding success. To test our hypotheses, we conducted two studies. For the first study, we collected and analyzed data from 203 Kickstarter projects from the mobile apps technology category. For the second study, we designed two short experiments with four hypothetical mobile apps technology projects each and collected data from 132 crowdfunders about their likelihood of supporting the projects. Both studies clearly highlight that social interaction has a significant positive impact on project success in terms of receiving funding and feedback among technological ventures. Our studies also suggest that products in the ideation stage benefit more from social interaction than products in the commercialization stage. Moreover, in contrast to our assumption, our findings indicate that the positive relationship between social interaction and project success is stronger for products with incremental innovativeness than radical innovativeness. Our study adds to the existing literature in crowdfunding by highlighting ways by which entrepreneurs can improve the success of their crowdfunding projects.

**Keywords:** Social Interaction, Crowdfunding, Product Development Stage, Product Innovativeness

## I. INTRODUCTION

Crowdfunding is defined as a process of collecting monetary contributions, suggestions, and feedback from a large group of people (crowd) on a project [1]. Crowdfunding is especially beneficial for technology start-ups as it provides them a low-risk opportunity to raise capital and seek feedback from lead users and potential customers [2-5]. In recent years, reward-based crowdfunding has gained significant popularity as an alternative funding source for technological innovations and entrepreneurs starting new technology ventures [6, 7]. In reward-based crowdfunding (hereafter referred simply as “crowdfunding”), the entrepreneurs gain access to the seed funds, customer feedback, and word-of-mouth publicity, while the crowdfunders receive a product, service, or a symbolic gift in exchange for their contributions [1, 5, 8-11]. Crowdfunding projects also help technology entrepreneurs to achieve legitimacy, identify early adopters, learn about the markets, develop product ambassadors, and generate word-of-mouth advertising for their technological innovations [4, 12-14]. Due to the importance of crowdfunding, many studies have emphasized on identifying factors that enhance the likelihood of success for crowdfunding projects [4, 15].

Prior studies highlight that information asymmetry between entrepreneurs and crowd could hinder crowdfunding success and suggested entrepreneurs to reduce the information asymmetry [16]. One way to reduce information asymmetry is by engaging in social interaction [16, 17]. Social interaction describes the communication between the entrepreneur and the crowd on the crowdfunding platform via updates and comments [17]. Some scholars advocate that social interaction could help entrepreneurs provide the information required by the potential funders, answer questions, and resolve concerns, increasing the likelihood of crowdfunding success [13, 17, 18]. In contrast, other scholars caution about the negative implications of social interaction as it may encourage disclosure of proprietary information, opposing arguments, misinformation, and negative publicity [19]. Technology ventures have

to safeguard their proprietary information, yet they are complex and require entrepreneurs to explain the product, its features, and its applications to potential funders [20]. Hence, it is essential to understand the impact of social interaction on crowdfunding success among technology ventures.

Moreover, the impact of social interaction on crowdfunding success could be contingent on contextual factors. Identifying moderators of this relationship would help understand the boundary conditions in which social interaction is more or less beneficial for technology start-ups in the reward-based crowdfunding platforms. However, none of the earlier studies have explored the factors that moderate this relationship. Technology entrepreneurs could seek crowdfunding for products with different levels of innovativeness (i.e., incremental (low) or radical (high)) or at different stages of development (i.e., ideation or commercialization). Different stages of development and different levels of product innovativeness have different contextual characteristics and require different resources as well as capabilities to succeed [7, 21]. Hence, the impact of social interaction might be contingent on the stages of product development as well as product innovativeness of the crowdfunding projects in the technology category. Therefore, it is essential to explore if the impact of social interactions on crowdfunding success varies across different product development stages and product innovativeness so that entrepreneurs can make informed decisions about investing resources on crowdfunding platforms.

Our study addresses the gaps in the literature mentioned above and explores the relationship between social interaction and crowdfunding success for technology ventures. Moreover, we examine the moderating roles of the product development stage and product innovativeness on the social interaction – crowdfunding success relationship to empirically highlight the boundary conditions of this relationship. To test our hypotheses, we conducted two studies. First, we tested our hypotheses by analyzing field data from 203 mobile app

technology projects on the Kickstarter platform. To establish the reliability and validity of our findings, we conducted a second experimental study where we designed two short experiments with four hypothetical mobile app technology projects each and collected data from 132 crowdfunders about their likelihood of supporting the technology projects.

The findings contribute to both theory and practice in multiple ways. First, results from both studies indicate a significant positive impact of the social interaction on crowdfunding project success among mobile app technology projects. Our findings add to the extant crowdfunding literature exploring factors that could enhance the success of the technology-based crowdfunding projects, which currently have the lowest success rate among all categories [22]. Second, our results showed a significant moderating effect of product development stage and product innovativeness on the social interaction – crowdfunding success relationship. Thus, this research contributes further to theory and practice by identifying two essential contextual factors that could influence the effectiveness of social interaction as a crowdfunding signal or informational cue on a crowdfunding platform. Finally, we contribute back to the literature on the product development stage and product innovativeness by highlighting their importance in a new and upcoming crowdfunding phenomenon. Additionally, our findings also inform technology entrepreneurs about the importance of social interaction during the crowdfunding project and encourage them to make an informed choice about investing time and other resources in social interaction.

## **II. THEORETICAL BACKGROUND**

### *A. Crowdfunding for Technology Ventures*

Crowdfunding draws its origin from the broader concept of crowdsourcing [23]. It helps entrepreneurs and project teams to leverage the power of the crowd to gain access to funds, lead users, new ideas, and feedback to improve their venture [1, 23]. Most technology start-ups

operate in an uncertain and hyper-competitive environment [24, 25]. In such markets, entrepreneurs find it difficult and costly to access funding for new projects via traditional means [2]. The popularity of online reward-based crowdfunding platforms and the involvement of many tech-savvy individual investors have provided new funding avenues and helped entrepreneurs access appropriate lead users and potential customers [26]. In her empirical research, Da Cruz [10] found that even failed crowdfunding projects learn and gain significantly during this process. The successful reward-based crowdfunding projects not only help the entrepreneurs in obtaining feedback and funds from the crowd but also increases their legitimacy, improving their future likelihood to access funding from traditional funding sources such as angel investors or venture capital [27].

Prior studies have proposed four different crowdfunding models – donation-based, reward-based, lending-based, and equity-based models, centered on what crowdfunder receives based on their contributions [1, 7, 12]. In the donation-based model, the crowdfunder does not seek nor receives any additional benefits but solely contributes out of their sense of charity or help to others [1, 12]. In the reward-based model, crowdfunder receives a product, service, or a symbolic gift in exchange for the funds they pledge [1, 6, 7, 9]. The lending-model allows the entrepreneurs to borrow a small loan from the crowd at an interest rate [7, 12]. Finally, the equity-based model provides the crowdfunders equity or share of the venture in exchange for their financial contributions [1, 7]. In this study, we focus on reward-based crowdfunding due to its popularity and significant growth in recent years [8, 9, 28]. Moreover, compared to other crowdfunding models, the reward-based model provides a unique context for technology start-ups where the potential customers fund the ventures, and their feedback is valuable, both as funders and customers [2, 29].

Kickstarter is one of the most popular reward-based online crowdfunding platforms and includes projects from multiple categories and sub-categories [1, 4, 27]. As compared to other

categories (theater, film, art, music, food, fashion, and others), technology entrepreneurs have to explain their technological innovations, their complex application, and provide a concrete reward (product or service) to their potential customers and crowdfunders [4, 30]. Data from the Kickstarter platform suggests that technology projects are one of the most popular crowdfunding categories with more than 44,000 campaigns (projects) launched and raising more than the US \$989 million as of September 2020, which accounts for 19% of the total funds raised on the platform [22]. However, the success rate of these technology projects is much less (about 20%) as compared to any other category [22]. This indicates that though some projects manage to raise large capital, most of the projects in this category fail. Hence, it is crucial to identify factors that could increase the likelihood of success for technology-based crowdfunding projects.

#### *B. Factors Influencing Crowdfunding Success*

Information asymmetry is at the core of crowdfunding as entrepreneurs have greater knowledge about their projects than potential funders [16, 17]. Therefore, information shared between the entrepreneurs and the crowd is crucial for seeking investments from the crowd. On the one hand, entrepreneurs would like to provide as much information as required by the potential funders to attract them to contribute to their project [16, 17]. On the other hand, sharing sensitive and proprietary information might limit the pioneering advantage, uniqueness, and future profits of the project [19]. Moreover, too much information might negatively influence the funder's decision to support. Hence, scholarship continues to encourage further empirical research to explore the impact of different informational cues and mechanisms (signals) on crowdfunding success [16].

Kuppuswamy and Bayus [31] suggested that three forms of information are critical in crowdfunding – information about the project, information about the entrepreneur and team, and finally, information exchange between the entrepreneurs and the crowd. Focusing on

informational cues about the project, scholars have found reward structure [12, 32], project quality [33], project graphics (quality of the video, audio, and text) [13, 32, 34, 35], linguistic and framing [36, 37], sustainability orientation [30], and project mission and objectives [30, 38] influence the success of the crowdfunding project. Ample studies have also highlighted the importance of showcasing information about the entrepreneur and team characteristics, such as gender [39, 40], race [31, 32], facial trustworthiness [41], social network, social ties, and social capital [4, 18, 32, 42, 43], and prior crowdfunding experience [44] on crowdfunding project performance. Furthermore, some scholars have also highlighted crowd dynamics, such as funding by other friends or family members [45], other peer crowd funders [32, 45], and the percentage of target achieved [46] also significantly influence the success of a crowdfunding project.

In recent years, some scholars have started exploring the impact of social interaction on crowdfunding success [7, 13, 17, 18, 32, 47]. Social interaction between the entrepreneurs and the crowd could reduce uncertainty and enhance the likelihood of crowdfunding success [17, 48]. Entrepreneurs could engage in social interaction with their potential crowdfunders via crowdfunding platforms and other social media accounts, such as Facebook, Telegram, Whatsapp, and Instagram [1, 4, 15]. In this study, we focus on the social interaction over the crowdfunding platform only as it highlights the resources (time, effort, money) invested by entrepreneurs on the crowdfunding project, signaling the seriousness of entrepreneurs towards this specific crowdfunding project rather than their social capital.

Social interaction over the crowdfunding platform has two components – updates and comments. Updates serve as a one-sided communication tool that helps the entrepreneurs share the important activities, changes, and progress of the project [47]. In contrast, comments are a multi-sided communication tool that allows information and communication to flow from the entrepreneur to crowd, the crowd to entrepreneur, and crowd to crowd [49]. Although both



updates and comments have specific uses, the entrepreneurs may use them interchangeably in different situations. For example, the entrepreneur may choose to respond to a generic crowd comment or discussion point by sharing an update or might provide the project's progress as a response to a common crowd comment. Hence, both updates and comments together indicate the social interaction in the crowdfunding project.

The proponents of social interaction suggest that it allows the entrepreneurs to engage with their potential customers to answer their questions, clarify their doubts, exchange ideas, seek feedback, and gain legitimacy [32, 47]. In contrast, other scholars are skeptical about the benefits of social interaction as they might lead to sharing proprietary or sensitive information, spreading misinformation and negative comments increasing negative crowd sentiment, which might hinder crowdfunding success [19]. Prior research examining the impact of comments and updates independently on crowdfunding success is found to be inconsistent. Some scholars did not find any significant impact of updates and comments on crowdfunding success [7], while other studies found that they positively drive crowdfunding success [13, 18, 32, 47]. Many earlier studies used updates and comments independently [e.g., 7, 13, 18, 32, 47], which might lead to inconsistent results, while entrepreneurs use them as complementary features. Although prior studies highlighting the independent impact of updates and comments provide us valuable insights about their individual impact, studies should also explore their combined impact as social interaction to study their effect on crowdfunding success. Another reason for the inconsistency might be due to the different effects of social interaction on different project categories. Some categories of crowdfunding projects might leverage the benefits of social interaction, while social interaction might hinder the success of projects from for other categories.

Technological innovation and technology-ventures are relatively more complex and require more effort from entrepreneurs to explain the product, its features, and its applications

compared to ventures from other categories [20]. Moreover, competition among technology ventures is high, and the success rate is low [22]. Hence, the benefits (i.e., funding, lead users, legitimacy), as well as the limitations (i.e., exposure of sensitive information, negative publicity) of social interaction, might be higher among technology-based projects than projects from other categories. Therefore, it is important to explore the impact of social interaction on crowdfunding success among technology projects. In the next section, we discuss the importance of social interaction and its influence on the crowdfunding project among technology ventures and identify various moderating factors that influence this relationship.

### III. HYPOTHESIS DEVELOPMENT

#### *A. Social Interaction and Crowdfunding Success*

Social interaction might provide multiple benefits as well as challenges for a technology venture. Frequent updates provide a signal to the crowd about continuous improvement and progress, which might lead to enhancing crowd's confidence in the project. Updates also signal the potential funders and lead users about the passion and seriousness of the entrepreneur and the project team, which can increase the confidence of potential users and funders on the venture, which is likely to increase crowdfunding project success. Over time, social interaction via frequent updates and comments enhances the individual funder's trust and generates credibility as well as the legitimacy of the team, enhancing the chances of project success [4, 47]. Comments allow potential funders to ask specific questions and provide vital feedback. Responses to crowd comments reduce information asymmetry and help the funders decide if they want to support the project. This is specifically important for technology ventures due to the complex and competitive nature of technological innovations [20, 27]. Additionally, a thoughtful and polite response also creates a sense of contribution for the individual who provided the comment, increasing their affinity towards the project. In many cases, comments

and questions from the crowd generate a discussion that brings the project to the attention of other funders.

Although social interaction has significant benefits, technology ventures have to be careful about disclosing sensitive information, limiting their future growth and success [19]. Potential competitors might use social interaction to spread misinformation or negative comments, undermining the legitimacy of the targeted technology venture. In many cases, too much information and technical details might also alienate the crowd and negatively influence the funder's decision to support it. However, carefully managed social interaction could help technology ventures minimize these limitations and even lead to learning and improving their product significantly using critical and negative comments. Therefore, taking a positive view, we hypothesize that social interaction would positively influence the likelihood of success for a crowdfunding project.

*Hypothesis 1: Social interaction positively influences crowdfunding project success*

[Insert Figure 1 about here]

### *B. Moderating Role of Product Development Stage*

Prior studies have highlighted various stages of product development in technology ventures. The early stage is generally known as the ideation and conceptual development stage, while advanced stages include production and commercialization stages [50]. Entrepreneurs could seek crowdfunding benefits during both ideation and commercialization stages. The ideation (early) and commercialization (advanced) stages of projects have different objectives and require different resources and capabilities to succeed [21]. The ideation or concept development stage involves the development and assessment of new ideas [21, 51]. Entrepreneurs are more flexible and receptive to new ideas in this stage [52]. In the ideation stage, projects try to acquire suggestions and feedback on the new idea or product offering and improve it further. In addition, funds received through crowdfunding during this stage help in

developing product prototype and proof of concept. In contrast, projects in commercialization stages have already finalized their existing prototype and could only make relatively small adjustments to their product. The commercialization stage typically involves activities such as market launch, product training, after-sales support, and monitoring of competitors' reactions [53]. As the product moves from the early stages of ideation to advanced stages of commercialization, making changes in the product becomes costlier [54]. Hence, entrepreneurs operating in the advanced stage use the crowdfunding campaign to gain access to lead users and encourage word of mouth along with accessing funds for commercialization rather than improving the product further.

Social interaction enhances the likelihood of crowdfunding project success by gaining suggestions and feedback to improve the product [31]. As the projects in ideation stages emphasize on refining their ideas using recommendations from potential users and customers [51], they are more likely to benefit from such kind of social interaction. In contrast, as the projects in commercialization stages have a relatively stable product, they find it costlier to incorporate additional suggestions to change the existing product [54]. Moreover, the ideation stage generally has higher uncertainty and limited financial forecast than the commercialization stage [50]. Hence, the funders at this stage are more likely to focus on non-financial motivation, such as helping a passionate entrepreneur or team. The trust, legitimacy, and confidence due to social interaction [55, 56] would more significantly benefit the projects at this stage than the projects in commercialization stages, which draw trust and legitimacy from their prototype and proof of concept. Hence, we hypothesize that the positive relationship between social interaction and project success would be stronger for projects in the ideation stage than those in the commercialization stage.

*Hypothesis 2: Product development stage moderates the relationship between social interaction and crowdfunding project success such that the positive relationship between social interaction and crowdfunding project success would be stronger for projects in the ideation stage than the commercialization stage.*

### *C. Moderating Role of Product Innovativeness*

Product innovativeness is the level of innovation in a product [57]. Prior innovation literature suggests that both low (incremental) and high (radical) innovativeness have benefits and attracts different types of technology investors [7]. Moreover, characteristics of incremental and radical innovativeness are different that require technology entrepreneurs to adopt different strategies and techniques for their success [7]. Incremental innovativeness represents minor novelty introduced in the product that drives the cumulative improvement of the product [58, 59]. They are less drastic, more familiar, easier to understand, and provides gradual enhancement over existing knowledge, technology, and capabilities [59]. In contrast, radical innovativeness highlights a major introduction of novelty into an existing product, leading to changing the existing product drastically. They are often unique and have the potential to fundamentally alter existing products, technology, and capabilities [60, 61]. Hence, incremental innovativeness is more familiar, easy to understand and relate, while radical innovativeness is complex, uncertain, and difficult to comprehend [7, 61, 62].

Social interaction helps the entrepreneur to further explain their product and project to the potential funders [17]. Moreover, updates and comments help to clarify any concerns and confusions that the potential funders have about the project. Radical innovativeness is more complex and difficult to understand than incremental innovativeness, which is relatively simple, familiar, and easy to understand. Therefore, social interaction would be more helpful for a product with radical innovativeness than incremental innovativeness as it requires more explaining and presentation of further details [7, 63]. In contrast, incremental innovativeness requires less clarification as they are easy to understand, limiting the benefits of social interaction. Additionally, challenging and breakthrough products with radical innovativeness also spark more discussion among the crowd, helping spread awareness and receive essential feedback. However, social interaction would have less influence on projects with incremental

product innovativeness as they are simpler and more familiar. Hence, in comparison to radical innovativeness, incremental innovativeness might not generate as much curiosity and crowd attention. Therefore, we hypothesize that the positive relationship between social interaction and project success would be stronger for products with radical innovativeness than incremental innovativeness.

*Hypothesis 3: Product innovativeness moderates the relationship between social interaction and crowdfunding project success such that the positive relationship between social interaction and crowdfunding project success would be stronger for products with radical innovativeness than with incremental innovativeness.*

#### **IV. METHODOLOGY**

To test our hypotheses, we conducted two independent studies. Prior studies have highlighted that multiple method studies have many advantages over single method studies [64-70]. Each method has certain inherent biases and limitations, and using two methods complements each other and reduces these biases and limitations [64, 65]. Moreover, business decisions and phenomena, such as investing and crowdfunding, are multifaceted and no single research method can fully capture the phenomena [65, 71]. Hence, using two methods allowed us to strengthen the understanding of the phenomena as compared to the use of single method. Many scholars have also advocated the use of multiple methods over single method as they produce robust findings by triangulating the evidence and are much more persuasive than findings from single method [72]. Therefore, the degree of confidence and robustness in the findings are stronger for studies using more than one method [66-69]. In our study, we use field data in study 1 that enhances external validity and experimental data in study 2 that strengthens internal validity [65]. Thus, using two methods, increases the reliability and validity of our findings. Additionally, experimental study design complements the field study by investigating the phenomena in controlled environment, ruling out alternate explanation and effectively clarifying the boundary conditions [65, 73].

Both our studies explore the impact of social interaction on crowdfunding success among mobile app technology projects. Moreover, the two studies examine the moderating roles of the product development stage and product innovativeness on the relationship between social interaction and crowdfunding success. We employed different measures of dependent, independent, and moderating variables as well as different data collection methods in the two studies. This allowed us to explore the same relationships while enhancing the reliability and validity of our research findings [69, 74, 75]. Details of the studies are provided below.

Mobile app technology crowdfunding projects offer an adequate context to test our hypotheses for multiple reasons. First, mobile apps are a digital technology product, and it is difficult to physically show the product and communicate its benefits to the potential crowdfunders than physical gadgets and other hardware products. Hence, the importance of social interaction is much more for the mobile app sub-category than other technology sub-categories. Second, the mobile app sub-category is the most popular sub-category within the technology category, with more than twice the number of projects than any other popular sub-category such as hardware, gadgets, and wearables on the Kickstarter website. However, mobile apps crowdfunding projects operate in a highly competitive environment and have a much higher failure rate than other sub-categories [76, 77]. Therefore, it is important to identify factors that could enhance the success rate of mobile app crowdfunding projects. Finally, the crowdfunding platform not only provides mobile app projects funding opportunities but also offers them access to lead users, beta testers, and future customers, which are very important for new mobile apps they use the subscription model as compared to other technology products looking for a one-time sale.

#### *A. Study 1 – Sample and Procedure*

For the first study, we collected data on all mobile app projects launched between June 2015 to December 2017 on the Kickstarter platform. We removed projects that were incorrect or

incomplete (e.g., false or fictitious names, deleted campaigns). We also excluded campaigns without videos as entrepreneurial video pitches play an essential role in determining funding outcomes [78]. Finally, we also removed any projects with a target project goal amount of less than 1000 USD to remove very small projects. These procedures resulted in our final sample of 203 projects.

Kickstarter platform is one of the most popular reward-based crowdfunding platforms [4], which has more than 18.64 million crowdfunders who have pledged more than USD 5.3 billion and successfully funded more than 1.89 million projects till September 2020 [22]. Moreover, many Kickstarter projects have used the funds and feedback from their projects and have evolved into successful ventures [4]. Several earlier studies have used this platform to explore the crowdfunding phenomenon [4, 12, 46]. Therefore, we used mobile app projects from the Kickstarter platform in our analysis.

Data were collected using two sources for this study. First, objective data, such as the number of funders, status of the project, and country of origin of the project, were directly mined from the Kickstarter website. For other information that was either subjective or could not be mined directly, two independent researchers (raters) were hired to go through the project website and hand-collect the data on other variables. Both raters have invested in the crowdfunding project and had good knowledge of mobile apps and the Kickstarter platform. During the initial stages of the project, one of the authors, along with the two raters, systematically developed a coding approach by coding the projects together. Then each rater followed the pre-defined coding process to collect data on each of the 203 crowdfunding projects. Finally, the data from the two raters were matched, and we found high inter-rater reliability ( $ICC = 0.82, p < 0.001$ ), indicating the reliability of measures collected by the raters. Any differences between the raters were resolved by the third rater (i.e., the author involved in developing the coding). For example, if one rater coded the product innovativeness as



incremental and the second rater coded it as radical, a third coder would code the project again to break the tie.

### *B. Study 1 – Measures*

1) *Dependent variable*: Crowdfunding project success was the dependent variable in this study. We measure project success using two measures – funding success and number of pledged funders. First, funding success was captured using a dummy variable, which was coded as one if the target amount was reached, and the project would receive the funds. It was coded as zero if the funding target was not met, and the project would not receive any funds. The second dependent variable, the number of pledged funders, provides a proxy for support and feedback received by the project. Both dependent variables were collected from Kickstarter and used by earlier studies to measure crowdfunding project success [4].

2) *Independent variable*: Social interaction is our independent variable. To measure social interaction, we added the number of updates and comments for that particular Kickstarter project. These values were collected directly from the Kickstarter platform. Prior scholars have also used updates and comments to measure social interaction [7, 17].

3) *Moderating variables*: We include two moderating variables - product development stage and product innovativeness. The product development stage was captured using a dummy variable, with one representing the commercialization stage and zero representing the ideation stage. Product innovativeness was also captured using a dummy variable. Incremental (low) innovativeness was coded as zero, while radical (high) innovativeness was coded as one. After going through each Kickstarter project in detail, independent raters coded these variables. A similar process is used by many earlier studies to capture data from crowdfunding projects [15, 79].

4) *Control variables*: Prior studies have highlighted that the duration of the project and project goal as an important predictor of crowdfunding project success [79]. Hence, we

included them as control variables in our models. The duration of the crowdfunding project indicates the number of days that the project is open for funding and is calculated by using the start-date and end-date of the project. The project goal highlights the entrepreneur's target goal for the crowdfunding project and is taken from Kickstarter in US dollars. We controlled for the industry, category and sub-category effect by selecting our sample from the mobile app sub-category. We also controlled the effect of country of origin using dummy variables. Investors generally like to support a project with a good team than a project run by a single entrepreneur [80]. Hence, we controlled the project team using a dummy variable where a project with an individual entrepreneur is coded as zero, and one if it is a team of individuals. Extant studies also highlight the importance of gender in crowdfunding research [81]. Hence, we include gender as a control using three dummy variables for male, female, and no gender indication. We also controlled for visual graphics of the project by controlling for length of the video in minutes, quality of audio, and the quality of video in the project. The quality of video and audio was rated by the two raters on a scale of 0 to 100.

[Insert Table 1 about here]

### *C. Study 1 - Analysis and Results*

Means, standard deviations, and correlations for all main variables used in the study are given in Table 1. In our sample, 38.9% of the campaign was run individually by males, females ran 15.3 %, and 8.4% of founders were a mixed-gender team, and 37.4% did not disclose their gender. Most of the projects in our sample originated from the USA (about 77%), followed by UK (9%), Australia (6%), Canada (4%), and Netherlands (3%). There was an even split between projects in ideation and commercialization stages in our sample. While 59% of the sample had incremental innovativeness, and 41% were classified to have radical innovativeness. In our sample, about 30% of mobile app projects were unable to receive their funding successfully, and on average, each Kickstarter project attracted 213 funders. None of

the independent variables had a very high correlation coefficient (more than 0.7), indicating no severe multicollinearity effects. Moreover, the maximum value of the variance inflation factor (VIF) was well below the acceptance limit of 10, highlighting no issue due to multicollinearity [69].

[Insert Table 2 and Table 3 about here]

As funding success is a binary dependent variable, and the number of funders is a continuous dependent variable, we used hierarchical logistic regression and hierarchical linear regression, respectively, to test our hypothesis. Our model fit statistics for all the models in Table 2 and Table 3 indicated that our models fit the data well. For example, The Hosmer and Lemeshow test statistics for each of the model in hierarchical logistic regression (Table 2) was not found to be significant [82]. Similarly, F-statistics for all models in hierarchical linear regression (Table 3) were significant.

Model 1 to Model 4 used funding success, and Model 5 to Model 8 used the number of funders as their dependent variables, respectively. Model 1 and Model 5 include all control variables, independent variable, and moderators. Then, we added the moderation term between social interaction and product development stage in the Model 2 and Model 6, further building on Model 1 and Model 5. Similarly, we added the moderation term between social interaction and product innovativeness in Model 3 and Model 7. Model 4 and Model 8 include all direct and interaction effects using funding success and the number of funders as the dependent variable, respectively, hence presenting our full model. Therefore, we discuss our results using Model 4 and Model 8.

Results from Model 4 (given in Table 2), indicate that project duration ( $\beta = 0.08$ ,  $p < 0.05$ ) had a positive and project goal ( $\beta = -0.21$ ,  $p < 0.01$ ) had a negative influence on funding success. None of the other control variables had any significant impact on funding success. Our findings also indicated that radical product innovativeness ( $\beta = 5.20$ ,  $p < 0.01$ ) positively drives

funding success. Supporting our hypothesis 1, we found social interaction ( $\beta = 6.73, p < 0.05$ ) positively influences funding success. The moderation term between social interaction and product development stage ( $\beta = -5.38, p < 0.1$ ) was found to be negative, indicating that products in the ideation stage leverage social interaction significantly more to gain funding success than products in the commercialization stage. Thus, supporting our hypothesis 2. However, the moderation term between social interaction and product innovativeness ( $\beta = -1.25, p < 0.05$ ) was found to be negative. Therefore, products with incremental innovativeness benefit more from social interaction than radical innovativeness. Thus, hypothesis 3 was not supported.

The results from Model 8 (given in Table 3) found the length of the video ( $\beta = 0.11, p < 0.01$ ) to influence the number of funders positively. None of the other control variables were found to have any significant impact on the number of funders. Both product development stage ( $\beta = 0.09, p < 0.05$ ) and product innovativeness ( $\beta = 0.07, p < 0.1$ ) had significant positive impact on number of funders. Hence, products in the commercialization stage, and products with radical innovativeness attract more funders. Model 8 also highlighted that positive impact of social interaction ( $\beta = 2.83, p < 0.001$ ) on number of funders. Therefore, hypothesis 1 is supported. In line with Model 4, Model 8 also shows that the moderation term between social interaction and product development stage ( $\beta = -1.65, p < 0.01$ ) and the moderation term between social interaction and product innovativeness ( $\beta = -0.39, p < 0.1$ ) are both negative. Therefore, in line with our earlier findings, these results also support our hypothesis 2 and do not support our hypothesis 3.

#### *D. Study 2 - Sample and Procedures*

To validate our findings further, we designed two short experiments that featured four hypothetical crowdfunding projects each. We collected data from crowdfunders about their likelihood of funding and the likelihood of support for all eight projects. The first experiment

asked the crowdfunders to evaluate four hypothetical crowdfunding mobile app projects with differences across social interaction (low vs. high) and product development stages (ideation vs. commercialization). The second experiment asked the crowdfunders to evaluate another four hypothetical crowdfunding mobile app projects with differences across social interaction (low vs. high) and product innovativeness (incremental vs. radical). We included additional unrelated filler tasks to create psychological separation between the two experiments. Additionally, multiple questions were included to check if the responders have knowledge and experience in the crowdfunding and mobile app domain. The detailed instructions and experimental tasks are given in Appendix I and Appendix II.

Data was collected from crowdfunders in the USA using Amazon mTurk – a crowdsourcing marketplace that enables individuals and businesses to outsource tasks to a distributed workforce who can perform these tasks virtually. Many prior studies have used mTurk to collect data on crowdfunding experiments [7, 79]. Initially, we collected data from 228 crowdfunders. However, responses from 96 responders were excluded as their responses were either incomplete or they did not pass the validity criteria indicating limited knowledge and prior experience about crowdfunding platforms and processes. Therefore, our final sample consisted of 528 decisions for each experiment from 132 crowdfunders. The average crowdfunder age in our sample was 37 years. About 46% of our respondents were female. About 22% were high-school graduates, 77% had a bachelor's or master's degrees, and 1% had doctoral degrees. In terms of work experience, 33% of respondents indicated more than 15 years of work experience, 15% indicated between 10 to 15 years, 19% indicated between 6 to 10 years, 27% indicated between 3 to 6 years, and 6% indicated less than three years of work experience.

#### *E. Study 2 – Measures*

1) *Dependent Variables*: We used the likelihood of funding and the likelihood of support as two dependent variables. This is in line with our study 1 as the likelihood of funding captures the funding success, while the likelihood of support includes non-financial support, such as feedback, suggestion, and word-of-mouth advertisements.

2) *Independent variable*: Social interaction is the independent variable. Each hypothetical crowdfunding project in the experiments either had low (coded as 0) or high (coded as 1) level of social interaction.

3) *Moderator*: For our first experiment, the product development stage acts as a moderator with each crowdfunding project had product either in the ideation stage (coded as 0) or commercialization stage (coded as 1). In the second experiment, product innovativeness acts as a moderator. Hence, each project had a product either with incremental (coded as 0) or radical innovativeness (coded as 1).

4) *Control variables*: Experimental design is generally considered robust as it controls for most external factors. However, we controlled for crowdfunder's individual attributes and characteristics using a dummy variable for each respondent. Alternatively, we used funder's age, gender, experience, and education as control variables, instead of dummies and found similar results. As dummy variables allow us to control for all observable and unobservable characteristics of the crowdfunders, we employ this approach in our main analysis.

[Insert Table 4 about here]

#### *F. Study 2 – Analysis and Results*

Table 4 presents means, standard deviations, and correlations of all variables included in study 2. The mean likelihood of support was 53%, and the mean likelihood of funding was 51%. We found a very high correlation ( $r = 0.93$ ,  $p < 0.001$ ) between two dependent variables – the likelihood of support and the likelihood of funding. This indicates that both dependent variables measure the success of the crowdfunding project. However, all correlations between

independent variables were less than 0.5, highlighting no serious issue due to multicollinearity. The VIF for all models in study 2 was also less than the acceptable limit of 10 [83, 84].

[Insert Table 5 and Table 6 about here]

Table 5 presents the results of hierarchical regression analysis for study 2's experiment 1, which aims to test the moderating effect of the product development stage on social interaction and crowdfunding project success. Model 9 and Model 10 feature the likelihood of support as the dependent variable, whereas Model 11 and Model 12 have the likelihood of funding as the dependent variable. Model 9 and Model 11 feature dummy variables for each individual funder along with the social interaction and product development stage. Model 10 and Model 12 feature moderation terms between social interaction and product development stage, in addition to variables included in Model 9 and Model 11, respectively. Both Model 10 and Model 12 highlight that projects with products in the commercialization stage have a greater likelihood of gaining support ( $\beta = 10.55, p < 0.001$ ) and funding ( $\beta = 10.20, p < 0.001$ ). The finding also supports hypothesis 1 as social interaction was found to have a positive impact on the likelihood of support ( $\beta = 36.68, p < 0.001$ ) and the likelihood of funding ( $\beta = 39.70, p < 0.001$ ). We also find support for hypothesis 2, as the moderation term in both Model 10 ( $\beta = -21.35, p < 0.001$ ) and Model 12 ( $\beta = -22.02, p < 0.001$ ) was found to be negative. Hence, the positive effect of social interaction on the likelihood of funding and support is lesser in projects with products in the communication stage than the ideation stage.

Table 6 highlights the results of hierarchical regression analysis for study 2's experiment 2 that aims to test the moderating effect of product innovativeness on social interaction and crowdfunding project success. Similar to experiment 1, Model 13 and Model 14 have the likelihood of support as the dependent variable, whereas Model 15 and Model 16 feature the likelihood of funding as the dependent variable. Model 13 and Model 15 include the dummy variables for each funder along with social interaction and product innovativeness

to test their direct effect. Model 14 and Model 16 feature the moderation term between social interaction and product innovativeness, in addition to all variables featured in Model 13 and Model 15, respectively. As Model 14 and Model 16 are our full models, we use them to discuss our findings of experiment 2. Radical innovativeness was found to have a higher likelihood of gaining support ( $\beta = 14.12, p < 0.001$ ) and funding ( $\beta = 13.12, p < 0.001$ ). Social interaction was also found to have a positive impact on the likelihood of support ( $\beta = 38.45, p < 0.001$ ) and the likelihood of funding ( $\beta = 39.52, p < 0.001$ ). Thus, we find support for hypothesis 1. We find a negative coefficient in moderation terms in both Model 14 ( $\beta = -10.39, p < 0.001$ ) and Model 16 ( $\beta = -9.33, p < 0.001$ ). This indicates that the positive effect of social interaction on the likelihood of funding and support is greater in products with incremental innovativeness than radical innovativeness. Thus, we do not find support for hypothesis 3. Table 8 presents the results of ANOVA for experiment 2, and Figure 4, and Figure 5 graphically show the ANOVA results for experiment 2. The results were consistent with the above findings from the regression analysis.

Finally, we performed an ANOVA test to establish the robustness of our findings. Table 7 presents the results of ANOVA for experiment 1, and Figure 2 and Figure 3 graphically show the ANOVA results. Table 8 presents the results of ANOVA for experiment 2, and Figure 4, and Figure 5 graphically show the ANOVA results for experiment 2. The results were consistent with the above findings from the regression analysis.

[Insert Table 7 and Table 8 about here]

[Insert Figure 2, Figure 3, Figure 4, and Figure 5 about here]

### *G. Post-hoc Analyses for Study 1 and Study 2*

Our main research objective was to explore the impact of product characteristics, such as product innovativeness and product development stage, on the relationship between social interaction and crowdfunding success. We conducted post-hoc analyses to test if project



(campaign) characteristics, entrepreneur's characteristics, and crowdfunder characteristics influence the relationship between social interaction and crowdfunding success. Analyses on Study 1 data highlighted that project duration positively moderates the relationship between social interaction and the number of backers. Hence, longer project duration helps technology entrepreneurs to leverage the benefits of social interaction and increase the number of backers. Our findings also indicated that projects with women entrepreneurs are likely to gain more backers by engaging in social interactions than their male counterparts. Additionally, individual led-projects gained more backers by engaging in social interaction than team-led projects. However, none of these factors influence or significantly moderate the relationship between social interaction and crowdfunding success. Analyses on Study 2 highlighted that funder's age positively moderates the relationship between social interaction and the likelihood of funding and support. Crowdfunder's gender, education, and work experience did not significantly moderate the relationship between social interaction and crowdfunding success.

## **V. DISCUSSIONS AND CONCLUSIONS**

Recent years have seen exponential growth in online crowdfunding platforms and projects [85, 86]. Crowdfunding not only helps the technology entrepreneurs in accessing funds but also helps them in testing their products among lead users and potential customers [4, 27, 81]. Hence, it is important to explore factors that drive the success of crowdfunding projects. Our research contributes to this stream of literature [e.g., 4, 7, 17, 46, 87] by investigating the impact of social interaction on the success of crowdfunding projects among mobile app technology projects. We also explore the moderating effects of the product development stage and product innovativeness on the effectiveness of social interaction. Although our findings clearly indicate that social interaction enhances the likelihood of success for all mobile app technology crowdfunding projects, the benefits of social interaction vary across different contexts. Our

findings suggest that products in the ideation stage are more likely to benefit from social interaction than in the commercialization stage. However, in contrast to our assumption, findings from both studies suggested that the positive benefits of social interactions are higher for products with incremental innovativeness than radical innovativeness. Our research adds to extant literature and practice in multiple ways.

#### *A. Research Implications*

Our research work contributes to multiple research streams. First, our findings contribute to the growing literature on crowdfunding, specifically focusing on factors that could enhance the success of the crowdfunding projects. Prior studies have highlighted the importance of signaling and indicated the specific informational cues could increase funder's support for the crowdfunding project [31]. Drawing on signaling theory, ample studies have explored the effect of informational cues about the project [see 12, 15, 30, 32, 34, 36], and project team [see 15, 39, 40, 44, 87], on the success of the crowdfunding project. Our study adds to this stream of literature by suggesting the importance of social interaction on the technology crowdfunding project. Prior studies on exploring the impact of updates and comments individually on a sample of projects from multiple categories found inconclusive results [e.g., 7, 13, 18]. We add to this literature and suggest using social interaction as an aggregate measure of updates and comments rather than independent dimensions. We also contend that social interaction could be more beneficial for complex projects with a specific reward (product or service). Hence, the impact of social interaction on crowdfunding success may vary across different categories. Although we acknowledge that the technology ventures have to be careful while sharing information and managing social interactions [19], our findings support prior studies advocating the benefits of social interaction among technology ventures [32, 47].

Second, our study adds to existing crowdfunding literature by highlighting the importance of the product development stage and product innovativeness on the effectiveness of

informational cues and signals in crowdfunding projects. Earlier studies highlighted that product innovativeness (incremental and radical), and product development stage (ideation and commercialization) require technology entrepreneurs to adopt different strategies and techniques to succeed [7, 21]. Drawing on these earlier findings, our study indicates that the product development stage and product innovativeness moderate the relationship between social interaction and crowdfunding project success among technology ventures. The product development stage and product innovativeness are likely to influence the usefulness of other signals and informational cues among technology ventures. Therefore, we encourage future studies to explore the moderating effects of the product development stage and product innovativeness to examine the effectiveness of other signals and informational cues in different contexts.

In line with our expectation, our findings indicated that the positive relationship between social interaction and the success of the crowdfunding project is stronger for products in the ideation stage than commercialization. However, in contrast to our expectation, products with incremental innovativeness benefitted more from social interaction than radical innovativeness. There could be two explanations for this finding. First, radical innovativeness is associated with high levels of uncertainty, and hence social interaction might only indicate curiosity rather than the actual interest of to fund or support. Second, incremental innovativeness is relatively simple and easy to understand rather than radical innovativeness. Hence, even moderate levels of social interaction might encourage commitment from funders for projects with incremental innovativeness. However, radical innovativeness requires a lot more explanation and convincing to attract funders.

Apart from adding to crowdfunding literature, we also contributed back to the literature on the product development stage and product innovativeness by highlighting their importance in the crowdfunding context. The product development stage and product innovativeness are

concepts drawn from a broader field of management, innovation, and entrepreneurship [7, 26, 54]. Prior studies have also highlighted their importance as contextual factors that influence the effectiveness of strategy and actions [88, 89]. However, their importance in the crowdfunding context has received limited attention. Our research is among those few studies that are extending our understanding of these concepts in the crowdfunding context.

### *B. Managerial Implications*

Apart from theoretical contributions, our research offers important insights and implications for both technology entrepreneurs and crowdfunders. First, our research informs entrepreneurs about the importance of social interaction and encourages them to invest time in communicating with the crowd via comments and updates. Furthermore, entrepreneurs exploring crowdfunding options during the ideation stage and or with incremental product innovation should give specific attention to social interaction to enhance their crowdfunding outcomes. Finally, our study indicates that projects with low social interaction are more likely to fail. Hence, crowdfunders can increase their chances of contributing to successful projects by avoiding projects with low social interaction.

### *C. Limitations and Future Research*

In this research article, our research findings were consistent across two studies that consisted of different samples and tasks with different measures of dependent, independent, and moderating variables. Despite the strengths of our manuscript, the limitations of the two studies should be noted and addressed in future research. Our findings are limited by the choice of our context, i.e., mobile app technology projects on Kickstarter. Future studies could enhance the generalizability of our findings by replicating the study across other sub-categories of technology as well as on other crowdfunding platforms. Although we took adequate care in controlling many possible confounding factors (study 2 - experimental design controls for most confounding factors), it is, however, difficult to eliminate all extraneous effects completely.

Moreover, our study focuses only on social interaction within the crowdfunding platform to capture the resources invested by the entrepreneur on this specific campaign rather than leveraging their external social ties and network. We encourage future studies to examine if external social interaction helps successfully crowdfund technology ventures and identify various boundary conditions of this relationship.

Another limitation of our study 1 (sample of Kickstarter projects) is that only backers can comment on the crowdfunding projects. Kickstarter platform allows everyone to view the comments and updates on a Kickstarter campaign page. However, only backers who have contributed (minimal contribution of about US \$1) can post comments on campaigns. This policy helps to remove the people who are not serious about backing the project as well as saves entrepreneurs' time and effort by focusing on serious backers for crowdfunding. However, future studies could replicate the findings in another crowdfunding platform, which allows potential crowdfunders to submit their comments without backing. Additionally, our research focuses on exploring the short-term impact of social interaction on the crowdfunding projects as we assume that the crowdfunding project is successful if they receive the target funding and backing on the crowdfunding platform. However, the success of the crowdfunding project also depends on the entrepreneur's ability to deliver the necessary product or service to the backers. Moreover, future studies should also investigate if these social interactions during the crowdfunding project have an effect on the success of the venture in the long run, i.e., running a successful venture within few years of successful crowdfunding.

### *Conclusion*

Our research suggests that social interaction via updates and comments enhances the success of technology-based crowdfunding projects. However, products in the ideation stage are likely to benefit more from engaging in social interaction than products in the commercialization stage. Additionally, incremental product innovativeness is also likely to

leverage social interaction more than radical product innovativeness. In conducting this research, we extended the crowdfunding literature by adding social interaction as a factor driving the crowdfunding project success for technology ventures. Our research also identified product development stages and product innovativeness as moderating factors that influence the effectiveness of social interaction strategies in crowdfunding context. We hope that this research would encourage researchers to explore further ways through which the success of the crowdfunding projects could be enhanced further and support them in being transformed into a successful venture.

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**Table 1. Study 1 – Means, standard deviations, and correlations**

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1 Funding Success (Fail = 0; Success = 1)	0.70	0.46	1								
2 Numbers of Funders	213.40	589.63	0.23**	1							
3 Social Interaction	32.69	131.78	0.16*	0.64***	1						
4 Product Innovativeness (Incremental = 0; Radical =1)	0.41	0.49	0.31***	0.22***	0.17*	1					
5 Product Development Stage (Ideation = 0; Commercialization =1)	0.50	0.50	0.27***	0.22**	0.19**	0.08	1.00				
6 Project Goal	37.16	246.42	-0.14*	0.02	0.00	-0.05	-0.08	1.00			
7 Project Duration	62.60	48.85	0.31***	0.06	0.01	0.07	0.05	-0.06	1.00		
8 Length of Video	2.29	1.31	0.22**	0.20**	0.01	0.10	-0.03	-0.04	0.10	1	
9 Quality of Video	55.17	22.91	0.09	0.07	0.01	0.20**	0.09	-0.04	0.06	0.01	1
10 Quality of Audio	52.24	23.71	0.09	0.10	0.04	0.18*	0.09	-0.06	0.16*	0.00	0.86**

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

**Table 2. Study 1 – Hierarchical Logistic Regression Analysis (Funding Success as a Binary Dependent Variable)**

	Model 1	Model 2	Model 3	Model 4
Project Duration	0.07**	0.06*	0.07*	0.08*
Project Goal	-0.19***	-0.17**	-0.2**	-0.21**
Length of Video	0.63	0.14	0.63	0.18
Quality of Video	0.00	0.05	0.02	0.10
Quality of Audio	-0.02	-0.07	-0.03	-0.10
Project Team (Individual = 0; Team = 1)	0.92	-3.91	-5.2	-3.16
Gender Dummies (Male, Female, Not disclosed)	+	+	+	+
Country Dummies	+	+	+	+
Social Interaction	0.82**	5.36*	1.74**	6.73*
Product Development Stage (Ideation = 0; Commercialization =1)	0.72	2.37*	-0.2	1.88
Product Innovativeness (Incremental = 0; Radical =1)	3.13**	3.06**	5.15***	5.20**
Social Interaction* Product Development Stage		-4.84†		-5.38†
Social Interaction* Product Innovativeness			-1.33*	-1.25*
Cox & Snell R <sup>2</sup>	0.677	0.691	0.688	0.7
Nagelkerke R <sup>2</sup>	0.902	0.921	0.917	0.933

N=203; † denotes p < 0.1; \* denotes p < 0.05; \*\* denotes p < 0.01; \*\*\* denotes p < 0.001;

**Table 3. Study 1 – Hierarchical Linear Regression Analysis (Number of Funders as Dependent Variable)**

	Model 5	Model 6	Model 7	Model 8
Project Duration	0.02	0.01	0.02	0.01
Project Goal	0.03	0.04	0.03	0.04
Length of Video	0.13**	0.11**	0.12**	0.11**
Quality of Video	0.00	-0.05	-0.02	-0.06
Quality of Audio	0.06	0.09	0.06	0.09
Project Team (Individual = 0; Team = 1)	-0.04	-0.05	-0.03	-0.04
Gender Dummies (Male, Female, Not disclosed)	+	+	+	+
Country Dummies	+	+	+	+
Social Interaction	0.81***	2.56***	1.29***	2.83***
Product Development Stage (Ideation = 0; Commercialization =1)	0.06	0.11***	0.04	0.09*
Product Innovativeness (Incremental = 0; Radical =1)	0.06	0.04	0.09*	0.07†
Social Interaction* Product Development Stage		-1.76***		-1.65**
Social Interaction* Product Innovativeness			-0.48*	-0.39†
R <sup>2</sup>	0.74	0.761	0.75	0.765
Adjusted R <sup>2</sup>	0.72	0.74	0.728	0.743
F	36.13***	36.96***	34.86***	35.39***

N=203; † denotes p < 0.1; \* denotes p < 0.05; \*\* denotes p < 0.01; \*\*\* denotes p < 0.001;

**Table 4. Study 2 – Means, standard deviations, and correlations**

	Variables	Mean	SD	1	2	3
1	Likelihood of support	52.93	32.07	1		
2	Likelihood of funding	50.89	33.41	0.93***	1	
3	Social interaction (low = 0; high = 1)	0.50	0.50	0.48***	0.48***	1
4	Product development stage (ideation = 0; commercialization = 1)	0.50	0.50	0.00	-0.01	0.00
5	Product innovativeness (Incremental = 0; Radical = 1)	0.50	0.50	0.14**	0.13**	0.00

\* p < 0.05; \*\*\* p < 0.01; \*\*\*\* p < 0.001,

**Table 5. Study 2 – Experiment 1 (Social interaction and product development stage) – Hierarchical Regression Analyses**

Dependent variable	Likelihood of support		Likelihood of funding	
	Model 9	Model 10	Model 11	Model 12
Social interaction (low = 0; high = 1)	28.01***	38.68***	28.69***	39.7***
Product development stage (ideation = 0; commercialization = 1)	-0.13	10.55***	-0.81	10.2***
Social interaction * Product development stage		-21.35***		-22.02***
Crowd funder individual dummies	+	+	+	+
R <sup>2</sup>	0.66	0.69	0.68	0.71
Adjusted R <sup>2</sup>	0.55	0.58	0.57	0.61
F	5.88***	6.60***	6.32***	7.10***

\* p < 0.05; \*\*\* p < 0.01; \*\*\*\* p < 0.001, N = 528

**Table 6. Study 2 – Experiment 2 (Social interaction and product innovativeness) – Hierarchical Regression Analyses**

Dependent Variable	Likelihood of support		Likelihood of funding	
	Model 13	Model 14	Model 15	Model 16
Social interaction (Low = 0; High = 1)	33.26***	38.45***	34.85***	39.52***
Product innovativeness (Incremental = 0; Radical = 1)	8.92***	14.12***	8.46***	13.12***
Social interaction * Product innovativeness		-10.39**		-9.33*
Crowd funder individual dummies	+	+	+	+
R <sup>2</sup>	0.67	0.68	0.68	0.69
Adjusted R <sup>2</sup>	0.56	0.57	0.58	0.59
F	6.06***	6.18***	6.44***	6.53***

\* p < 0.05; \*\*\* p < 0.01; \*\*\*\* p < 0.001, N = 528

**Table 7. Study 2 – Experiment 1 (Social interaction and product development stage) – ANOVA results**

		Social interaction		
		Low	High	Difference across low and high social interaction (F-value)
Project Development Stage	<b>Commercialization</b>	Mean likelihood of support = 44.80 Mean likelihood of funding = 41.58 N=132	Mean likelihood of support = 62.63 Mean likelihood of funding = 59.26 N=132	Difference in support = 23.05*** Difference in funding = 21.64***
	<b>Ideation</b>	Mean likelihood of support = 34.25 Mean likelihood of funding = 31.38 N=132	Mean likelihood of support = 72.93 Mean likelihood of funding = 71.08 N=132	Difference in support = 126.72*** Difference in funding = 121.83***
<b>Difference across Ideate and Commercialization stages (F-value)</b>		Difference in support = 6.87** Difference in funding = 6.11*	Difference in support = 13.47*** Difference in funding = 13.49***	

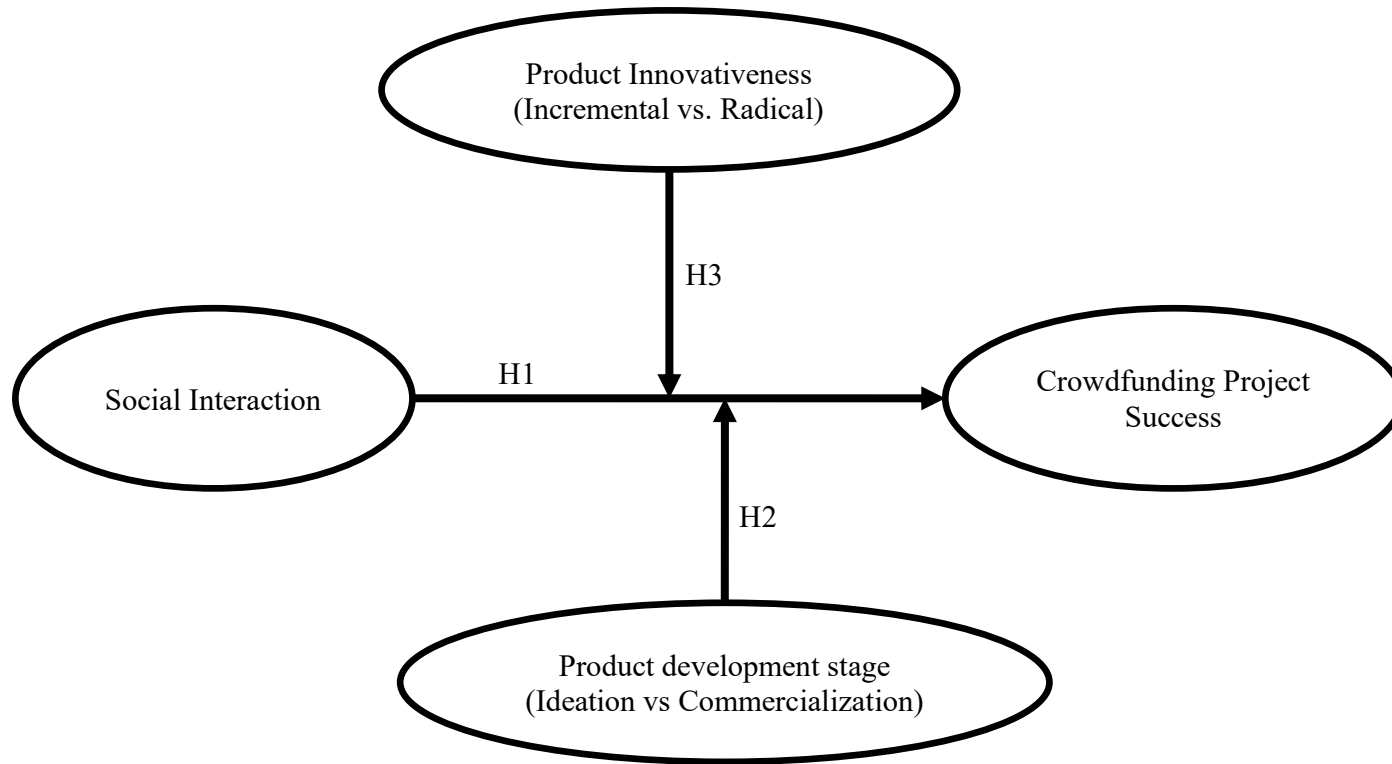
\* p < 0.05; \*\*\* p < 0.01; \*\*\*\* p < 0.001

**Table 8. Study 2 – Experiment 2 (Social interaction and product innovativeness) – ANOVA results**

		Social interaction		
		Low	High	Difference across low and high social interaction (F-value)
Product Innovativeness	<b>Radical</b>	Mean likelihood of support = 42.77 Mean likelihood of funding = 40.08 N=132	Mean likelihood of support = 70.83 Mean likelihood of funding = 70.27 N=132	Difference in support = 72.72*** Difference in funding = 77.39***
	<b>Incremental</b>	Mean likelihood of support = 28.64 Mean likelihood of funding = 26.96 N=132	Mean likelihood of support = 67.10 Mean likelihood of funding = 66.48 N=132	Difference in support = 135.23*** Difference in funding = 132.99***
<b>Difference across Incremental and Radical Innovativeness (F-value)</b>		Difference in support = 15.37*** Difference in funding = 12.26**	Difference in support = 1.58 Difference in funding = 1.52	

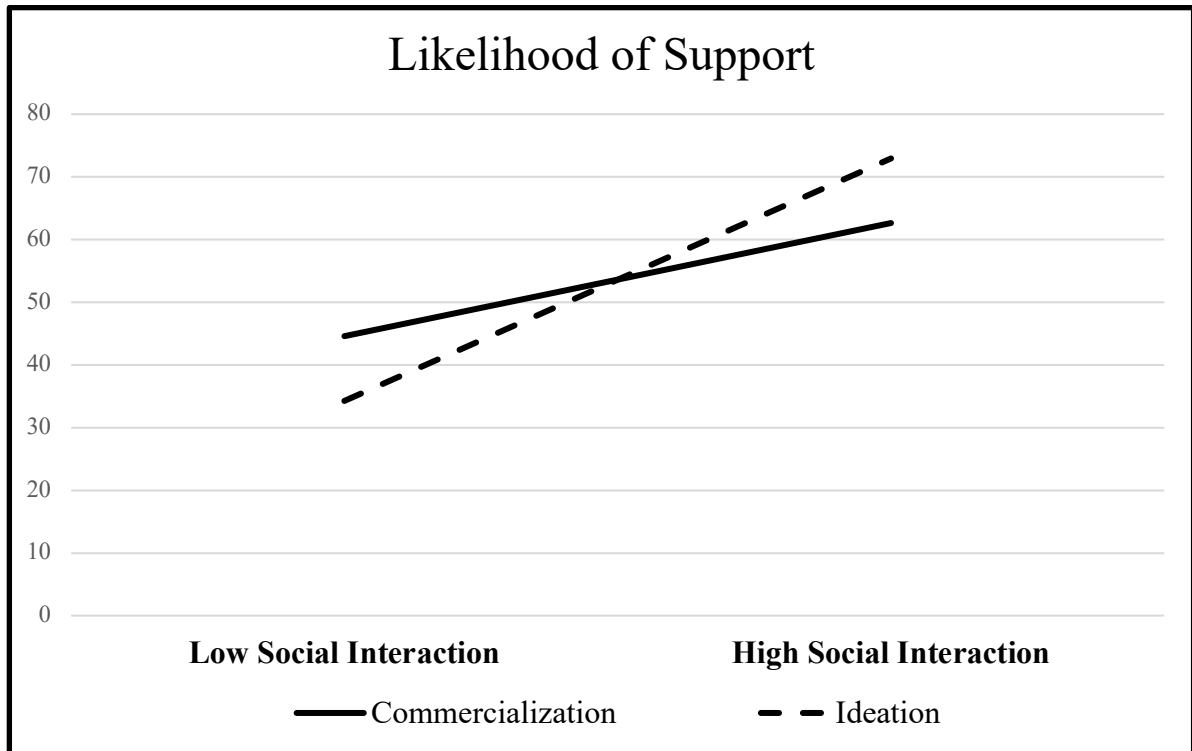
\* p < 0.05; \*\*\* p < 0.01; \*\*\*\* p < 0.001

**Figure 1. Conceptual Model**

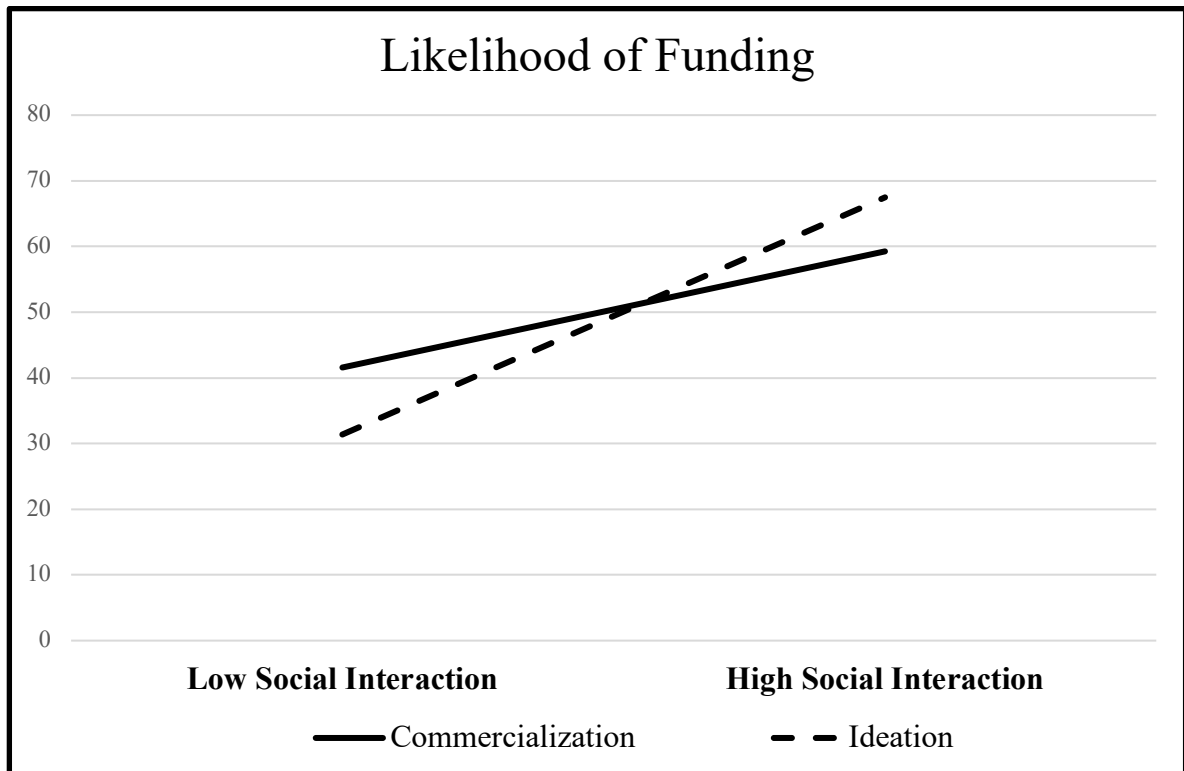




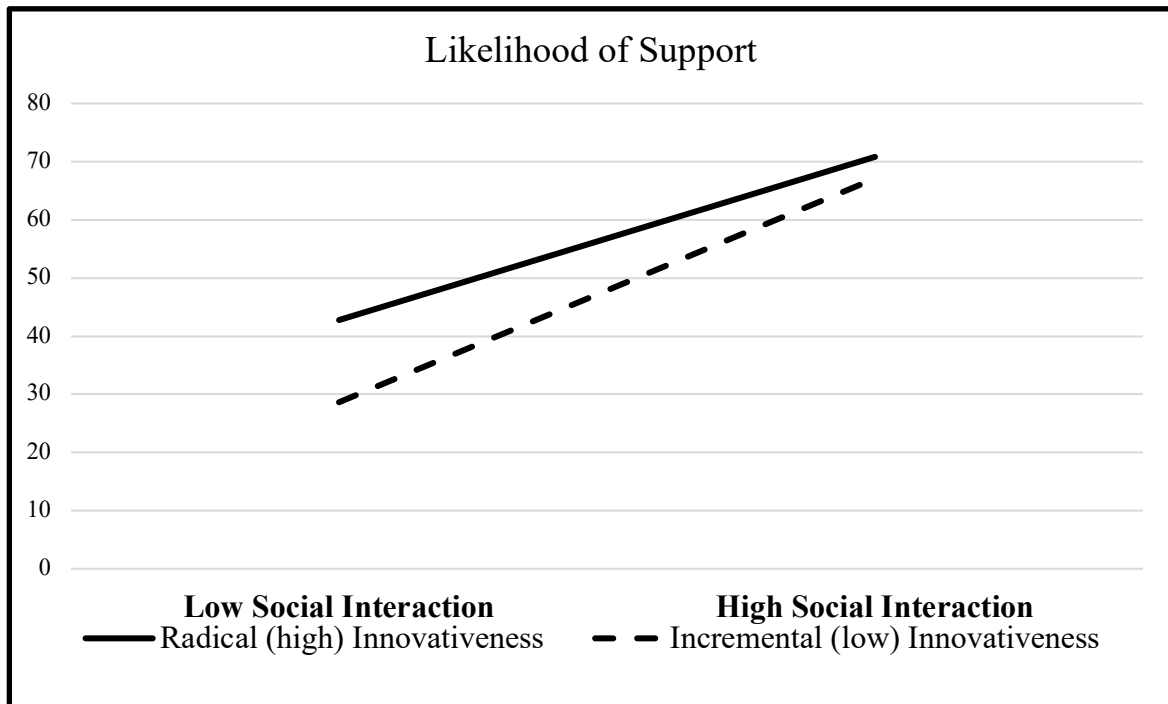
**Figure 2. Study 2 – Experiment 1 – Moderating effect of product development stage (ideation vs commercialization) on social interaction and likelihood of support**



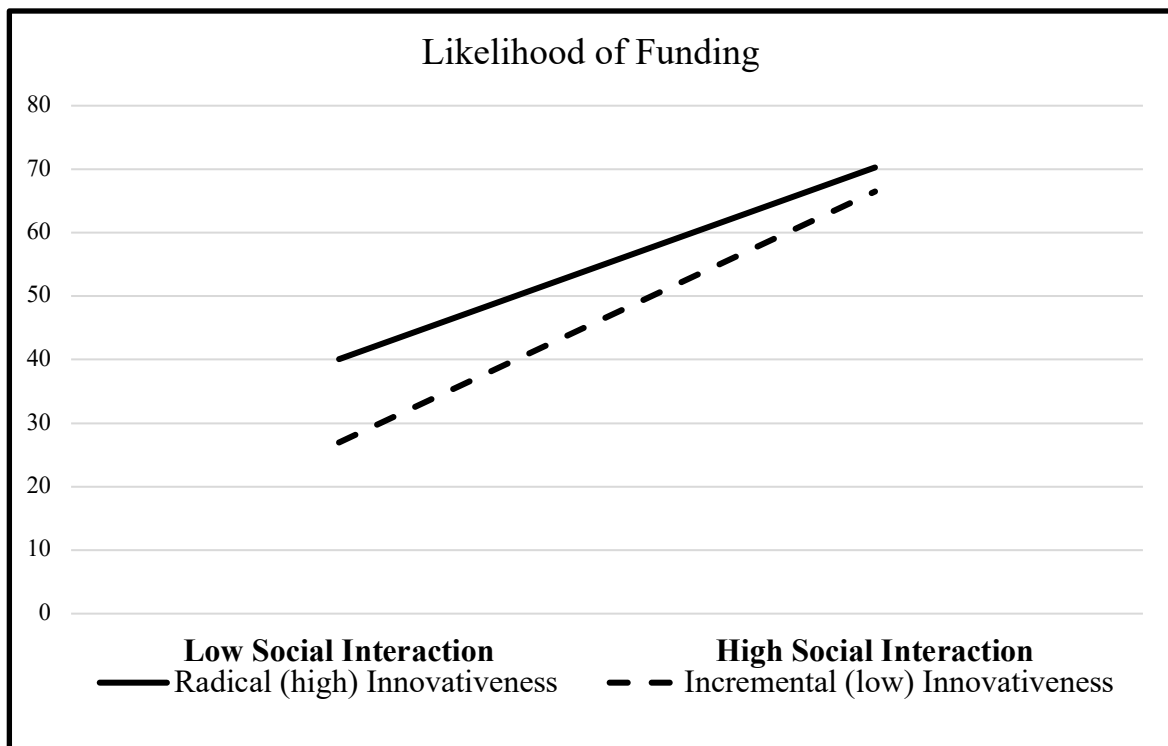
**Figure 3. Study 2 – Experiment 1 – Moderating effect of product development stage on social interaction and likelihood of funding**



**Figure 4. Study 2 – Experiment 1 – Moderating effect of product innovativeness on social interaction and likelihood of support**



**Figure 5. Study 2 – Experiment 2 – Moderating effect of product innovativeness on social interaction and likelihood of funding**



## Appendix I. Study 2 – Task Instructions for all scenarios

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### Task Instructions for all scenarios

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There are four projects on a crowdfunding website, that propose to develop and commercialize mobile apps, requesting your contribution. Assume you have US \$10 for crowdfunding project/s. You can contribute to the project(s) to become a backer by (i) providing a small financial contribution of USD 10, and/or (ii) feedback on the app to the development team.

**Assuming all other aspects of the projects are similar among the four projects, kindly evaluate the projects based on the two parameters provided below and highlight your answers.**

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## Appendix II. Study 2 – Additional task instructions for three variables (two levels each)

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Condition	Task Instructions
1. Product development stage	(i) Ideation stage - <u>Project is in the idea stage</u> . Your contribution – funding and/or feedback – would help in prototype design and development. (ii) Commercialization stage - <u>Project is in the commercialization stage as product prototype is already developed</u> . Your contribution – funding and/or feedback – would help in improving the product prototype further for its commercial launch.
2. Social Interaction	(i) The entrepreneur <u>does not actively seek feedback from backers and does not update them about the progress of the project</u> . (ii) The entrepreneur <u>actively engages with the backers, seeking their feedback and providing them with regular updates</u> about their progress.
3. Product Innovativeness	(i) Incremental - <u>Focusing on incremental innovation</u> , the product brings some improvements over existing products in the industry. (ii) Radical - <u>Focusing on radical innovation</u> , the product is revolutionary and has potential to change the way the industry operates currently.

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