Product Launch Strategy for Reward-based Crowdfunding in Competitive Markets

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Abstract. This study focuses on the product launch strategies of creators, namely whether to launch products that are still in development or those that have been fully developed. We develop a theoretical model composed of two creators who develop homogeneous products and a common crowdfunding platform. Our results show that the low-risk creator is more willing to launch an under-developed product with the increase of community benefit. However, the high-risk creator may choose not to launch an under-developed product even if the community benefit is relatively high. Besides, both creators and platform can achieve the optimal profit under the equilibrium strategy in some conditions.

Keywords: Reward-based crowdfunding, product launch strategy, competition

1 Introduction

Reward-based crowdfunding, by promising products as rewards, has emerged as an important instrument for new products to enter the market [2]. With the emergence of crowdfunding platforms such as Kickstarter, Indiegogo, etc., reward-based crowdfunding has witnessed a rapid growth in recent years. As of 17 Nov. 2024, the largest crowdfunding platform, Kickstarter, has raised over $8.4 billion with 269,372 successful funding campaigns. The tremendous crowdfunding industry is expected to reach a volume of $300 billion by the year of 2030.

In addition to obtain funds, another important reason for creators to engage in crowdfunding is to enable consumers to be deeply involved in product development [3]. Since the backers can experience feelings beyond purchasing during the activities, such as a sense of participation, pride and the joy of helping others [12, 13]. However, it is also worth noting that launching under-developed products may increase consumers' perceived risks [17]. The main reason is that most under-developed crowdfunding products are faced with risks in terms of technology and management, resulting in numerous cases of failed deliveries [1, 9]. The under-developed products have relatively higher delivery risks, and their backers are similar to venture capitalists. This might discourage them from contributing to crowdfunding campaigns if creators launch the under-developed products.

To enhance consumers' confidence and alleviate their perceived delivery risk, many crowdfunding platforms have introduced policies to reduce such risks. For example, Indiegogo divides the product development into four stages (i.e., concept, prototype, production and transportation), and requires creators to reveal the actual stage of their projects. It's a strategic issue regarding which type of product to be launched in the crowdfunding campaigns for creators.

Notably, these two types of products co-exist in the platform. The existence of competition further influences the product launch strategy. Since in addition to their own factors, creators also need to consider the influence of their competitors. This evidence raises the following interesting and important questions: (1) What are creators' product launch strategies in a competitive market? (2) How will the product launch strategies affect the crowdfunding pricing, profitability, and platform's profit?

2   Literature Review

Along with the rapid development of crowdfunding, an increasing number of studies of crowdfunding have emerged recently. To promote the success rates of crowdfunding projects, previous literature has paid much attention to the design of crowdfunding campaigns. In particularly, pricing strategy has been a classical research topic since [8] design a two-stage sequential model to analyze the pricing strategies in crowdfunding. Subsequently, the pricing strategies has received considerable attention under various situations such as in the context of competition [14], with quality decisions [3], with product line and package size [10, 11], with sales strategies [16], with strategic contribution behavior [4, 7], with advertising decision [5, 6, 15], etc.

Despite the operations strategies for reward-based crowdfunding have received extensive examination, few studies consider the new product launch strategy in crowdfunding. Our study fills into this research gap by examining the crowdfunding product launch strategies in competitive market. To the best of our knowledge, this paper is the first study to address these challenging issues.

3   The Model

Consider two creators who develop homogeneous products and simultaneously launch crowdfunding activities via a common crowdfunding platform. Following real practice, the products launched by the creators may be the under-developed or full-developed version. If the product launched by creators is the under-developed version, then consumers may perceive a relatively high delivery risk [17]. For full-developed products, considering that the products are nearly completed, consumers' perceived risk regarding them are relatively low [17]. Without loss of generality, we assume that the two creators' under-developed products are heterogeneous in delivery risk, namely a high-risk creator (H) and a low-risk creator (L). Specifically, we assume that the probability of product failure in delivery is denoted by θ_i ($i \in \{H, L\}$) and $0 < \theta_L < 1/2 < \theta_H < 1$. The

perceived delivery risk of products in the late stage of development by consumers is normalized to zero.

If the creator launches an under-developed product, it is assumed that consumers can enjoy extra sense of participation and achievement, and the joy of helping others, called community benefit [12, 13], which is assumed to be proportional to their valuations with a scale factor of λ, $0 < \lambda < 1$. If the creator launches a full-developed product, it is assumed that the community benefit is relatively small, without loss of generality, we normalize it as zero.

Suppose that there is a unit mass of consumers, who are heterogeneous in their valuations of the products, which is assumed to be uniformly distributed over [0,1], i.e., $v \sim U[0,1]$. Given the price, the expected utility of a consumer purchasing the under-developed product is formulated as

$$U_i = (1 - \theta_i)v(1 + \lambda) - p_i \tag{1}$$

The expected utility of a consumer purchasing the full-developed product is formulated as

$$U_i = v - p_i \tag{2}$$

Naturally, consumer will buy product i if and only if his utility is larger than that from buying product j and is nonnegative, i.e., $U_i \geq \max\{U_j, 0\}$, $i, j \in \{H, L\}$, $i \neq j$.

The sequence of events is summarized as follows. First, two creators decide on the type of product to be launched and determine the prices simultaneously. Subsequently, consumers observe the products' prices and development status, and decide whether to purchase and which product to purchase. We use $R_i \in \{0,1\}$ to denote the creator i's product launch strategy, where 0 represents the under-developed product, and 1 represents the full-developed product. Hence, there are four possible scenarios, namely $(R_H, R_L) = (0,0)$, $(R_H, R_L) = (0,1)$, $(R_H, R_L) = (1,0)$, and $(R_H, R_L) = (1,1)$.

For simplicity of analysis, we do not consider the funding constraints. Hence, creator i's optimization objective can be expressed as

$$\max_{R \in \{0,1\}, \, p_i} \pi_i = (1 - r)p_i D_i \tag{3}$$

Note that the parameter r denotes the commission rate charged by the crowdfunding platform, and the platform's expected profit can be formulated as

$$\Pi = r[p_H D_H + p_L D_L] \tag{4}$$

4   Analysis

In this section, we first find the equilibrium prices for a given product launch strategy and obtain the creators' payoffs under all possible scenarios. Then we examine creators' equilibrium product launch strategies.

The equilibrium solutions for subgame $(R_H, R_L) = (0,0)$.

$$p_H^{(0,0)*} = \frac{(1-\theta_H)(\theta_H - \theta_L)(1+\lambda)}{3 + \theta_H - 4\theta_L} \tag{5}$$

$$p_L^{(0,0)*} = \frac{2(1-\theta_L)(\theta_H - \theta_L)(1+\lambda)}{3 + \theta_H - 4\theta_L} \tag{6}$$

The equilibrium solutions for subgame $(R_H, R_L) = (0,1)$.

$$p_H^{(0,1)*} = \frac{(1-\theta_H)(\theta_H - \lambda(1-\theta_H))(1+\lambda)}{3 + \theta_H - \lambda(1-\theta_H)} \tag{7}$$

$$p_L^{(0,1)*} = \frac{2\theta_H - 2\lambda(1-\theta_H)}{3 + \theta_H - \lambda(1-\theta_H)} \tag{8}$$

The equilibrium solutions for subgame $(R_H, R_L) = (1,0)$ if $0 < \lambda < \lambda_1$.

$$p_H^{(1,0)*} = \frac{2\theta_L - 2\lambda(1-\theta_L)}{3 + \theta_L - \lambda(1-\theta_L)} \tag{9}$$

$$p_L^{(1,0)*} = \frac{(1-\theta_L)(\theta_L - \lambda(1-\theta_L))(1+\lambda)}{3 + \theta_L - \lambda(1-\theta_L)} \tag{10}$$

The equilibrium solutions for subgame $(R_H, R_L) = (1,0)$ if $\lambda_1 \le \lambda < 1$.

$$p_H^{(1,0)*} = \frac{(1-\theta_L)\lambda - \theta_L}{3 + 4\lambda - 4\theta_L(1+\lambda)} \tag{11}$$

$$p_L^{(1,0)*} = \frac{2(1-\theta_L)(1+\lambda)(\theta_L - \lambda(1-\theta_L))}{3 + 4\lambda - 4\theta_L(1+\lambda)} \tag{12}$$

The equilibrium solutions for subgame $(R_H, R_L) = (1,1)$.

$$p_H^{(1,1)*} = p_L^{(1,1)*} = 0 \tag{13}$$

Proposition1: The relationship of creators' profits under different subgames satisfies (1) if $0 < \lambda < \lambda_1$, then $\pi_L^{(0,1)*} > \pi_L^{(0,0)*}$; otherwise, $\pi_L^{(0,0)*} \ge \pi_L^{(0,1)*}$. (2) if $\max\{\lambda_2, 0\} \le \lambda \le \min\{\lambda_3, 1\}$, then $\pi_H^{(0,0)*} \ge \pi_H^{(1,0)*}$; otherwise, $\pi_H^{(1,0)*} > \pi_H^{(0,0)*}$.

Specially, when $0 < \lambda < \lambda_1$ (or $0 < \lambda < \max\{\lambda_2, 0\}$), creator L (or creator H) will prefer to launch a full-developed product given the creator H (or creator L) launches an under-

developed product. In addition, when $\lambda_1 \leq \lambda < 1$, given the creator H launches an under-developed product, creator L will also launch an under-developed product to enjoy the community benefits. Besides, when $\min\{\lambda_3, 1\} < \lambda < 1$, expecting that creator L will launch an under-developed product, for creator H, the community benefits are not sufficient to outweigh the advantages of alleviating competition by launching a full-developed product. Hence, creator H launches a full-developed product at this time.

Proposition2: The equilibrium product launch strategies for two creators satisfy (1) if $0 < \lambda < \max\{\lambda_2, 0\}$, $(R_H, R_L) = (0,1)$ and $(R_H, R_L) = (1,0)$ are the equilibrium outcomes; (2) if $\max\{\lambda_2, 0\} \leq \lambda < \lambda_1$, $(R_H, R_L) = (0,1)$ is the equilibrium outcome; (3) if $\lambda_1 \leq \lambda \leq \min\{\lambda_3, 1\}$, $(R_H, R_L) = (0,0)$ is the equilibrium outcome; (4) if $\min\{\lambda_3, 1\} < \lambda < \min\{\lambda_3, 1\}$, $(R_H, R_L) = (1,0)$ is the equilibrium outcome.

In particular, when $0 < \lambda < \max\{\lambda_2, 0\}$, $(R_H, R_L) = (0,1)$ and $(R_H, R_L) = (1,0)$ will rise as the equilibrium outcomes. This is because at this time, neither creator has the incentive to launch an under-developed product when he expects the competitor to do so (i.e., $\pi_H^{(1,0)*} > \pi_H^{(0,0)*}$ and $\pi_L^{(0,1)*} > \pi_L^{(0,0)*}$). Nonetheless, when both creators launch the full-developed products, the fierce price competition drives both creators' profits down to zero. Hence, creator will take the initiative to differentiate and launch an under-developed product when he expects his competitor not to do so. Then when $\max\{\lambda_2, 0\} \leq \lambda < \lambda_1$, creator H has the incentive to launch an under-developed product (i.e., $\pi_H^{(0,0)*} > \pi_H^{(1,0)*}$), while creator L still chooses to launch the full-developed product, and thus leading to equilibria $(R_H, R_L) = (0,1)$. Subsequently, when $\lambda_1 < \lambda < \min\{\lambda_3, 1\}$, creator L is also willing to launch an under-developed product to enjoy the community benefits, and thus $(R_H, R_L) = (0,0)$ be the equilibrium outcome. Hereafter, when $\min\{\lambda_3, 1\} < \lambda < 1$, creator L continues to launch an under-developed product, while creator H chooses to launch a full-developed product to form product differentiation and thus relieve price competition (i.e., $\pi_H^{(1,0)*} > \pi_H^{(0,0)*}$). These findings suggests that creators can implement an asymmetric product launch strategy to relieve price competition, which can also be found in practice. For example, the creator of KJM K3 launched the product after completing the first batch of trial production[1], while the Xming projector of the same type was launched during the prototype stage[2].

Proposition3: Crowdfunding platform achieves the maximum profit under subgame $(R_H, R_L) = (0,1)$ if $0 < \lambda < \lambda_1$, and $(R_H, R_L) = (0,0)$ otherwise.

The platform can obtain the maximum profit under subgame $(R_H, R_L) = (0,1)$ if $0 < \lambda < \lambda_1$ or under subgame $(R_H, R_L) = (0,0)$ if $\lambda_1 \leq \lambda < 1$. The former is mainly because of the competition alleviation of the creators' differentiated product launch strategies, while the latter is due to the higher community benefits brought by launching the under-developed products. Within the region of $\max\{\lambda_2, 0\} \leq \lambda < \lambda_1$ and $\lambda_1 \leq \lambda \leq \min\{\lambda_3, 1\}$, both creators and platform can achieve the optimal profit under the equilibrium strategy, that is, a triple-win situation is achieved. Our results also indicate that platform would call

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[1] KJM - Certified Netflix & JBL Brightest Projector | Indiegogo
[2] FORMOVIE:World First True Lumen GoogleTV Projector | Indiegogo

on the creators to utilize the social functions of the platforms to increase community benefits, especially for those creators with relatively high delivery risk.

5   Conclusion

In this paper, we focus on the creator' strategy regarding which type of product to be launched in the crowdfunding campaigns. Our analysis reveals that the low-risk creator is more willing to launch an under-developed product with the increase of community benefit. However, when the community benefit is relatively high, the high-risk creator may choose not to launch an under-developed product. Besides, when the community benefit is extremely low, there are two equilibrium outcomes, and the creators implement an asymmetric product launch strategy. In addition, it is also found that both creators and platform can achieve the optimal profit in some conditions.

This paper has limitations. For example, it assumes that products are homogeneous with the same valuations, and the information in crowdfunding is completely symmetric. Another future research could be to consider the product launch strategy for competitive or complementary products with different valuations. In addition, it could be interesting to examine the product launch strategy under asymmetrical information.

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