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Information Disclosure on Operational Risks and Mitigation Strategies in Crowdfunding Projects: From the Supply Chain Perspective

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Abstract

In reward-based crowdfunding, projects are to disclose the operational risks and mitigation strategies for delivering the physical rewards during the funding phase. However, limited knowledge exists regarding projects' operational risks and mitigation strategies during the funding phase. In contributing to the literature, the study uses data on Kickstarter.com and conducts a content analysis to explore themes and their relationships. The results reveal various operational risks and associated mitigation strategies. Among the identified themes, product-related, contract manufacturers, and supply markets are the most expected risks, while outsourced production and proactive sourcing are the popular mitigation strategies. Also, the finding reveals that proactive sourcing and outsourced production, in-house production and post-campaign sourcing, contract manufacturer risk, and project internal risk are themes forming clusters. The results extend crowdfunding risk disclosure literature and set the tone for future research in crowdfunding operational risk management. Finally, other business implications are drawn for crowdfunding practitioners.

Keywords

Crowdfunding, Information, Risks, Mitigation Strategies, Supply Chain

1. Introduction

Crowdfunding, an emerging area in entrepreneurial financing, uses an electronic

platform to solicit financial support from individual investors to commercialize new products [1]. The various crowdfunding models are donation-based, lending-based, equity-based, and reward-based [2] [3]. This study focuses on the reward-based crowdfunding (RBCF) model, which has become a viable financing source for small businesses [4].

In RBCF, projects that promise physical rewards in exchange for funding undertake some operational activities to ensure the delivery of the physical rewards. For instance, crowdfunders may support a novel video camera project in return for the finished product after commercial production. The production of the new video camera is project-based, requiring defined operational activities. Some operational activities may include sourcing, contracting, manufacturing, and delivery to the final consumer. The interconnectedness of the operational activities may increase the risk exposure of the parties involved. For instance, internal and external failures may occur, such as component defects, delivery delays, and unreliable suppliers. Other risks documented in crowdfunding research include sourcing and production challenges [3] [5]-[7]. Therefore, project creators are prone to various internal and external operational risks in producing and delivering physical rewards. In addition, the risk exposure in the RBCF may be high because most creators are novice entrepreneurs [8] [9]. Against this backdrop, risk disclosure is assumed to center on the operational challenges of novel product manufacturing.

[10] find that projects' disclosures are non-risk-related and contain financing schemes that accommodate more significant risks. A related study [9] revealed that funders pay more attention to risk information when receiving the promised rewards. Therefore, it is inferred from the above that funders are concerned about how operational risks would be disclosed and managed. However, since introducing this requirement in 2012 on the Kickstarter crowdfunding platform, RBCF stakeholders have limited knowledge of the disclosed categories of projects' supply chain operational risks and mitigation strategies. It may be that research to offer insight into RBCF operational risks has not been advanced much. [9] attempted to provide insight but concentrated on the positive and negative words in projects' risk disclosure. Unfortunately, these negative words do not offer various categories of operational risks nor comment positively about risk mitigation strategies to provide insight for prospective crowdfunding seekers. Therefore, a gap exists in the current crowdfunding literature regarding the expected operational risks and mitigation strategies. Hence, the following question remains unanswered: What are the various operational risks and mitigation strategies disclosed by creators during the funding phase?

To answer the above question and contribute to RBCF risk information disclosure literature, this study looks through the lens of information disclosure, patterns discovery, operational, and crowdfunding risk management literature to explore the operational risks and mitigation strategies at the funding phase on the Kickstarter crowdfunding platform. In doing so, we employ a manual method and digital software (Nvivo) to achieve rigor in data coding and analysis. The manual approach would help researchers remain open and flexible to emerging insights

and achieve deeper interactions with the data, which are prerequisites for qualitative data interpretation [11]. In addition, digital software organizes unstructured data, keeps track of the coding, and sees the progress of ideas/patterns as they emerge to ensure rigorous data analysis [11]. Further, the presence of nodes in Nvivo Software would help the study focus on finding underlying themes, interpreting, and theorizing, thereby boosting the accuracy of the qualitative data [12]. This analytical approach allows the content analysis by moving the description to an explanatory model, categorizing the patterns into more encompassing themes, and supporting the visualization of the findings [13]. Further, it helps achieve studies' reliability and validity [14].

The results reveal operational risks related to contract manufacturers, supply market, product-related, natural disasters, internal administration, and project external shared. Product-related, contract manufacturers, and supply markets are the most expected among the identified risks. Further, the operational mitigation strategies explored are outsourced production, proactive sourcing, post-campaign sourcing, in-house production, and experience/administrative. The finding suggests outsourced production and proactive sourcing as the popular mitigation strategies. Also, proactive sourcing and outsourced production, in-house production and post-campaign sourcing, contract manufacturer risk, and project internal risk are themes forming clusters. These findings offer insight into previous research findings on the project's increased reported rate of delivery challenges and the call to have an operational plan [3].

The rest of the paper is organized as follows. First, Section 2 presents a literature review on operational and crowdfunding risks. Next, we describe the study method and data coding in Section 3. The presentation of the results in Section 4 follows it. Finally, research implications and conclusions are drawn in Section 5.

2. Literature Review

A globalized approach to executing operational activities to serve customers with quality products at the least cost contributes to an organization's risk profile [15]. Further, e-trade, advanced technologies, and emerging production techniques to deliver efficiency and value addition have made supply networks and operations more precarious and vulnerable than before [16] [17]. Moreover, infrastructure dependence, inter-organizational networks, terrorism, war, natural disasters, political turmoil, non-responsive suppliers, and environmental challenges have increased organizations' risk exposure and affected inbound and outbound operational activities [18]. These vulnerabilities have exposed businesses to operational risks such as product non-quality conformance, an unproven workforce, and erratic systems [15].

Managing operational risks requires planning, identifying, analyzing, response planning, monitoring, controlling, and optimization techniques [19] [20]. Operational risk identification is a crucial step in the risk management process but is problematic due to the inability to predict all the expected risks [21]. Moreover, interrelationships and feedback loops among network players are widely known

to pose challenges to risk identification and monitoring [22]. Therefore, managing adverse effects requires a risk management practice involving proactiveness knowledge and an understanding of the operational dynamics, including information flow and relationship management among partners [23]. One way to identify risks is to scan the internal and external business environment and map them with appropriate mitigation strategies [24]. [25] [26] contribute to this discourse that isolating the risk and reducing its impact on operational activities are part of the mitigation strategies. It is also the action plan to manage the identified risks [27], which could be proactive or reactive [28] [29]. Extant literature has outlined several risk mitigation strategies, such as vendor-managed inventory [30], centralized production distribution, outsourcing, and supply base reduction [31]. [32] contribute to this discussion by theorizing that the relevance and efficiency of risk mitigation strategies depend on the internal and external environment and that there is no one-size-fits-all strategy.

In the RBCF model, some operational activities at the post-funding stage include sourcing, contracting, producing, and logistical activities to move the physical products to the funders. As a result, the projects are confronted with operational uncertainties that complicate the functional outcomes [3]. An example is project over-subscription, which may throw operational plans overboard and cause delivery delays [8] [9] [33]. In addition, these upstream and downstream activities may encounter challenges impacting operational schedules, giving rise to various risks. Due to these uncertainties, [34] suggests that creators' foreknowledge would help manage the risks proactively. Also, extant literature proposes information sharing to deal with disruption and mitigate risks. For instance, [35] finds that information management may increase visibility and manage unexpected risks.

In crowdfunding information disclosure literature, it is found that the crowd responds negatively to project risk disclosure, while [36] asserts that crowdfunding faces information asymmetry due to limited accessibility. Likewise, [6] believes that crowdfunding could strive on a condition of meaningful disclosure about the project and the terms of the offering. Also, [10] reveal that projects' disclosure emphasizes higher-quality non-risk-related issues and proposes a financing structure accommodating greater risk. Furthermore, meaningful disclosure will reduce information asymmetry if project creators disclose their preparedness to mitigate the threats to ensure successful implementation [37] [38]. In joining this conversation, we look through the lens of information disclosure and risk management literature and extend crowdfunding literature on risk disclosure. Specifically, we add to the existing literature by exploring the operational risks and mitigation strategies projects disclosed at the funding phase.

3. Data Collection, Risk and Strategy Classification, and Data Coding

3.1. Data

The study relies on data collected from crowdfunded projects' campaigns in three

categories (*i.e.*, Technology, Design, and Fashion) on the Kickstarter crowdfunding platform (https://www.kickstarter.com) from 2022 to 2023. This study's analysis component includes funded projects in the three categories. The idea behind selecting the three project categories is that they promise physical rewards that require manufacturing, which may follow some operational processes and encounter supply chain risks and mitigation strategies. Project data are from their respective crowdfunding campaign homepages on the Kickstarter platform. On the platform, a project founder pitches a project with descriptions that include funding goals, rewards types, and estimated delivery dates at the campaign's site. Other information is product description/video, project venture profile, crowdfunding experience, reward-delivery updates, and project community. Further, on the crowdfunding platform, it is a requirement that a campaign pitch includes submission on the expected project implementation risks or challenges and strategies to manage them. Other accessible data are project venture status, promised delivery lead time, various funders, crowd capital, overfunded amount, and founder's years of work experience. The unit of analysis in this study includes successfully funded projects in the three categories. The study aims to provide a broad viewpoint on the projects' submission on risks and challenges. Hence, the study pays special attention to selecting small qualitative and quantitative samples that capture project information on the variables of interest. Due to their small textual content, the data on projects' risks and mitigation strategies on Kickstarter.com was collected manually.

Following the above, we considered 23,353 successful projects from the Technology, Design, and Fashion categories on Kickstarter.com and further used Random.org to generate numbers for the random selection of projects from the three categories. Thus, 200 successfully funded projects were chosen from each category. The sampled projects' data were retrieved based on the availability and accessibility of information at their respective campaign sites. Finally, after cleaning the data for inaccuracy and insufficient facts, 300 projects remained for analysis.

3.2. Classification of Operational Risks and Mitigation Strategies

Various studies on risk disclosure define it as either a negative/positive or a gain/loss component [37]-[40]. Therefore, it presupposes that a firm's risk disclosure could include a positive statement showing how those negative ones could be overcome. They support this approach and share that the modern view of risk includes negative and positive outcomes of events. Further, according to the International Risk Management Standard (ISO 3100:2009), risk definition comprises positive and negative outcomes and influences a firm's objective. Therefore, based on the literature, this study groups risks externally and internally to cover the projects' operations.

Risks related to the physical product and the internal administrative mechanism are categorized under internal risks. Also, risks originating from service providers/suppliers, contract manufacturers, and acts of nature are grouped under external risks. After crowdfunding, the physical product may require technical

variation and affect the delivery timelines, hence termed product-related risk. Risks due to the projects' internal administrative processes are described as internal administrative risks. Additionally, risks that may derive from upstream supply sources are termed supply market risks. Moreover, the risk from external stakeholders with contributory factors from project owners is named external shared risk. Besides, the risk from outsourced service providers related to the manufacturing of the physical product is termed contract manufacturer risk. Lastly, the risk due to an act of nature beyond a project's control is called natural disaster risk.

[41] included "opportunity" in classifying risks. They explained that "opportunity" comprises gains and prospects. This study argues that gains and prospects include various strategies to manage the expected adverse outcomes in the projects' operations. Therefore, the positive contents are defined herein as mitigation strategies. Due to the different characteristics of crowdfunding projects, the approach to sourcing may differ.

Consequently, it relies on the definitions of some constructs that [42] used to group the mitigation strategies. The current study emphasizes exploring the anticipated operational risks and the mitigation strategies described by the project creators. Hence, we adopt proactive and post-campaign sourcing and in-house and outsourced production constructs proposed and used in [42]. Proactive sourcing involves initiating the sourcing process before the campaign starts, while sourcing after the campaign is post-campaign sourcing. In-house production makes the promised rewards internally while using an external production facility, which is outsourced production. Other strategies based on work, crowdfunding experience, and administrative structures were combined and named experience and administrative strategies.

3.3. Data Coding

The study intends to explore the patterns directly from the data; therefore, the researchers adopt a content analysis approach. The study follows [43] coding pattern to structure the process and realize conceptual density relationships between the raw text and the study objectives. Also, there is a growing trend to use computer-assisted qualitative data analysis software to achieve accuracy, generalization, and complexity in qualitative studies [13]. Following this call, the textual document was analyzed using NVivo software version 12. The analytical software helps import, code, categorize, and store large amounts of data [44]. The software supports the advancement of qualitative thematic content analysis, simplifying coding, analysis, and data display. Additionally, it is advantageous when dealing with large quantities of information, helping achieve the reliability and validity of studies [14]. It further adopts a two-step approach to data coding and analysis. The first approach is manual coding, which helps the researchers remain open and flexible to emerging insights and achieve deeper interactions with the data [11]. Digital coding, the second approach, would further organize the unstructured data, categorize the patterns into more encompassing themes, and support

visualization of the findings in a rigorous manner required in qualitative research [11].

Our research team agreed on coding parameters to achieve coding consistency, consisting of the classifications and categories of themes based on literature, rules, and definitions for assigning the codes, as suggested by [45]. The research team then coded a sample of the raw data to validate the agreed coding parameters before importing it into the NVivo software. The verification of the consistency level was through an inter-coder agreement. Cohen's Kappa value in the Nvivo software was used. The Kappa value measures the agreement between the coders' ratings in assigning categories to the variables. Larger values mean better reliability, and values near zero or equal to zero suggest agreement due to chance. The percentage of coding agreement was between 100 and 78.93, and disagreement was between 21.07 and 0. Based on the research question, which sought to explore projects' supply chain risks and mitigation strategies, inductive and deductive approaches were used in the data coding process to determine the themes, as exhibited in Table 1 and Table 2.

Table 1. Sample classification of emerging theme (risks).

No.	Sample Statements	Risk Subcategories
1	Natural disasters such as explosions, **acts of nature**, **war**, **civil disturbances**, and acts of civil.	Natural Disaster
2	Our timeline is most **vulnerable to delays**, so we have batteries, which make them more challenging to ship.	Project Internal Admin.
3	The main **risk**, though, is quality from assembly and mechanical suppliers.	Supply Market
4	Everyone's **biggest fear** is—the capability to manufacture.	Project Internal Admin
5	Component **supply shortages**—Our product is designed.	Supply Market
6	There are **risks and challenges** linked with manufacturing and supply chain logistics.	Supply Market
7	Watches include lithium batteries, which make them more **difficult to ship**.	Product-Related
8	Main **challenges** we will tackle: Choice of Factory: As with any number of **challenges** to getting it right.	Contract Manufacturer
9	There are stories about production **delays** when manufacturing abroad.	Contract Manufacturer
10	The biggest **challenge**, as we do make all of the Purple for our backers.	Product-Related
11	We face a risk of **delay** in delivering some of the rewards.	Project Internal Admin.
12	**Delays** will likely be due to some materials' supply chain lead times.	Supply Market
13	My **challenge** will be producing a huge quantity of wallets and making sure all the partners I'm working with maintain my quality standards.	Project External Shared
14	Getting your size info—This is the schedule; your reward may be delivered **late**.	Project Internal Admin.
15	It is a complex product with several unique components that leave us **vulnerable**.	Product-Related
16	The main **risk** is **poor** quality from assembly and mechanical suppliers.	Supply Market
17	The **design flaw** can set product releases back months and part **shortages**.	Product-Related
18	Our shipment during transport, they **go bankrupt** or a machine breakdown.	Supply Market
19	Timing is the biggest **challenge**.	Project Internal Admin
20	We run the **risk** of natural **disasters** and other **cataclysmic** events interfering with manufacturing and shipping schedules, which will run **the risk of impacting** the project.	Natural Disaster

Source: Kickstartet.com.

Table 2. Classification of emerging themes (Mitigation Strategies).

No.	Sample Statement	Subcategories
1	We're a team with a lot of **experience** making and delivering things.	Experience & Administrative
2	We are in close **contact with the factory,** and they are well-prepared for **production** when the project is funded.	Outsourced Production
3	But by implementing **production** safeguards in **our factory** and conducting a high level of research, we've dramatically reduced these risks.	In-house Production
4	We have identified and locked in our **manufacturers**, who will ship within 60 days of successful project funding.	In-house Production
5	This isn't our first rodeo. We've brought several Kickstarter projects to life in the past and have **learned** from **our experiences**.	Experience & Administrative
6	To best prepare for the challenges ahead, we've **partnered** with **supply chain** experts to tackle challenges.	Proactive Sourcing
7	We have developed our plan for **manufacturing** in Asia and shipping to our backers worldwide.	Outsourced Production
8	We have **sourced** the **factories** for all of G-RO's **major components**.	Proactive Sourcing
9	Our **production partners** have approved the G-RO design for its manufacturability and are committed to its success.	Outsourced Production
10	Have extensive **manufacturing** and **operational experience** (I used to manufacture interiors for large condominium buildings and hotels), plus two **manufacturers capable** of delivering Better Back.	In-house Production
11	Thanks to previous campaigns, I gained **experience** in **manufacturing** a product such as Ulo.	Experience & Administrative
12	For the **last five years now**, we've been **creating long-term working relationships** with these **manufacturers**, and they have been invaluable and active partners during our prototype development phase.	Outsourced Production
13	On the **logistics** side, we have **established partnerships** with a US fulfillment house and international **shippers** to help the product get to where they're going quickly and safely.	Proactive Sourcing
14	We've **already obtained samples** from the **factory**, and they all look and feel **flawless** and function **perfectly**.	Outsourced Production
15	This time, we're **working** with one of the world's **leading contract manufacturers** to make sure we can **address** demand and scale **quickly**.	Outsourced Production
16	We have passed our prototype and testing stage successfully, and we are confidently entering the mass production stage in **our factory**.	In-house Production
17	We have **selected** all necessary **vendors** and tool makers.	Proactive Sourcing
18	We **will** carefully **plan** a timeline for the sourcing, mass-production, and delivery of the devices approximately 22 - 24 weeks **after Kickstarter funding**.	Post-campaign Sourcing
19	Because we **already** have samples in **our factory** that ride great, we believe the risks of late delivery are **low**.	In-house Production
20	We have the **materials purchased** and prototypes tested.	Proactive Sourcing

Source: Kickstarter.com.

The study was further informed by [13] [46] in the coding, as described as follows. The coding followed the hierarchical form (*i.e.*, open, axial, and selective) to realize conceptual density relationships between the raw text and the study objectives [47]. Under the open coding, the data was broken into discrete parts. Finally, the data were split into discrete components (*i.e.*, risk or mitigation strategy) and were imported into the Nvivo Software. Using the word frequency query tool of Nvivo, frequently mentioned phrases were identified and led to an understanding of the content of the submissions. Next, the imported data were broken into pieces

and read line-by-line for closer scrutiny and concept identification. Finally, the nodes which serve as the storage area for references to the coded texts were created. The created nodes were used to store the relevant text to ensure its representation whenever a new concept was identified. The above process ensures openness to new possibilities emerging from the data. Additional insight into the significant properties of the data was often obtained using a Boolean logic-based coding query. The rationale behind that process was to establish the meaning, underlying uniformity, and varying conditions in assigning data to a particular node with similar characteristics. Memos were subsequently created. These memos improved logical thinking and recorded ideas that further explained the developing concepts and their interrelations to the explored themes. The memos were linked to the initial nodes created to provide an analytical audit trail. Coding stripes were made to view texts of the entire documents, compare categories and concepts, and offer a visual overview of how coded nodes are related. In addition, the exploratory nature of coding stripes simplified the iterative theory-building process, addressed emergent questions, and generated subsequent lines of inquiry. The fractured data formed at the open coding were reassembled to create relationships between concepts. Axial coding was performed to reassemble the fractured data and manage overlapped codes. After completing the above process, the researchers deliberated extensively on the highlighted words/phrases to decide on the broad thematic areas. All words that said the same thing were grouped with concise code, and the core content was chosen as a group heading. So, all the phrases related to risks and mitigation strategies were grouped into two folders. The three projects had a separate file in the two folders created. Based on the sample themes in Table 1 and Table 2, parent nodes created were external risks (defined as risks that exist outside the project), internal risks (defined as risks that exist within a project), and mitigation strategies (defined as actions to reduce the impact of risks). After further data exploration, the child nodes formed under the internal risks to capture the identified sub-themes, which were product-related (defined as risks deemed to affect a product) and administrative risks (defined as managerial and day-to-day risks). Also, the external risks had four child nodes: natural disaster risk (defined as act of God), contract manufacturers risks (defined as risk emanating from manufacturer), projects external shared risk (defined as risks from the mistakes of a manufacturer and project owners), and supply market risk (defined as risks from the supply chain). Under the mitigation strategies, three child nodes were created: production (defined as a strategy related to early production), sourcing (defined as a strategy related to early sourcing), and experience/administrative (strategies related to the owners' experience and robust administrative procedures). After extensive content analysis of the production and sourcing strategies, other subcategories were discovered to form the second-generation child nodes. These were in-house production (defined as a product manufactured within the project) and outsourced production (defined as a product given to an external manufacturer to produce). Sourcing strategies were proactive (defined as sourcing done before the crowdfunding campaign) and post-campaign (defined

as sourcing done after the crowdfunding campaign), as the second-generation child notes. Figure 1 shows the themes derived from the coding process.

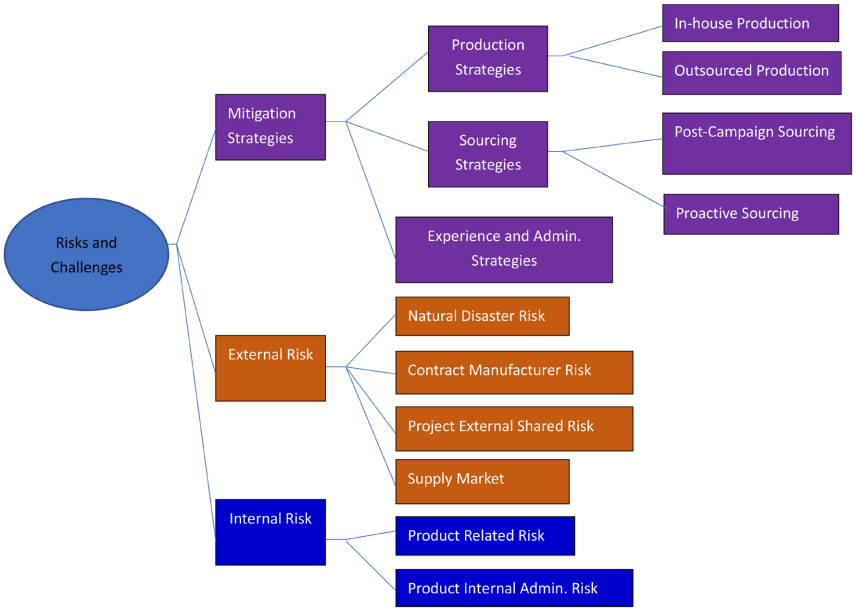

Figure 1. Mind map of data coding process and themes.

4. Qualitative Results

4.1. Frequency of Themes

The frequencies of themes were produced from the coded data using the Matrix coding query tool.

4.1.1. Text Word Cloud

Figure 2 shows the Text Word Cloud that visually identifies the frequently occurring words in the data. Here, the word size shows the extent of occurrence and importance in the text corpus. Also, the location of a word matters, with many of the predominant ones in the center.

Figure 2. Text word cloud.

4.1.2. Frequencies of Themes

Table 3 shows that 226 operational risks were predicted by the design projects. It comprises 45 contract manufacturer risks (CMR), 35 supply market risks (SMR), 50 project external shared risks (PESR), 5 natural disaster risks (NDR), 56 product-related risks (PRR), and 35 project internal administrative risks (PIAR). Also, the Technology Projects anticipated 247 risks. It comprises 23 CMR, 44 SMR, 39 PESR, 9 NDR, 87 PRR, and 45 PIAR. Finally, the Fashion Projects predicted a total of 164 risks. It comprises 29 CMR, 14 SMR, 30 PESR, 8 NDR, 16 PRR, and 67 PIAR.

Table 3. Projects operational risks.

Risk Category	CMR	SMR	PESR	NDR	PRR	PIAR	Total
Design Projects	45	35	50	5	56	35	226
Technology Projects	23	44	39	9	87	45	247
Fashion Projects	29	14	30	8	16	67	164

From Table 4, it was observed that 240 mitigation strategies were identified in the textual documents of the Design Projects, which consist of 102 experience and administrative (EA), 68 outsourced production (OP), 6 in-house production (IHP), 4 post-campaign sourcing (PCS), and 60 proactive sourcing (PS). Also, 248 mitigation strategies were found in the Technology Projects documents. Of the total, 107 were E&A; 59 were OP; 13 were IHP, 17 were PCS, and 52 were PS. Finally, 288 mitigation strategies patterns were identified from the Fashion Projects documents. Of this number, 132 were on E&A, 58 on PS, 8 on IHP, 17 on PCS, and 73 on PS.

Table 4. Projects operational mitigation strategies.

Mitigation Strategies	E&A	OP	IHP	PCS	PS	Total
Design Projects	102	68	6	4	60	240
Technology Projects	107	59	13	17	52	248
Fashion Projects	132	58	8	17	73	288

4.1.3. Cluster Analysis

A cluster analysis was performed to visualize and measure the similarity among the themes. Based on a calculated similarity index between a couple of items, the items were grouped into several clusters using the hierarchical clustering and iterative multidimensional scaling algorithm. By default, the result of the cluster analysis is displayed as a dendrogram. The dendrogram is generated using the same complete linkage hierarchical clustering technique to form the cluster. For example, the horizontal dendrogram in Figure 3 shows similar items among the core themes clustered together on the same branch. However, different themes are further apart. For example, it can be observed from Figure 3 that a proactive sourcing strategy is closer to outsourced production, and an in-house production strategy is more immediate to post-campaign sourcing. Also, contract manufacturer risk is more relative to project internal risk.

Figure 3. Horizontal-dendrogram of projects operational risks and mitigation strategies.

4.2. Quantitative Results

4.2.1. Descriptive Statistics

Table 5 shows the descriptive statistics of the study's data, including the mean and standard deviation.

Table 5. Descriptive representation of the variables.

Variable	Mean	Standard Deviation
Promised Delivery Lead Time	1.53	0.50
Total Number of Funders	3328.33	2399.61
New Funders	38.51	24.97
Returning Funders	37.76	24.37
Funding Goals	31.58	22.04
Crowd Capital Acquired	428.38	269.95
Amount Over Funded	425.63	259.90
Project Venture Status	1.53	0.50
Years of Work Experience	10.86	4.08
Design Projects Mitigation Strategy	2.47	1.84
Technology Projects Mitigation Strategy	2.85	1.90
Fashion Projects Mitigation Strategy	2.69	1.87
Fashion Projects Risks	3.71	1.68
Design Projects Risks	4.09	1.71
Technology Projects Risks	4.10	1.81

Table 6 shows the correlation between the variables. The correlation between the variables was tested at a 5% level of significance. The bolded correlation values

show significance at 5%. From the correlation coefficient values, it can be observed that there is a statistically significant correlation among the bolded variables in the data.

Table 6. Correlation matrix for the variables in the data.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	−0.316	0.03	−0.076	−0.024	−0.034	−0.003	1	0.164	0.099	0.162	0.125	0.116
2		1	−0.208	0.155	−0.072	0.127	0.179	−0.196	−0.125	−0.172	−0.126	−0.213	0.128
3			1	0.031	−0.01	−0.015	−0.072	0.03	−0.014	0.022	0.015	0.066	0.096
4				1	−0.73	0.06	0.074	−0.76	−0.251	−0.19	−0.353	−0.232	−0.086
5					1	0.086	−0.021	−0.024	−0.038	−0.034	0.082	0.012	−0.274
6						1	**0.791**	−0.034	−0.439	−0.422	0.105	−0.289	−0.287
7							1	−0.003	−0.435	−0.436	−0.085	−0.356	−0.251
8								1	0.164	0.099	0.162	−0.125	0.116
9									1	**0.846**	**0.665**	**0.784**	**0.849**
10										1	**0.518**	**0.756**	**0.667**
11											1	**0.853**	**0.884**
12												1	**0.875**
13													1

Legend: 1: Promised Delivery Lead Time; 2: Total Number of Funders; 3: New Funders; 4: Returning Funders; 5: Funding Goals; 6: Crowd Capital Acquired; 7: Amount Over Funded; 8: Project Venture Status; 9: Technology Projects Mitigation Strategy; 10: Fashion Projects Mitigation Strategy; 11: Fashion Projects Risks; 12: Design Projects Risks; 13: Technology Projects Risks.

4.2.2. Factor Analysis

Factor analysis was used to elucidate the salient variables influencing the data. From the Factor Analysis, Bartlett's test of sphericity was 1023.09 (p-value = 0.001). Hence, there is significant statistical probability among some variables in the correlation matrix. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to check the appropriateness of the data for factor analysis. From the analysis, the KMO value was 0.82.

The minimum factor loading was 0.50. Table 7 shows the communalities for the variables. From Table 7, it can be observed that each of the communalities is greater than 0.50. The varimax factor rotation was used. In order to determine the number of factors appropriate for explaining the data, the scree plot was examined. From Figure 4, the scree plot could not explicitly show the appropriate number of factors. Hence, the eigenvalue-greater-than-one principle was used. Five factors were extracted using the eigenvalue-greater-than-one principle. The exploratory factor analysis showed that the years of work experience and design project mitigation strategies did not load on any factor. Hence, they were deleted from the data, and the analysis was re-run. In total, these five factors explained 74.41% of the variance in the data. The first factor has an eigenvalue of 4.706, explaining 33.61% of the variance in the data. With an eigenvalue of 2.006, the second factor

explained 14.33% of the variance in the data. The third factor has an eigenvalue of 1.492 and explains 10.66% of the data variance. The fourth and fifth factors have eigenvalues of 1.176 and 1.037, respectively. These factors explain 8.40% and 7.41% of the variance in the data.

Table 7. Communalities of the variables in the data.

Factor	Communality
Promise delivery lead time (months)	0.989
Total number of funders	0.593
New funders	0.785
Returning funders	0.644
Funding goals	0.676
Crowd capital acquired	0.848
Amount overfunded	0.812
Project venture status	0.989
Technology projects mitigation strategies	0.870
Fashion projects mitigation strategies	0.736
Fashion projects risks	0.843
Design projects risks	0.906
Technology projects risks	0.920

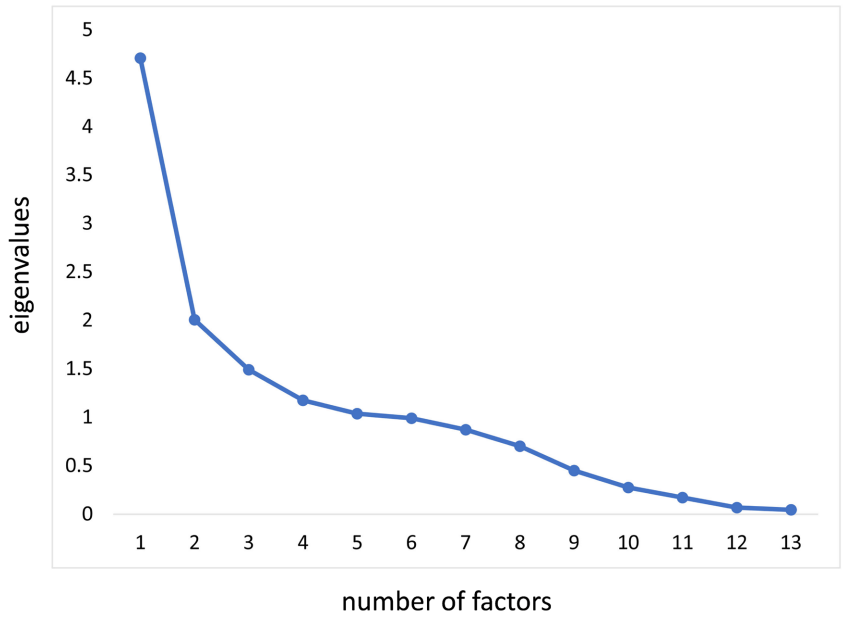

Figure 4. A scree plot of variables in the data.

From Table 8, the variables that significantly loaded on factor 1 are technology projects mitigation strategies, fashion projects mitigation strategies, fashion projects risks, design projects risks, and technology projects risks. Hence, factor 1 can

be referred to as Risks and Mitigation Strategies. Promise delivery lead time and Project Venture Status loaded on Factor 2. Factor 2 can be referred to as Commercial Features. Factor 3 has Crowd Capital Acquired and an Amount Overfunded loading on it. Hence, factor 3 can be referred to as Funding Status. The total number of funders and new funders loaded on factor 4. It can be observed that new funders loaded negatively on the factor. Factor 4 can be referred to as Project Acceptance. Factor 5 has funding goals and returning funders loading on it. However, it can be observed that returning funders loaded negatively on factor 5. Hence, factor 5 can be referred to as Financial Goal. The analysis shows that the three categories of projects in the study anticipated similar risks and came up with common mitigation strategies.

Table 8. Factor loadings.

Variables	Factors				
	1	2	3	4	5
Promise delivery lead time (months)		0.989			
Total number of funders				−0.649	
New funders				0.865	
Returning funders					−0.545
Funding goals					0.806
Crowd capital acquired			0.905		
Amount overfunded			0.868		
Project venture status		0.989			
Technology projects' mitigation strategies	0.853				
Fashion projects' mitigation strategies	0.752				
Fashion projects' risks	0.901				
Design projects' risks	0.926				
Technology projects' risks	0.948				

5. Discussions and Research Implications

Figure Labels: Reward-based crowdfunding projects face significant information asymmetry and operational risks. Therefore, creators must prove adequate preparedness for the project implementation and reduce the associated risks and information asymmetry. Based on the policy change at Kickstarter, a project risk disclosure is getting more attention to address the current information asymmetry.

Our study adds to the literature by exploring the textual documents to identify the projects' operational risks and mitigation strategies. The risk disclosure literature has rarely observed the risks and mitigation patterns. The study shows the various trends of operational challenges and the mitigation strategies toward the promised rewards delivery. It further offers that text mining, rarely used by the

disclosure literature, is a valuable research tool for revealing projects' critical operational challenges and mitigation strategies. The above analytical approach supports the study by grouping the emerging words into more encompassing and meaningful themes. Further, the study findings confirm that creators are becoming more aware of the operational challenges associated with project implementation, which is essential for sustainable reward-based crowdfunding.

The archival data analyses of the projects' operational risks and mitigation strategies are intriguing. **Figure 2** displays the most reoccurring words mentioned in the textual documents. Some of the most recurring words are manufacturing, supply, and delivery.

Also, **Table 3** shows the projects' different operational risk expectations. For example, the Design and Technology Projects anticipated more product-related risks. This finding is consistent with the previous study's assertion that new products would face more risks [48]. On the other hand, Fashion Projects expect more administrative risks. This may be due to changes in the post-funding phase regarding funders' product dimensions.

Moreover, **Table 3** reveals that project creators expect risks from contract manufacturers and the supply market. These operational-related risk results contribute to crowdfunding and entrepreneurial research on risk. Project creators' knowledge of operational risks may reduce information asymmetry and improve post-crowdfunding phase performance.

Besides, **Table 4** confirms more submissions on mitigation strategies than risks, as shown in **Table 3**. Specifically, the commonly mentioned mitigation strategies were proactive sourcing and outsourced production. The finding of projects presenting more mitigation strategies confirms [9] and [49] asserting that projects' success depends on the ability to ease funders' concerns about risks. Also, the finding of projects presenting more mitigation plans supports the viewpoint of [10] that project creators may disclose more non-risk information to accommodate the high-risk profile of crowdfunding. The effect of the mitigation strategies would be dependent on efficient implementation during the project life. For instance, the benefit of production outside could be achieved if the parties are able to address the challenges associated with it. Also, in-house production would yield the best result and deliver the promised reward on time if the internal resources are managed and coordinated well. The positive effect of project owners' experience and robust administrative procedure could be realized based on team spirit and shared knowledge.

Furthermore, the concentration of projects on operational mitigation strategies addresses funders' concerns about delivering the promised rewards. Identifying more mitigation strategies answers the call of [50] [51] that crowdfunding projects should have a contingency plan.

Figure 3 shows similar themes clustered together. It shows proactive sourcing and outsourced production, in-house production and post-campaign sourcing, and contract manufacturer risk and project internal risk as themes forming clus-

ters. The findings suggest that outsourced production, proactive sourcing, in-house production, and post-campaign sourcing best complement each other as viable operational strategies. The result of the outsourced output as a popular mitigation strategy contradicts previous research assertion that entrepreneurs lack the resources to purchase and manage an outsourced arrangement [52] [53]. It supports the literature claim that outsourcing benefits operational performance in high-risk scenarios and disincentives in low risk with high production capacity [54]. The similarity between outsourced production and proactive sourcing supports management literature that outsourcing would yield better results if aligned with another operational strategy [55].

Also, post-campaign sourcing would work well for projects with production infrastructure. The few choices of post-campaign sourcing strategies may probably be due to the lack of production facilities for many of the projects and further exhibited in the small number of in-house production strategies. Previous research has emphasized that projects can deliver on their promises if only creators have significant knowledge of schedules [34]. The finding in **Table 4** further suggests that most projects have already engaged suppliers and entered production contracts before the launch of the funding campaign. Therefore, adherence to these mitigation strategies can help creators set realistic delivery schedules for the physical rewards.

Further, **Table 6** and **Table 8** show that projects expect similar operational risks and mitigation strategies. Also, new funders contributed more positively toward the funding goals than returning funders. Theoretically, the findings contribute to risk disclosure literature and start a conversation on crowdfunding operational mitigation strategies.

Practically, this research offers support to crowdfunding stakeholders. First, the expected operational risks would benefit the prospective creators and funders in terms of the challenges associated with this model. Second, the results offer ideas to project creators on mitigating some of the operational risks related to the promised rewards. Third, a knowledge of the operational risks and mitigation strategies would assist funders in making an informed decision on project funding. Fourth, the findings would update project creators on the operational challenges surrounding sourcing, supplying, and producing the promised rewards. Fifth, prospective creators need to note that outsourcing the production of the promised rewards will yield a better result with a sourcing process that starts before the launch of a campaign. Lastly, crowdfunding platform operators and funders can demand mitigation plans to address operational challenges.

6. Conclusions

This research explores the operational risks and mitigation strategies of reward-based crowdfunding projects using data collected from Kickstarter.com. It centers on information disclosure, operational, and crowdfunding risk literature to explore the themes in the risks and challenges section during the funding phase. The

mixed-method approach revealed reward-based projects' operational risks and mitigation strategies. In particular, the study confirms that project creators make more submissions on mitigation strategies than operational risks. Also, it reveals that projects expect more risks from the contract manufacturers and supply market.

The qualitative analysis also establishes a strong association among these mitigation strategies: outsourced production, proactive, in-house production, and post-campaign sourcing. Both the qualitative and quantitative studies support these novel results. The results contribute to risk disclosure literature and offer guidelines to prospective crowdfunding seekers on managing operational challenges. Even though the selected projects come from three different industries: the Fashion Industry, the Technology Products Industry, and the Product Design Industry, future studies can conduct a comparative study to include other non-crowdfunding projects in other industries.

Statement and Declaration

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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