A Work-System Approach to Classifying Risks in Crowdfunding Platforms: An Exploratory Analysis

Full Paper

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Abstract

Crowdfunding has attracted much attention in the last few years because it has opened up new pathways for projects to obtain financing from individuals who are non-professional investors via the Internet. While risk occupies a central role in crowdfunding, this notion has been an unexplored area in the information systems literature. To close this gap, we contribute to the literature by identifying the main risks in crowdfunding platforms. Using the Work Systems Risk Framework, we analyze main risks in three equity crowdfunding platforms: Crowdfunder, AngelList and Seedrs. Our findings indicate that operational risk, project management risk, cognitive skill risk, IP risk, quality risk, legal risk and vendor relationship risk factors to be important to crowdfunding platforms. Findings from this study are relevant to platform owners and regulators in assessing the risks of crowdfunding platforms.

Keywords

Crowdfunding, risk identification, work systems risk framework, multiple case study

Introduction

> *"While this picture of the potential benefits of crowdfunding is undeniably attractive, as regulators we must be vigilant that the exemption will not become a tool for financial fraud and abuse… so there is the great risk that these offerings will fly under the radars of many regulators… There is the great risk that pump and dump operators will use social media to improperly promote these offerings… company information may be limited or simply false, and investors typically lack investment sophistication and are often insufficiently cautious" (Letter from the Secretary of the Commonwealth for Massachusetts to the SEC, August 8, 2012)*[1]

In this letter from the Secretary of the Commonwealth for Massachusetts to SEC, the notion of risk clearly occupies a central role. Crowdfunding is the financing of a project by a group of individuals usually via the Internet. Precisely, Lambert and Schweinbacher (2010) define crowdfunding as "an open call, mostly through the Internet, for the provision of financial resources either in the form of donation or in exchange for the future product or some form of reward and/or voting rights in order to support initiatives for specific purposes."

[1] http://www.sec.gov/comments/jobs-title-iii/jobstitleiii-121.pdf

Crowdfunding differs from traditional financing in various ways. A key difference is funders' profile . Traditional funders such as financial institutions, venture capitalists, and angel investors are professionals with investing experience. In contrast, the majority of crowdfunders are often retail investors funding for the first time. Unlike traditional funders, crowdfunders have neither the resources nor the expertise to evaluate investment opportunities for risks and returns. The geographical separation between creator and funders further prevents the funders from conducting a stringent review process. Also, due to the small amount of funding per funder, funders lack motivation to perform due diligence (Agrawal et al. 2013). With a wide variety of geographically dispersed projects competing for funds, funders of the noisy crowdfunding markets can benefit from help to identify and mitigate the risks (Ahlers et al. 2012).

These fundamental differences between traditional funding and crowdfunding may result in differences between the risks to users of traditional funding and crowdfunding. Given the heightened information asymmetries in crowdfunding markets, it is crucial to identify and understand the specific risks faced by crowdfunders. This leads to our central research question: *what are the risks to key stakeholders (funders, creators and platform owners) of a crowdfunding platform?*

To answer this question, we review previous literature on online multisided platforms to identify risk factors. We classify these risk factors based on Sherer and Alter's (2004) Work System Risk Framework (WSRF). The WSRF is a generic risk framework for all risks related to information systems (IS) and the environment around IS organized according to the work systems theory. Subsequently, we choose three crowdfunding platforms and analyze the risks on these platforms. Finally, we compare the risks identified from literature and real world applications.

This research contributes to IS literature by exploring an understudied aspect of crowdfunding: risk. Although research in crowdfunding has been gaining momentum, many questions, especially those on risks remain unexplored (Mollick 2014). Our work advances the understanding of crowdfunding by identifying and classifying risks on crowdfunding platforms.

Literature Review

Despite the remarkable success of crowdfunding as a source of funding, there has been little published peer reviewed work examining the risk on this phenomenon. Schweinbacher and Larralde (2010) offered one of the first descriptions of crowdfunding, and subsequently there have been several attempts to model the factors affecting crowdfunding, such as when individuals would choose to crowdfund (Belleflamme et al. 2014). Other studies have focused on the role of users in crowdfunding. Kuppuswamy and Bayus (2014) examine how funder support on Kickstarter varies depending on project success and timing. In another study, Agrawal et al. (2011) use a market of musicians seeking crowdfunding to understand whether geographic constraints which affect traditional funding are relaxed for crowdfunding. Baskerville and Cordery (2014) study crowdfunding in the context of universities and find that most universities are not using crowdfunding to raise funding for research. They find that certain more popular projects may crowd-out other less popular but more important research projects, and adversely affect their performance. Deffains-Crapsky and Sudoiska (2014) examine how crowdfunding may help bridge the early stage funding gap for radical innovation projects. They propose research to be carried out on how capital is allocated on crowdfunding platforms, the cognitive selection criteria used by crowdfunders while project selection, role of investors before and after funding and regulations that can ensure investor protection.

While these studies advance our understanding of crowdfunding, none of them examine risks. Only two previous studies address risks in crowdfunding. One study examines risk-taking behaviour of entrepreneurs on rewards-based crowdfunding platforms and finds that an entrepreneur sets higher funding goals to avoid project discontinuation due to the funding goal not being reached (Schweinbacher 2014). Another study identifies three legal risks in crowdfunding (Smith, 2013). Our study differs from previous work because our focus is to identify the risks to entrepreneurs, creators in our case, funders and crowdfunding platforms. Additionally, unlike the latter study, our study goes beyond legal risks, including technical risk factors and the concerned stakeholders.

A recent call highlighted three challenges in crowdfunding research: whether crowdfunding success and failure is driven by the same underlying dynamic as other forms of entrepreneurial investment, what is the role of geography in a crowdfunding environment, and do crowdfunding projects deliver risks (Mollick,

2014). The current literature on crowdfunding examines the roles of different users in the crowdfunding process, but the role of *risk* in the crowdfunding process has not been examined yet. Risk is the underlying concept of any entrepreneurial investment and all points of Mollick's agenda can be better understood if the risks in the crowdfunding process are identified. Our study seeks to answer this question by identifying risks to key stakeholders.

Our conceptualization and operationalization of risk are based on previous research. While various definitions exist, we adopt the definition by Rommel and Gutierrez (2012), who define risk as "the probability that something unfavorable will occur mostly followed by a loss." Several risk assessment methods adopt the approach of approximating the probability of an undesirable outcome by identifying and assessing *risk factors*, that is, *the characteristics of a situation that are likely to influence the occurrence of the outcome* (Bahli & Rivard 2005; Golichenko & Samovoleva 2013; Khidzir et al. 2010).

Crowdfunding is a multisided Internet based platform. Therefore, it should have risks similar to other multisided Internet based platforms. Researchers have proposed various risk frameworks for such platforms. Risks have been classified into 7 dimensions: physical, social, political, operational, economic, legal and cognitive environment (Tchankova 2002). Liebermann and Stashevsky (2002) identified 5 distinguishable areas of risks in eCommerce: financial, physical, psychological, social and technological. Evangelidis (2005) proposed a 5 dimensional STEPS framework for risks in eServices: societal, technical, economical, political and security. Kannangara and Uguccioni (2013) identified 8 major risks in crowdsourcing: relationship complexity, control/effectiveness, coopetition, keystone/actor independence, replication of business model, loss of know-how, loss of certainty in results and intellectual property risks.

Crowdfunding is a cross between crowdsourcing and microfinance (Mollick 2014). It can be viewed as an extension of the crowdsourcing concept where the consumers and other individuals provide financial help to the company (Schwienbacher and Larralde 2010). Therefore, some risks of crowdsourcing should extend to crowdfunding. Furthermore, when a firm carries out its initiative on a third party platform, that firm is partly dependent on the strategic decisions taken by the platform owner (Schenk & Guittard 2011). When initiatives are poorly designed or badly managed, they can trigger negative reactions in the community, and damage firm reputation (Gebauer et al. 2013). Through joint consideration of the various literatures, one may conclude that crowdfunding carries risks.

Running a successful fundraising campaign on crowdfunding platforms is a project by itself. It requires as much effort and ingenuity as any other fundraising activity (Dawson & Bynghall, 2012). There have been various risk frameworks developed for IS projects. One of the first studies provided a formal definition of IS project risks and arranged the risks into five dimensions: characteristics of the application, future users, development team, automated tasks and organizational tasks (Barki et al. 1993). Wallace et al. (2004) further refined this classification by presenting a six dimensional risk framework for IS projects: team, organizational environment, requirements, planning and control, user and project complexity. Han and Huang (2007) confirmed the framework proposed by Wallace et al. and found that 'requirements' and 'planning and control' were the two greatest threats to IS projects. Another important dimension was added to this framework taking into account the evolving nature of IS projects: outsourcing risks (Rommel and Gutierrez 2012). As per Kern et al. (2002), "In the context of information technology outsourcing, customers take risks when they put their faith in suppliers who oversell their capabilities, negotiate incomplete contracts or do not properly manage their outsourcing relationships. The negative outcomes from these risks include excess costs, poor service, loss of competitiveness, loss of revenues and loss of customers." Crowdfunding outsources the entrepreneurial risk and blurs the boundaries between marketing and finance by involving consumers as funders (Ordanini et al. 2011). Like IT outsourcing projects, crowdfunders also face risks from creators who may oversell their project and capabilities.

One of the criticisms of risk factors in IS research is the lack of an underlying theory (Sherer & Alter 2004). Many risk studies simply offer a list of risk factors without means that allow one to compare them independent of their application – for instance, which risks factors are common to crowdsourcing and crowdfunding – or without organizing them according to predefined criteria. To address this issue, Sherer and Alter (2004) defined a framework to organize risk factors using the work systems theory as the basis for their work. In their approach, risk factors are organized in nine groups (Appendix 1) covering all aspects of a work system. In this study, we adopt Sherer and Alter's (2004) risk framework as the conceptual basis underlying our work.

Determining Risks Factors in Crowdfunding

Risk factors for **work practices** include poorly designed business processes and inadequate planning and control mechanisms within the business process (Sherer & Alter 2004). We have identified an *operational risk* to indicate the probability that the funding process makes regular operations encumbered. For e.g. when overwhelming response from funders leads to overfunding, creators set unattainable expectations from the project as can be seen from the example of Pebble. This is close to the risk of overfunding of new ventures in traditional funding because it detaches the creators from the reality of the market (Adner 2006), encourages them to take enormous and unnecessary risks (Burke & Hussels 2013), and leads to a sharp decline in the effectiveness of funds (Gompers & Lerner 2003) resulting in decreasing returns (Achleitner et al. 2013). In equity crowdfunding, the creator distributes equity of the company in lieu of the funding s/he receives. With this equity, the funders may get some control over the project functioning and this may result in an agency problem (Agrawal et al. 2013; Wroldsen 2013). We define a *project management control risk* to encompass the potential risk of reduced control over various aspects of the project including resources and milestones. These agency problems are similar to those experienced in traditional funding (Bergemann & Hege 1998; Sahlman 1990).

Risk factors related to business **strategies** include a mismatch of the system with the organization's strategy (Sherer & Alter 2004). Creators face needs to raise funds depending on their strategy. Therefore, fundraising operations follow firm strategy. A similar case is seen with creators using crowdfunding. The risk of misalignment of business strategy in overfunded projects is already encompassed as part of operational risk. Therefore, there seem to be no risks due to the misalignment of business strategies.

Risk factors for **participants** include inadequate managers, inadequate skills and understanding, lack of motivation and interest, or a mismatch between participants' characteristics and the requirements of the work (Sherer & Alter 2004). Participants as defined by Sherer and Alter (2004) are "people who perform the work done by the business process and people who maintain the work system." People who maintain the crowdfunding work system are assumed to be experts who have requisite skills and are motivated. People who perform the work done by the crowdfunding business process are the users of the platform. Both creators and funders may display inadequate skills and understanding of IS platforms (Rommel & Gutierrez 2012), be incapable of fulfilling project goals (Belanger & Hiller 2006), or lack motivation (Chandler et al. 2013). Because of the unique nature of crowdfunding platforms, participants who "perform the work done by the business process" (i.e., crowdfunding) are the same as the **customers** of the business process. Typical risk factors related to customers include disagreement concerning the requirements or expectations for the products and services, or difficulty using or adapting the system's products and services (Sherer & Alter 2004). In our study, these risk factors are similar to those identified for user participants of crowdfunding which we have defined earlier. Funders on crowdfunding are retail investors and are not as sophisticated as funders of traditional funding. Therefore, they may not have the cognitive skills to assess the viability of a project (Chandler et al. 2013). We combine the risks from participants and customers to define a generic risk factor called *cognitive skill risk*.

Risk factors for **information** include inadequate information quality, accessibility, presentation, and security (Sherer & Alter 2004). In all open innovation platforms, management of intellectual property (IP) remains a critical part of the management model (Euchner 2013). In crowdfunding, creators disclose their personal information and IP of their project in a public environment. Souza et al. (2009) and Kannangara and Uguccioni (2013) identify loss of IP as one of the risk factors in crowdsourcing. Smith (2013) mentions loss of IP as an important risk while participating in a business ecosystem. This motivates us to define an *IP risk* related to the loss or theft of intellectual property or knowledge into the public domain.

Typical risk factors related to **products and services** include products or services that have inadequate quality or cost levels or that do not meet customers' wants or needs (Sherer & Alter 2004). Quality of a crowdfunding platform is dependent on the quality of the projects on the platform and the ability of the platform to attract creators and funders. Statistics have shown that the majority of the projects go unfunded on most of the platforms. Kickstarter, one of the most popular crowdfunding platforms, has a

success rate of less than 40%.[2] Therefore, there is a loss of certainty of results, like crowdsourcing platforms (Kannangara and Uguccioni 2013). We define this as *quality risk* factor.

Risk factors for **environment** include lack of management support and attention, inconsistencies with the organizational culture, and lack of fit with the demands of the surrounding environment (Sherer & Alter 2004). Wolfson and Lease (2011) have identified a set of legal challenges in crowdsourcing, including issues such as inventorship and patent laws, and customer privacy. Evangelidis et al. (2002) have identified legal risks as key to eGovernment platform success. Online platforms carry legal risks related to the confidentiality of personal information and availability of platforms to unauthorized users (Mahler & Vraalsen 2007; Vraalsen et al. 2005). The JOBS Act of 2012 has started the process of regulating crowdfunding in US but it is still a constantly changing environment. Security and success of crowdfunding, particularly equity crowdfunding, will not be achieved without sufficient legal protections for the users. We identify a *legal risk* factor, covering the likelihood that the crowdfunded project will not satisfy compliance requirements and will increase exposure to lawsuits between participants.

Risk factors for **technology** include ease of use or performance issues (Sherer and Alter 2004). Various technology acceptance and usage models for IS have focused on the usability and performance reliability of the technology as an important determinant of users' technology behavior (Davis, 1993; Davis et al. 1989; Venkatesh & Davis 2000; Venkatesh et al. 2003). We define as the *usability risk* factor. Typical risk factors for **infrastructure** include human, technical and IS infrastructure inadequate to support the system (Sherer & Alter 2004). We define a *vendor relationship risk* factor, which applies to funders who use crowdfunding platform vendors to host their crowdfunding projects. The risk factor refers to the potential for the vendor to underperform in a way that undermines the project's objectives.

Using the WSRF, we have defined operational risk, project management risk, cognitive skill risk, IP risk, quality risk, legal risk, usability risk, and vendor relationship risk factors based on the nine risks in the framework. In the next section, we identify risks on three crowdfunding platforms and test whether these risks can be classified as per our risk factor definitions.

Methodology

While literature in crowdfunding is emerging, there is limited research and understanding in this area (Mollick 2014). Questions about risk in this area are fundamentally unexplored given that crowdfunding is a current and booming phenomenon. Our aim was to perform exploratory qualitative research using a multiple case study approach to help us generate new insights into the risks of crowdfunding platforms as this approach was deemed to provide the best methodological fit for this study (Eisenhardt 1989b) and to explain the phenomenon (Yin 2009).

Research Context and Data

Three crowdfunding platforms were examined to identify risks according to the WSRF. We chose two platforms in US and one in Europe. Two platforms from the same geographical region allow us do a comparison between two interpretations of crowdfunding in the same market and under the same regulations. The third case from a different geographical region allows us to compare and contrast interpretations of crowdfunding in different markets and under different regulations. This sample takes a broad view of the crowdfunding space for our exploratory study. Crowdfunder and AngelList are among the top 10 crowdfunding platforms globally.[3] Seedrs is one of the top crowdfunding platforms in Europe.[4]

We collected data about the operational process from publically available information on the website of each platform. To collect data, one author parsed through the pages on the official websites to determine the crowdfunding operation on each platform. To ensure reliability, a research assistant performed the same task. In addition, both the author and the research assistant independently read the various terms

[2] https://www.kickstarter.com/help/stats

[3] http://www.forbes.com/sites/chancebarnett/2013/05/08/top-10-crowdfunding-sites-for-fundraising/

[4] http://crowdsourcingweek.com/top-15-crowdfunding-platforms-in-europe/

and conditions, and privacy policies that users are made to sign while signing up for the platforms. This was an important resource to identify risks factors and how they may have been controlled by the platforms. At the end of the independent searches, the author and the research assistant compared their reports and built a general consensus on the operations of the three platforms through discussion. The second author, who is an expert in risk management, information security, and information privacy, checked the results. In addition, we use the Woorank, a website review portal that offers data about the usability of websites, and their underlying technologies to enrich the data gathered. Below we describe the crowdfunding process on the three platforms.

Crowdfunding operates similarly on all three platforms. Users are required to register themselves on the platforms to create or fund a project. Creators mention their project details, funding goal, funding time limit and the security they wish to distribute in lieu of funding. All projects go through a basic due diligence test by the platforms before they can be published. Funders search for desirable projects to fund according to their preferences. However, there are subtle differences in the operations of each platform.

Crowdfunder and AngelList follow the SEC regulations in US. All funders on Crowdfunder and AngelList have to be 'Accredited Investors' as defined by the JOBS Act, 2012. Crowdfunder targets funders who are looking for small amounts at the beginning stages of a project while AngelList targets funders who wish to fund projects at a later stage in the life cycle, similar to angel investing stage. Therefore, the average profile of funders on Crowdfunder and AngelList is different. Seedrs targets independent funders in Europe and follows the UK regulations. AngelList creates a Limited Liability Company (LLC) for each project published on its platform while Seedrs acts as a nominee for all funders of a project on its platforms and interacts with creators on behalf of the funders.

Findings and Analysis

We created a table of all the risk factors described in the work systems framework and identified if those risk factors are relevant to the operations of each platform. Appendix 2 shows this analysis. From the table we can see that the risk factors identified for each platform are common in most cases. There are also a few cases where risks are identified on a platform(s) and not identified on the other(s). This is because of the small differences in how the platforms operate.

In the **work practices** risks factors, 'Failure to operate the business process efficiently or effectively,' 'Failure to maintain the work system resulting in gradual degradation of work system performance,' and 'Ineffective operational management and leadership' are risk factors on all three platforms because equity crowdfunding inherently bring agency problems and all three platforms allow overfunding. Due to differences between funders and creators about the management and vision of the project, a project may fail to operate efficiently or effectively. This is similar to the agency theory where separation between the management and board of directors (shareholders) induces risk due to agency costs that may make the project inefficient (Eisenhardt 1989a; Fama 1980). Some platforms allow overfunding, some don't. Crowdfunder, AngelList and Seedrs allow overfunding, which can overwhelm the creators and lead to a failure to maintain the system. Creators, who are not very experienced and who do not have agile plans for their project can get a false sense of security and mismanage the project. This shows ineffective leadership on their part. Therefore, these risk factors are present on the three platforms. Risk factors 'Inadequate fit of the business process with other work system elements,' and 'Inadequate resources to support the business processes' cannot be determined since data about projects' internal resources and work systems is not available. The risk factors identified align with the operational risk and project management control risk factors that we defined based on literature.

In the business **strategies** risk factors, we identified that the two risks were not applicable. There are two reasons for this. First, a crowdfunding platform's strategy will inherently be aligned with the work system's strategy. Second, creators primarily use crowdfunding to raise capital, not to source ideas about their strategy or products. Therefore, crowdfunding should not affect the business strategies of a creator's project. This leads us to conclude that business strategy risk factors for IS projects are not applicable to the specific case of crowdfunding projects.

Due to the unique nature of crowdfunding, crowdfunding platform managers and users of crowdfunding platforms can both be classified as **participants** as defined in the WSRF. In determining the risk factors due to actions of platform managers, it is safe to assume that risk factors related to platform managers do

not exist. User participants of crowdfunding are also **customers** of crowdfunding. Therefore we simultaneously analyze participant and customer risk factors. These risk factors include 'Inadequate managers and leaders,' 'Lack of motivation and interest,' 'Inability or unwillingness to work together to resolve conflicts,' and 'Errors by participants: poor judgment in making decisions, operator error in using technology' do apply to users of crowdfunding platforms. Despite basic due diligence by the three platforms, inadequately skilled creators who may lose motivation or interest in the project may be able to post projects on the platforms. This is seen by the low level of project funding success on the platforms reflecting the average project quality, as determined by the crowd. On the other hand, the three platforms differ on the risk factors 'Inadequate skills and understanding,' and 'Mismatch between characteristics of participants and requirements of the process.' This is because funders on Crowdfunder and AngelList have to satisfy stringent criteria to be classified as 'Accredited Investors (AI)' while on Seedrs, they don't. Only allowing AIs to fund ensures that all funders understand the specific risks of funding on crowdfunding platforms and have the requisite skills or experience to perform the operation(s). This is not required for funders on Seedrs; therefore the risk factors are applicable. These risk factors align with the cognitive skills risk factor that we defined based on literature.

Crowdfunder, AngelList and Seedrs are successful platforms and have **information** on the platforms that is relatively secure, and of high quality. All three platforms mention that they maintain industry standards while dealing with information, however some security and accessibility risks were identified when the platforms were analyzed using the Woorank service (Appendix 3). Crowdfunder does not have 'Robots.txt' and 'XML Sitemap' files. Therefore crawlers can access all pages and information on the website. Accessibility of information about the project can also be a risk factor in the post funding stage on Crowdfunder. AngelList creates LLCs for each of the projects published on its platform, which may give funders accessibility rights while Seedrs acts as a nominee for all the funders, constantly interacts with creators and helps track project progress for the funders. Crowdfunder however, specifically states that it is not a broker or a dealer and has plays no part in the transactions. Therefore, it cannot ensure traceability of projects post funding. Users can register and access the platforms for free, opening up the platforms to malicious and nonmalicious users. The platforms try to mitigate risks to confidential information using privacy policies but cannot guarantee confidentiality of intellectual property. Therefore, like all other public platforms, there is a risk to IP on crowdfunding platforms as well. These risks align with the IP risk we defined based on literature.

The products for crowdfunders are the projects and the service is the crowdfunding platform. These **products and services** also have risk factors. The projects, as determined the experts in the crowd, are mostly not of the best quality. This is because most of the projects on crowdfunding platforms don't reach their funding goal. There may also be the case that creators use crowdfunding for projects that do not attract investment from traditional funding. This may also reflect bad quality of crowdfunding projects. Therefore, there is a risk factor related to the quality of products and services of crowdfunding projects aligned with the quality risk factor we defined based on literature.

Success of a new fundraising phenomenon such as crowdfunding depends on the **environment** surrounding its ecosystem; especially the regulations that governments propose to control its use and prevent fraud. Before the JOBS Act of 2012, crowdfunding was not regulated and there was freedom for platforms to operate. Since the regulations were proposed in 2012, the platforms have to abide by the regulations and modify their functioning accordingly. This is especially true for the equity crowdfunding platforms. In the past few years, the regulations have been regularly changing and updating affecting the functioning of platforms. The scenario in UK has been similar. Therefore, risk factors 'High level of turmoil and distractions undermines work system performance,' and 'Changes in the surrounding environment dictate that the new or modified work system is no longer adequate' are applicable to the three platforms. These risks, related to the regulations align with our definition of legal risk factors.

Crowdfunder, AngelList and Seedrs do not publicly disclose the **technologies** they are using to operate the platforms and ensure information security. However, we found information about load time and speed using the Woorank tool, as shown in Appendix 3. From these statistics, Crowdfunder is weak in the usability scores while others are average at best. This is a sign that the platforms may be affected by usability problems and they have scope for improvement. The risk aligns with the usability risk we identified using literature. In contrast, the human, technical and informational **infrastructure** is adequate on the three platforms. Crowdfunder and AngelList do not have explicit relationships with the creators and funders on their platforms. They do not act as an intermediary in the funding process. Seedrs

however, acts as a nominee for all the funders and constantly interacts with creators. Therefore, the relationship between users and the platform is very important. Data from Woorank (Appendix 3) shows that vendor relationship score for Seedrs is the least. Failure of this relationship is a risk factor that the users of the platform need to consider. This risk factor aligns with the vendor relationship risk factor we defined.

Conclusion

While risk occupies a central role in crowdfunding, this notion has been an unexplored area in the crowdfunding literature. This study takes a first but important step in filling this gap in the IS literature by identifying the risks to 3 main stakeholders of crowdfunding platforms. We analyzed Crowdfunder, AngelList and Seedrs using WSRF and find that the risks identified fits the risk factor classification scheme we have defined. Our finding provides a set of risks that affect funders, creators and crowdfunding platforms, which can be used by future research. This finding is also pertinent from a practical standpoint. Crowdfunding as a source of funding has accelerated in the last few years especially in regions such as Europe, attributed largely to the crisis which has been characterized by limitations to obtain funding via traditional funders (Sannajust et al. 2014). As such, Platform owners and regulators will find the proposed framework to be helpful in assessing the risks of crowdfunding platforms. In addition, users of crowdfunding can use our findings to identify immediate risks and perform a thorough risk assessment while choosing to participate on crowdfunding platforms. Finally, this study has limitations, which we will address in future research. For instance, we will include more platforms in our future analysis to increase the validity of our findings. We also intend to provide the weightings for each of the risks highlighted in this work.

Appendices

Appendix 1

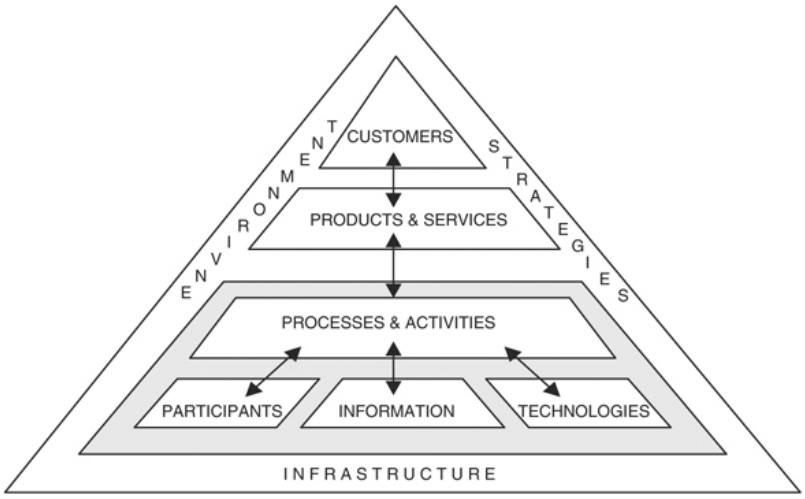

Figure 1: Work System Risk Framework (Sherer and Alter, 2004)

The following is the description of 9 elements of the Work System Risk Framework:

Work Practices / Business Processes: The work performed within the system can be summarized in terms of one or more business processes whose steps may be defined tightly or may be relatively unstructured.

Participants: People who perform at least some of the work in the business process are the system participants.

Information: Include codified and non-codified information used and created as participants perform their work.

Technologies: Include tools (such as cell phones, Web, spreadsheet software, etc.) and techniques (such as management by objectives, optimization, remote tracking, etc.) that system participants use while doing their work.

Product and Services: the combination of physical things, information, and services that the system produces. They may include physical products, information products, services, intangibles such as enjoyment and peace of mind, and social products such as arrangements, agreements, and organizations.

Customers: People who receive direct benefit from products and services the system produces include external customers who receive the organization's products and/or services and internal customers who are employees or contractors working inside the organization.

Infrastructure: Include human, informational, and technical resources that the system relies on even though these resources exist and are managed outside of it and are shared with other systems.

Strategies: To the extent to which they are clearly articulated, the system's strategy and the organization's strategy may help in explaining why the system operates as it does.

Environment: includes the organizational, cultural, competitive, technical, and regulatory environment within which the system operates.

Appendix 2

RISKS	RISK FACTORS (SHERER AND ALTER, 2004)	STAKEHOLDER AFFECTED	CROWDFUNDER	ANGELLIST	SEEDRS
Work Practices	Failure to operate the business process efficiently or effectively	Creator	Y	Y	Y
	Failure to maintain the work system, resulting in gradual degradation of work system performance	Creator, Funder	Y	Y	Y
	Inadequate fit of the business process with other work system elements	NA	NA	NA	NA
	Inadequate resources to support the business processes	NA	NA	NA	NA
	Ineffective operational management and leadership	Funder	Y	Y	Y
Participants	Inadequate managers and leaders	Funder	Y	Y	Y
	Inadequate skills and understanding	Funder	N	N	Y
	Lack of motivation and interest (typically resulting in poor quality, lower productivity, higher rework)	Funder, Platform	Y	Y	Y
	Inability or unwillingness to work together to resolve conflicts	Creator, Funder	Y	Y	Y

	Errors by participants: poor judgment in making decisions, operator error in using technology	Creator, Funder	Y	Y	Y
	Mismatch between characteristics of participants and requirements of the process	Funder, Platform	N	N	Y
Information	Inadequate information quality (Data errors degrade system operation; Incorrect or untimely data produced by the system)	NA	N	N	N
	Inadequate information accessibility	Creator, Funder	Y	N	N
	Inadequate information presentation	Creator, Funder	Y	Y	Y
	Inadequate information security	Creator, Funder	Y	Y	N
Technologies	Technology is difficult and inefficient to use	Platform, Creator	Y	N	N
	Technology crashes	NA	NA	NA	NA
	Technology performance is inadequate	Platform, Creator	Y	Y	N
	Hardware or software bugs degrade work system efficiency or effectiveness	Platform, Creator	Y	Y	N
	Incompatibility of technology with other complementary technologies elsewhere	NA	NA	NA	NA
	Difficulty maintaining the technology	NA	NA	NA	NA

Product and services	The work system produces products or services whose average quality or cost to the customer is inadequate	Platform	Y	Y	Y
	Particular instances of the work system's products or services contain major flaws	Platform	Y	Y	Y
Customers	New or modified work system produces products and services that its customers don't want	Platform	Y	Y	Y
	Work system customers change, and new customer requirements differ from previous customer requirements	Platform	Y	Y	N
	Major flaws in particular instances of the work system's products or services cause significant problems for customers	Platform	Y	Y	Y
Environment	Lack of management support and attention needed for effective operation of the work system	NA	NA	NA	NA
	Inconsistencies with the organizational culture undermine work system performance	NA	NA	NA	NA

	High level of turmoil and distractions undermines work system performance	Platform	Y	Y	Y
	Changes in the surrounding environment dictate that the new or modified work system is no longer adequate	Platform	Y	Y	Y
Infrastructure	Human, technical, or informational infrastructure is inadequate to support the ongoing operation and maintenance of the new or modified work system	Creator, Funder, Platform	N	N	Y
	Particular failures of human, technical, or informational infrastructure degrades or prevents work system operation during a particular period	Creator, Funder, Platform	N	N	Y
Strategies	The organization's strategy changes, creating or exacerbating a mismatch with the work system's strategy	NA	N	N	N

Table 1: Risk Analysis of Crowdfunder, AngelList and Seedrs

Note: In the table, 'NA' denotes that public data was not available for that particular risk factor for that platform, 'Y' denotes that we could identify the risk factor for that platform and 'N' denotes that we could not identify the risk factor for that platform.

Appendix 3

Risk Factor	Metric	Submetric	Crowdfunder	AngelList	Seedrs
Usability	Load time		3.6 seconds (9.28 kbps)	0.81 seconds (154.73 kbps)	0.75 seconds (54.13 kbps)
	Speed tips		3/6	5/6	4/6
	W3C validity		7 errors, 5 warnings	7 errors, 3 warnings	4 errors, 1 warning
	Mobile load time		Very Slow	Average	Average
	Custom 404 page		Present	Missing	Present
Security	Directory browsing		No	No	No
	Server signature		No	No	No
	Robots.txt		Missing	Present	Present
	XML sitemap		Missing	Missing	Present
	Email privacy		Good	Problem	Good
	Trust Indicators	Trust	88%	91%	79%
		Vendor reliability	88%	91%	79%
		Privacy	88%	91%	79%
		Child safety	95%	91%	89%
	Safe browsing		Good	Good	Good
Overall Rating			82.5	83.5	85.6

Table 2: Woorank.com statistics for Crowdfunder, AngelList and Seedrs

Notes:

- Speed tips: Signifies how many of the 6 Woorank speed metrics does the platform qualify for. The metrics are: your server is using a caching method to speed up page display, your website doesn't use nested tables, your website is using inline styles, your website has few CSS styles, your website has few JavaScript files, your website takes advantage of gzip.
- W3C validity: This validator checks the markup validity of Web documents in HTML, XHTML, SMIL, MathML, etc. Markup validation is an important step towards ensuring the technical quality of web pages.
- Custom 404 page: Whether the website has a customized 404 page. It is bad to not have it in terms of usability.
- Directory browsing: Directory browsing is a web server feature that keeps people from seeing the unrendered html/images on your web page. It is better to switch it off for security purposes

- Server signature: In the default configuration of servers, any error pages will contain the full signature of the server (version number), which could be exploited by hackers. Each version has some deficiencies that could be exploited, and a hacker who knows your version number may benefit from it by focused attacks. It is better to switch it off.
- Robots.txt and XML Sitemap: A robots.txt file allows you to restrict the access of search engine robots that crawl the web and it can prevent these robots from accessing specific directories and pages. It also specifies where the XML sitemap file is located. A sitemap lists URLs that are available for crawling and can include additional information like your site's latest updates, frequency of changes and importance of the URLs. This allows search engines to crawl the site more intelligently. It is better to have both these files for your website.
- Email privacy: Signifies whether at least one of the emails mentioned on the website is in plain text. Malicious bots scrape the web in search of email addresses and plain text email addresses are more likely to be spammed.
- Trust indicators: These are 4 indicators that are self-reported by the users of the website.
- Safe browsing: Indicates if any evidence of malware and/or phishing has been detected.

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