



*WORKING PAPER:*

HOW DO CROWDFUNDING INTERMEDIARIES PERFORM FINANCIAL INTERMEDIATION? MECHANISMS AND ARCHETYPES

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**Abstract**

Crowdfunding emerged as new way of funding by matchmaking capital givers and seekers. However, traditional financial intermediation theory falls short in explaining how crowdfunding brings demand and supply for capital to equilibriums. We thus develop a system theory of crowdfunding intermediation by unraveling specific mechanisms of crowdfunding intermediation and identifying dominant configurations of them. Following a mixed method approach, we collect data on implemented crowdfunding intermediation mechanisms by content-analyzing 160 crowdfunding intermediaries. We then apply unsupervised and supervised machine learning techniques in order to identify three timely robust archetypes of crowdfunding intermediation – philanthropic, hedonistic, and profit-oriented crowdfunding. This study contributes to crowdfunding literature by proposing a theory of crowdfunding intermediation that unravels the inner workings of crowdfunding intermediaries and reflects a theoretically grounded, empirically validated, and temporally stable taxonomy of crowdfunding intermediaries. Further, it extends financial intermediation theory by improving the understanding of how the Internet disrupts traditional financial intermediation.

**Keywords:** Crowdfunding, Crowdfunding Intermediation, Financial Intermediation, System Theory, Cluster Analysis, Survival Analysis, Alignment

## 1. INTRODUCTION

Emerged from the impact of digitization, platform-based business approaches have affected, threatened, and radically changed traditional industries with start-ups introducing innovative solutions, which deeply impacted today's societies and individuals (Weber 2016). Especially, the financial service industry is facing radical changes, driven by the *fintech* paradigm, where the roles of customers and suppliers become blurry and the value co-creation takes place on multi-sided platforms, which perform the service provision within ecosystems (Rong and Shi 2014; Williamson and De Meyer 2012).

Providing an innovative, platform-based approach in order to perform financial intermediation, crowdfunding has gained large attention recently (Belleflamme et al. 2014; Mollick 2014; Schwienbacher and Larralde 2012). Crowdfunding describes the collective funding of projects by a crowd of capital givers on an intermediary platform (Belleflamme 2014). It may span highly different purposes that range from collecting donations for social projects, (pre-) selling products, to funding start-ups in exchange for profit shares and/or interests (Bradford 2012). While the platform-based crowdfunding intermediaries serve the same purpose such as incumbent financial intermediaries – connecting capital seekers and givers to create thick markets – they exhibit three fundamental differences. (1) Funding decisions and activities are no longer reserved to professional financial institutions (e.g., banks or venture capitalists), but democratized by opening up to every individual with Internet access and the required financial ability (Belleflamme et al. 2014). (2) They provide funding for projects that have limited access to traditional forms of funding due to high investment risk and/or low profitability expectations and that may reflect the long tail of the financial service industry (Liebenau et al. 2014; Schwienbacher and Larralde 2012). Crowdfunding intermediaries make extant use of information technology aiming at serving such projects profitable (e.g., co-creation based on web 2.0 approaches, big data analytics, or process automatization) (Haas et al. 2015). (3) As opposed to traditional financial intermediaries, crowdfunding intermediaries are not involved in the actual funding process. Crowdfunding intermediaries serve as matchmaker by linking capital seekers and givers directly and by enabling them to exchange capital and value for which they provide the technical or organizational infrastructure on an online platform (Liebenau et al. 2014).

These differences exhibit some degree of disintermediation of the actual funding process by directly linking capital seekers and givers. In crowdfunding, however, the intermediary platform still represents an essential instance of the funding process, due to occurring transaction costs and information asymmetries (Bakos 1991; Bakos 1998; Mahadevan 2000). For instance, collecting micropayments from capital givers can reflect an arduous task. Similarly, new approaches for evaluating and controlling “default risks” of long tail projects may be required, particularly when capital seekers may hide or manipulate important information (Ahlers et al. 2015; Burtch et al. 2016). Consequently, crowdfunding intermediaries evolved as new platform-based class of financial intermediaries that have reshaped the way effective financial intermediation is performed with regard to the disruptive challenges caused by the digitization. Existing financial intermediation theory (Allen and Santomero 1998; Diamond 1984) falls short in explaining how crowdfunding platforms perform financial intermediation as it does not take into consideration (1) the high degree of digitization of the business operations; (2) the joint value co-creation in ecosystems; (3) the changed role of the financial intermediary as matchmaker within a multi-sided platform business; and (4) the creation of long tail offerings for niche markets. Considering the diversity of crowdfunding platforms suggests that different archetypes of crowdfunding platforms exist, that represent certain dominant configurations in order to perform effective crowdfunding intermediation within a specific context of use. Thus, these dominant configurations may reflect different instantiations of crowdfunding intermediation. However, research and practice offer a plethora of different conceptualizations of the phenomenon, which hampers our understanding of *how the platform-based crowdfunding intermediaries are configured in order to perform effective financial intermediation*.

In this paper, we intend to answer this crucial question. We develop an explanative system theory of crowdfunding intermediation and discover how crowdfunding intermediaries apply distinct organizational and technical mechanisms for performing effective financial intermediation. We argue that the implementation of these mechanisms results in a system of crowdfunding intermediation, which determines the way of how crowdfunding intermediation is being performed effectively. We illustrate this theory following a mixed method approach. We content analyze a set of 178 crowdfunding intermediaries in order to identify the implemented mechanisms for crowdfunding intermediation. We apply unsupervised (cluster analysis) and supervised

(classification tree analysis) machine learning techniques (George et al. 2016) and identify three temporally stable archetypes of crowdfunding intermediation. First, hedonistic crowdfunding intermediation, which enables the funding of innovative and creative projects by applying a rigid set of funding mechanisms and proposing non-monetary rewards as compensation for capital givers. Second, philanthropic crowdfunding intermediation, which is characterized by relaxed funding mechanisms and that enables raising funds for charitable projects by creating altruistic experiences without any direct compensation for capital givers. Third, profit-oriented crowdfunding intermediation comprises financial compensations for capital givers, which is mostly applied for the funding of start-ups and loans for private consumption. This type includes a rather moderate set of funding mechanisms and mostly performs some sort of due diligence. By analyzing the survival rate of the investigated platforms, we show that a platform's proximity to one of three dominant configurations of intermediation mechanism enhances the platform's effectiveness.

By defining a system theory of crowdfunding intermediation, we provide three important theoretical contributions. First, we contribute to the crowdfunding literature by unraveling the inner workings of crowdfunding and explaining how crowdfunding intermediaries perform financial intermediation by forming effective systems of crowdfunding intermediation mechanisms. Thus, we help to substantiate existing attempts to structure the crowdfunding phenomenon by proposing three theoretically grounded, empirically validated, and timely stable archetypes of crowdfunding intermediaries. Second, we are able to explain the relationship between a platform configuration's proximity to one of the archetypal configurations and its sustainable effectiveness. Third, we extend financial intermediation theory by improving our understanding of how the Internet, the digitization, and the opportunities of innovative information technology reshape traditional financial intermediation (Allen and Santomero 1998; Diamond 1984) and we provide valuable insights in the rise and the maturation of the crowdfunding phenomenon.

The paper proceeds as follows. We start reviewing the literature on crowdfunding and financial intermediation theory. We extend this theory base by unraveling the building mechanisms of our crowdfunding intermediation theory. After presenting our methodology, we then identify dominant archetypes of crowdfunding intermediation

and investigate the impact of the platform's configuration on effectiveness. Finally, we discuss these results with regard to their theoretical and practical implications.

## **2. CONCEPTUAL AND THEORETICAL BACKGROUND**

### **Crowdfunding and Crowdfunding Intermediaries**

Belleflamme et al. (2014) define crowdfunding as collective funding by an undefined crowd, where capital seekers (i.e., initiators of crowdfunding projects such as artists, entrepreneurs, etc.) and a crowd of capital givers are directly interlinked via an online crowdfunding intermediary by means of an Internet-based open call. Crowdfunding intermediaries provide an online platform as the point of interaction between capital givers and seekers, a regulatory framework (e.g., standardized contracts (Bradford 2012)), and additional services (e.g., debt collection (Liebenau et al. 2014)).

Most existing crowdfunding research has focused on capital seekers and givers. Research investigated behavioral decision-making patterns of capital givers and seekers, e.g., herding or signaling effects (Agrawal et al. 2010; Burtch et al. 2013b), their motivation (Gerber et al. 2012), their characteristics (Lin et al. 2014; Wang and Greiner 2011), or their roles and activities within crowdfunding projects (Hui et al. 2013; Ordanini et al. 2011). The second main stream of research focuses on crowdfunding projects, e.g., factors that influence the funding success including social and personal networks (Lin et al. 2013), project presentation (Mitra and Gilbert 2014b), or the dynamics of crowdfunding projects (Mollick 2014; Schwienbacher and Larralde 2012). Additionally, certain authors investigated risks associated with crowdfunding (Burtch et al. 2016; Cumming et al. 2016; Siering et al. 2016).

So far, research on crowdfunding intermediation and intermediaries has been largely neglected. Most notably, Tomczak and Brem (2013) conceptualize the process of crowdfunding intermediation. Some researchers emphasized that crowdfunding intermediaries are mainly build on modular service systems (Haas et al. 2015; Hemer 2011; Liebenau et al. 2014). Thus, crowdfunding intermediation can be conceptualized as a bundle of services needed to match capital givers and seekers in a two-sided market (Wei and Lin ; Zvilichovsky et al. 2013). Furthermore, existing research has focused on classifying crowdfunding intermediaries (see Table 1). These first attempts differentiated crowdfunding based on the *legal* relationship between capital givers and seekers (Bradford 2012), the *compensation* for capital givers (Belleflamme et al. 2014;

European Commission 2014; Massolution 2013), their *motivation* (Collins and Pierrakis 2012; Hemer 2011), and additional *risk* factors (Beaulieu et al. 2015; Ordanini et al. 2011). Table 1 exhibits that between two and six different types of crowdfunding intermediaries have been proposed.

**Table 1: Classifications of Crowdfunding Intermediaries**

<b>Author</b>	<b>Focus of Classification</b>	<b>Types of Crowdfunding</b>	<b>Theoretical Foundation &amp; Empirical validation</b>
Belleflamme et al (2014)	Community benefits that increase capital givers' utility	<ul style="list-style-type: none"> <li>• Pre-Ordering</li> <li>• Profit-Sharing</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• Theoretical unified model</li> <li>• No empirical validation</li> </ul>
Bradford (2012)	Legal Relationship based on the offered returns for capital givers	<ul style="list-style-type: none"> <li>• Donating Model</li> <li>• Reward Model</li> <li>• Pre-Purchase Model</li> <li>• Lending Model</li> <li>• Equity Model</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• Federal Securities Law</li> <li>• No empirical validation</li> </ul>
Collins & Pierrakis (2012)	Forms of contributions, returns, and motivations	<ul style="list-style-type: none"> <li>• Donation Crowdfunding</li> <li>• Reward Crowdfunding</li> <li>• Crowd-funded Lending</li> <li>• Equity Crowd-funding</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• No theoretical foundation</li> <li>• No empirical validation</li> </ul>
European Commission (2014)	Forms of returns	<ul style="list-style-type: none"> <li>• Donations</li> <li>• Reward-based</li> <li>• Pre-Sales</li> <li>• Crowdlending</li> <li>• Crowdinvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• No theoretical foundation</li> <li>• No empirical validation</li> </ul>
Hemer et al (2011)	Forms of returns and motivations	<ul style="list-style-type: none"> <li>• Crowd Donations</li> <li>• Crowd Sponsoring</li> <li>• Crowd Pre-Selling</li> <li>• Crowd Lending</li> <li>• Crowd Equity</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• No theoretical foundation</li> <li>• Systematic description of 200 crowdfunding platforms</li> </ul>
Massolution (2013)	Forms of returns	<ul style="list-style-type: none"> <li>• Donation-based</li> <li>• Reward-based</li> <li>• Lending-based</li> <li>• Equity-based</li> <li>• Royalty-based</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• No theoretical foundation</li> <li>• No empirical validation</li> </ul>
Ordanini et al. (2011)	Risk return ratio and type of consumer involvement	<ul style="list-style-type: none"> <li>• Music business</li> <li>• Financial services</li> <li>• Context of personal and social services</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• No theoretical foundation</li> <li>• No empirical validation</li> </ul>
Beaulieu et al. (2015)	Exchange and risk factors	<ul style="list-style-type: none"> <li>• Private equity</li> <li>• Royalty</li> <li>• Microfinance</li> <li>• Peer-to-peer</li> <li>• Rewards</li> <li>• Donation</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual nature</li> <li>• Grounded theory approach</li> <li>• Content analysis of 99 campaigns with regard to 13 characteristics</li> </ul>

These classifications are mostly conceptual in nature and are primarily based on the provided compensation. They are neither theoretically grounded, nor empirically validated. Further, these classifications neglect financial intermediation as core function of crowdfunding intermediaries.

### **Financial Intermediation Theory**

A financial intermediary is a middleman in financial transactions, which effectuates more efficient transactions (Lin 2015). Financial intermediaries are ubiquitous and essential institutions in imperfect markets, which are characterized by transaction costs (Benston and Smith 1976; Gurley and Shaw 1966) and information asymmetries (Fama 1980; Leland and Pyle 1977). Financial intermediaries borrow capital from capital givers and lend it to capital seekers by using debt contracts and make profits by asking higher interests from capital seekers than they pay for capital givers (Gorton and Winton 2003). Financial intermediation theory describes the necessity of specialized intermediaries in the resource allocation between capital seekers and givers by transforming (1) lot sizes, (2) risk, (3) information, and (4) maturities (Allen and Santomero 1998; Diamond 1984; Entrop et al. 2015; Fama 1980).

**(1) Lot Size Transformation:** Financial intermediaries balance diverging capital requirements. Therefore, deposits of capital givers are bundled in order to satisfy the capital requirements of capital seekers. Financial intermediaries act as matchmakers by serving capital givers and seekers on own account. In so doing, they provide pooling and payment mechanisms for the capital exchange in order to overcome the boundaries of time, geographies, and industries (Merton 1989).

**(2) Risk Transformation:** Financial transactions contain risks and uncertainties. The expected return for an investment is directly linked to a certain risk expectation (Markowitz 1952). Thus, higher default risks result in higher return expectations. Financial intermediaries balance diverging risk expectations by managing, diversifying, and trading risks among capital seekers and givers. They may act as neutral, trustworthy, objective, and specialized partner for third parties that ensure integrity, veracity, and legal compliance (Bakos 1998; Gorton and Winton 2003; Merton 1989). Due to their experience in assessing investments risks and corresponding monitoring activities, financial intermediaries are able to reduce risks associated with information asymmetries and avoid free riding behavior of capital givers (Diamond 1984; Gorton and Winton 2003).

**(3) Information Transformation:** Participants in financial markets strive for a better level of information in order to make the “best” investment decisions. However, since only capital seekers possess information about the veracity of their intentions, financial intermediaries reduce information asymmetries by creating, bundling, and providing reliable information, e.g., regarding a capital seeker’s creditworthiness (Gorton and Winton 2003; Leland and Pyle 1977; Merton 1989).

**(4) Maturity Transformation:** Financial intermediaries balance different timeframes. This involves borrowing capital on longer timeframes than lending it out (Gambacorta and Mistrulli 2004). As interest rates differ between timeframes (i.e., they are higher for short-term loans than for long-term loans), financial intermediaries create profits and reduce transaction costs by synchronizing timeframes.

Taking a system perspective, financial intermediation theory spans three levels of abstraction. The *transformation functions* represent the basic principles of financial intermediation. A set of organizational and technical *mechanisms* form the building blocks of each of these functions. These mechanisms are context-specific and not every intermediary needs to implement each available mechanism (Diamond 1984; Hellwig 1991). These mechanisms reflect design choices of financial intermediaries regarding their specific intermediation model (e.g., the degree of information production). In turn, single mechanisms can be implemented by means of different *instantiations* (e.g., creating creditworthiness scores or information leaflets in terms of information production).

### **3. THEORY DEVELOPMENT**

In order to describe a system theory of crowdfunding intermediation, we follow a system perspective that describes exchange processes between the involved actors. A system theory proposes a paradigm of interacting parts resulting in a system, which represents an entity with its own properties (Boulding 1956; Burton-Jones et al. 2015; Mattessich 2012; Von Bertalanffy 1968). A system theory mainly focuses on giving explanatory insights by interrelating the mechanisms forming the overall system. They result in alternate understandings about *how* things occur and are, thus, suitable for exploring new phenomena (Salmon 1998).

Following financial intermediation theory (Allen and Santomero 1998; Diamond 1984) and existing crowdfunding research that considers crowdfunding intermediaries



as service systems (Haas et al. 2015; Liebenau et al. 2014), we conceptualize crowdfunding intermediation as a system of mechanisms that have been chosen and implemented by a crowdfunding intermediary in order to offer a respective type of intermediation. These mechanisms are guiding the interaction and exchange between capital seekers and givers and set the infrastructural boundaries for the process of financial intermediation. Thus, we aim at explaining *how* the different transformation functions of financial intermediation theory are implemented at crowdfunding intermediaries by a set of context-specific mechanisms.

### **Lot Size Transformation in Crowdfunding Intermediation**

Lot size transformation in crowdfunding basically involves the pooling of numerous small investments of capital givers in order to fulfill the financial requirement of capital seekers. This is achieved by mechanisms for (1) *specialization*, (2) *funding*, and (3) *compensation*.

**Specialization Mechanism:** As traditional financial intermediaries, crowdfunding intermediaries transform lot sizes by overcoming time, geographies, or industry boundaries in order to satisfy capital seekers and givers. As crowdfunding intermediaries do not borrow and lend on own account and act as matchmakers, they have to create “thick” markets, in which matches between seekers and givers of capital are created (Evans and Schmalensee 2016). As the interests of capital givers and seekers may be highly diverse and heterogeneous, successful matchmaking is based on addressing specialized target groups. Crowdfunding intermediaries try to connect a defined group of capital seekers with an appropriate crowd of capital givers (e.g., start-ups and capital givers making such risky investments). Thus, crowdfunding may provide funding for a broad variety of highly specialized niche markets that have limited access to more traditional sources of finance by making use of self-selection effects of capital seekers and givers (Anderson 2004; Bruton et al. 2015; Harrison 2013; Mollick and Robb 2016). Research has identified four major instantiations of specialization: *creative projects and creative products* (Agrawal et al. 2010), *start-ups and new businesses* (Ahlers et al. 2015; Schwienbacher and Larralde 2012), *private consumption* (Herzenstein et al. 2011; Lin et al. 2013), or *sustainability and social action* (Burtch et al. 2013a; Burtch et al. 2013b).

**Funding Mechanism:** Crowdfunding intermediaries synchronize heterogeneous lot sizes of capital givers (larger amount for project realization) and capital seekers

(smaller investments) by pooling funding decisions of capital givers. In this regard, the funding enables the direct exchange between capital seekers and givers and is instantiated by three interrelated parts that define how capital givers can make investments and how the collected funds are paid out to capital seekers. First, *investment levels* and *minimum investments* define funding conditions of capital givers. *Investment levels* define certain compensations for investing different amounts of money. Funding a project, capital givers can choose from these pre-defined *investment levels* (e.g., a “thank you email” for 1 USD, a signed poster for 40 USD, or profit shares for 500 USD). Each investment level might be limited to a certain quantity in order to attract higher investments. Second, a *minimum investment* defines a lowest possible investment sum. For instance, many investments into start-ups are bound to a minimum investment amount in order to prevent too strong dilution effects. Second, the funding mechanism defines the *payout conditions*. These vary between the principles of “all-or-nothing” and “keep-it-all” (Cumming et al. 2014). Applying all-or-nothing, capital seekers are only granted the collected money if their funding goal has been reached, assuming that capital seekers are only able to accomplish their project and to deliver the promised returns in case they have the required resources. By contrast, the keep-it-all-principle allows capital seekers to receive any collected sum (Gerber et al. 2012). Summarizing, funding mechanisms affect and regulate the direct interaction between capital seekers and givers and are instantiated by *investment levels*, *minimum investments*, and *payout conditions* (Gerber et al. 2012; Mitra and Gilbert 2014b; Mollick 2014; Walsh 2014).

**Compensation Mechanism:** The effective matching of the capital requirements of capital seekers and the compensation interests of the capital givers is crucial in crowdfunding intermediation (Belleflamme et al. 2014; Mollick 2014; Schwienbacher and Larralde 2012). In traditional financial intermediation, capital givers are financially compensated by interests that are paid by the financial intermediary (or other types of financial compensation). By contrast, the compensation is directly made by capital seekers in crowdfunding and may also be of non-financial nature. The crowdfunding intermediary provides the infrastructure for exchanging financial and non-financial compensations that aim at delivering five different types of compensation (Bradford 2012; European Commission 2014; Hemer 2011). First, capital givers support projects by means of donations without receiving an actual compensation such that they are offered an *altruistic experience*. *Rewards* reflect non-

financial compensations for capital givers and may include “thank you emails,” “gimmicks,” and other giveaways for those exchange crowdfunding intermediaries offer a specific infrastructure. Similarly, compensation mechanisms may also comprise *pre-ordered products*. The investment of capital givers can be seen as a pre-payment for a not yet existing product for whose exchange crowdfunding intermediaries resemble a specific type of online shop. By contrast, financial compensation may comprise *interests* or *profit shares*. In the case of interests, capital givers grant loans to capital seekers and receive partial repayments on a regular basis, which also contain interests. In the case of *profit shares*, a participation certificate is issued, which entitles the capital giver to receive a certain profit share. For both types of financial compensation, crowdfunding intermediaries have to install a specific legal model and to build up an infrastructure for enabling capital seekers to make regular payments to capital givers. However, compensations are not mutually exclusive and compensation mechanisms may combine several of them.

### **Risk Transformation in Crowdfunding Intermediation**

Risk transformation in crowdfunding is mainly facilitated by means of delegated monitoring.

**Delegated Monitoring Mechanism:** Capital seekers might aim at manipulating their chances of getting successfully funded by glossing over the project description, expected returns, or their skills, thus, exploiting information asymmetries (Herzenstein et al. 2011; Siering et al. 2016; Zhang and Liu 2012). This is of particular concern in crowdfunding as capital givers carry the default risk directly and they are rather inexperienced and casual investors. Thus, crowdfunding comprises a significant level of uncertainty and risk for them (Cumming et al. 2016; Robock 2014). Providing delegated monitoring, crowdfunding intermediaries ensure integrity, veracity, and legal compliance. Crowdfunding intermediaries implement delegated monitoring most prevalently by requiring capital seekers projects’ to pass a *feasibility assessment* or a more sophisticated *due diligence*. Feasibility assessments may include the presentation of feasibility studies or working prototypes before the projects are broadcasted by the crowdfunding intermediary. Feasibility assessments usually focus on the availability of skills and resources in order to accomplish the presented project. After a positive assessment, the results are provided to interested capital givers (e.g., in form of scores or business plans) in order to enable them to assess the risk return ratio (De Buysere et

al. 2012; Rechtman and O'Callaghan 2014). In a more sophisticated process, capital seekers and their projects have to undergo some sort of due diligence. This may comprise the intense evaluation of the capital seekers' default risk based on the analysis of, e.g., income statements or projected cash flows. Additionally, behavioral online data, e.g., prior visited websites, may influence the capital seeker's risk assessment (Bradford 2012; Haas et al. 2015). The due diligence results in certain risk scores, indicating default risks, which determine potential compensations (e.g., interest rates).

### **Information Transformation in Crowdfunding Intermediation**

Crowdfunding intermediaries transform and reduce information asymmetries between capital seekers and givers by implementing mechanisms for information provision and communication.

**Information Provision Mechanism:** In order to perform information transformation, crowdfunding intermediaries aim at satisfying the need for trustworthy information of capital seekers. Acting as information providers, crowdfunding intermediaries produce, bundle, and distribute information in order to reduce information asymmetries (Fama 1985; James 1987; Kane and Burton 1965; Merton 1989). In contrast to traditional financial intermediation, the signaling efforts of capital seekers are directed directly to the capital givers. Therefore, crowdfunding intermediaries may implement an information provision mechanism, which provides trustworthy information regarding the project. Information provision may be achieved by four different instantiations. Usually, capital seekers have to provide a comprehensive *project description* that provides all necessary information for getting a comprehensive overview about the project and the initiating capital seeker. Further, capital seekers are encouraged to provide *videos and pictures* in order to provide additional information that should aim at addressing emotional and hedonic feelings of capital givers and at providing a better personal impression of the capital seeker (Beaulieu et al. 2015). Additional, *background information about the capital seeker* (e.g., résumés or financial statements) may provide a more fine-grained perspective for capital givers. Finally, the *funding history* of already invested capital givers is frequently provided as this signals credibility and investment quality.

**Communication Mechanism:** In crowdfunding intermediation, information transformation is not limited to a static project description. As crowdfunding projects

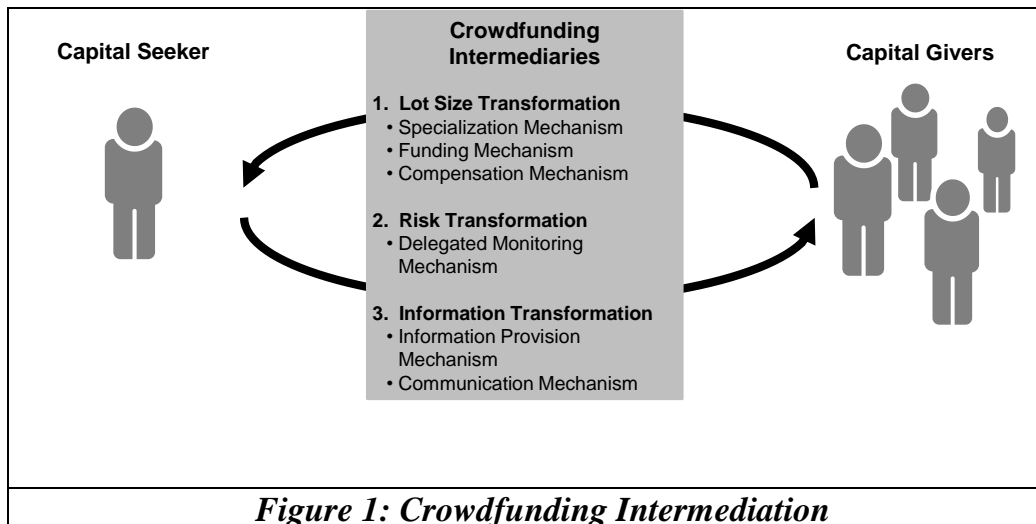
are dynamic, capital givers have to be informed continuously in order to keep them interested, satisfied, and engaged (Mollick 2014; Ordanini et al. 2011). Communication mechanisms in crowdfunding intermediation mostly reflect a many-to-many relationship enabling capital seekers to form a trusted relationship with capital givers and to interconnect capital givers directly. Such communication mechanisms allow capital seekers to continuously provide new information about the project and funding progress or updates regarding the offered compensations (Beaulieu et al. 2015). Ongoing communication generates trust and emotional ties between capital givers and seekers, because it satisfies the capital givers' desire to participate in the project (Ahlers et al. 2015; Ordanini et al. 2011; Thies et al. 2016). Thus, a direct *communication function* (Beaulieu et al. 2015; Moritz et al. 2015) enables crowdfunding intermediaries to transform information asymmetries by enabling direct flows of information from capital seekers directly to capital givers and vice versa.

### **Maturity Transformation in Crowdfunding Intermediation**

Maturity transformation aims at synchronizing different expectations of capital seekers and givers regarding timeframes for lending and borrowing capital on the intermediaries own account (Gambacorta and Mistrulli 2004). As crowdfunding intermediation aims at the direct peer-to-peer matchmaking of capital givers and seekers with homogenous expectations with regard to timeframes, maturity transformation does not take place in crowdfunding intermediation.

### **Summary**

Our theoretical analysis shows that crowdfunding intermediation directly links capital seekers and givers by transforming lot sizes, risks, and information via the implementation of different context-specific and IT-enabled intermediation mechanisms (see Figure 1). Further, we identified six mechanisms that put these transformation functions into action and shape how crowdfunding intermediation takes place (see Table 2).



**Table 2: Mechanisms of Crowdfunding Intermediation**

Transformation Function	Underlying Mechanism	Instantiations
Lot size Transformation	Specialization	<ul style="list-style-type: none"> <li>• <i>Creative projects and creative products</i></li> <li>• <i>Start-ups and new businesses</i></li> <li>• <i>Private consumption</i></li> <li>• <i>Sustainability and social action</i></li> </ul>
	Funding	<ul style="list-style-type: none"> <li>• <i>Investment levels</i></li> <li>• <i>Minimum Investments</i></li> <li>• <i>All-or-nothing- / keep-it-all-principle</i></li> </ul>
	Compensation	<ul style="list-style-type: none"> <li>• <i>Altruistic experience</i></li> <li>• <i>Rewards</i></li> <li>• <i>Pre-ordered products</i></li> <li>• <i>Interests</i></li> <li>• <i>Profit shares</i></li> </ul>
Risk Transformation	Delegated Monitoring	<ul style="list-style-type: none"> <li>• <i>Due diligence, creditworthiness checks</i></li> <li>• <i>Feasibility assessments</i></li> </ul>
Information Transformation	Information Providing	<ul style="list-style-type: none"> <li>• <i>Description</i></li> <li>• <i>Videos and pictures</i></li> <li>• <i>Background information about capital seeker</i></li> <li>• <i>Funding history of capital giver</i></li> </ul>
	Communication	<ul style="list-style-type: none"> <li>• <i>Communication function</i></li> </ul>

#### 4. HYPOTHESIS DEVELOPMENT

So far, our theoretical analysis has helped us to unravel the central building blocks of crowdfunding intermediation in the form of six mechanisms of crowdfunding intermediation and a total of 19 instantiations. These insights are grounded by the principles of the theory of financial intermediation (Diamond 1984; Benston 1976;

Allen 1998). Following this grounding, the respective bundling of these mechanisms within an intermediary system is subject to choice and performs the transformation functions of traditional financial intermediation (Liebenau 2014). Therefore, crowdfunding intermediation is able to address various areas of application, ranging from collecting donations to the funding of loans (Bradford 2012), and thereby addresses the emerged challenges of multi-sided and digitally transformed financial markets (Yum 2012).

These heterogeneous contexts of application demand highly differentiating competences in order to perform effective crowdfunding intermediation. In order to meet the rigidity, objectives, and functioning of the different contexts of application, these mechanisms cannot be bundled freely but may be related to each other. Thus, the selective bundling of the identified mechanisms into a respective system of crowdfunding intermediation is necessary in order to perform effective crowdfunding intermediation within a certain context. Following this line of reasoning, unraveling the relationships between these mechanisms, may lead to the identification of a set of dominant configurations of how these intermediation mechanisms are implemented.

These dominant configurations represent archetypal bundles in order to perform effective financial intermediation with regard to a specific context of application. Therefore, the proximity of a crowdfunding platform to the respective, context specific dominant configuration may lead to higher effectiveness. According to previous research the effectiveness of a strategic options leads to a higher probability of market survival (Bayus 2007). Following this thought, we argue that this is also the case for crowdfunding. Due to the high competition of the crowdfunding market, a lack of the ability to perform effective financial intermediation, inevitable leads to a loss of both customer markets – capital givers and capital seekers. . Therefore, a crowdfunding platform, which is not able to perform effective financial intermediation will be more likely to die. Following this line of reasoning a hypothesis can be formulated as:

*H1: Platforms with higher proximity to a context specific dominant configuration, are more likely to survive.*

## **5. METHODOLOGY**

The identified intermediation mechanisms and their instantiations represent fine-grained, observable, and distinctive characteristics, which allow for comparison

between the crowdfunding intermediaries and configurational analysis (McKelvey 1982; Rich 1992). However, for taking a system's perspective on crowdfunding intermediation, it is not sufficient to consider single building blocks separately, but rather to analyze their interaction within the system (Ackoff 1971). Therefore, we apply a mixed method approach in which we first collect data by content-analyzing 178 crowdfunding intermediaries in order to unravel how these instantiations are implemented. We first identify archetypes of crowdfunding intermediation by applying cluster analysis that are based on dominant configurations of intermediation mechanisms. As a second step, we analyze of how the platform configuration's proximity to one of the derived archetypal configurations impacts the sustainable effectiveness of the crowdfunding intermediation by investigating the platform's survival rates.

### **Data Collection**

In total, we collected data on 178 crowdfunding intermediaries in three independent rounds of data collection in order to identify the dominant configuration patterns and to assess the temporal stability of our clustering results. The first round of data collection took place from October 2012 till December 2013. We initially identified over 500 crowdfunding intermediaries via an online search. We only considered crowdfunding intermediaries for the following analysis if they met three criteria: (1) An active, working and publicly accessible website in order to ensure reliable and transparent data access; (2) English or German language as the USA, UK, and Germany are among the biggest and most mature crowdfunding markets worldwide; (3) track record of business operations (i.e., history of successfully funded projects) in order to ensure the actual viability of the crowdfunding intermediation. These criteria applied to 127 crowdfunding intermediaries, which were used for a first round of analysis. Based on the six mechanisms of crowdfunding intermediation and their 19 instantiations, a coding scheme for content analyzing the crowdfunding intermediation system was developed (see Appendix). All intermediaries were then content analyzed by the first author using the coding scheme. The second round of data collection was conducted from March till June 2016. Applying the same search criteria as in round one, led us to identify 88 new crowdfunding intermediaries. Within a third round of data collection in July till August 2017, we reevaluated the previous data with regard to the coding and we additionally investigated the date of market entry and (when applicable) market exit. Thus, in total 178 crowdfunding intermediaries were



considered for identifying the dominant patterns. In order to ensure intercoder-reliability of the collected data, a second researcher re-coded about 30% of the collected data. Thus, a random subsample of 48 crowdfunding intermediaries was analyzed. A Cohen’s Kappa value of 0.69 indicates substantial agreement (Landis and Koch 1977).

## Variables

### *Cluster Variables: Design choices for Crowdfunding Intermediation Model*

Our central study variables are reflected by 19 dichotomous variables representing the different instantiations of the crowdfunding intermediation mechanisms. These variables indicated whether a certain instantiation is implemented by a crowdfunding intermediary or not (0 = no implementation, 1 = implementation). Table 3 shows the descriptive statistics.

*Table 3: Descriptive Analysis*

<b>Instantiations</b>	<b>Min</b>	<b>Mean</b>	<b>Max</b>	<b>Standard Deviation</b>
Creative Projects & Products	0	0.32	1	0.47
Start-ups & New Businesses	0	0.34	1	0.47
Private Consumption	0	0.12	1	0.33
Sustainability & Social Action	0	0.41	1	0.49
Investment Levels	0	0.51	1	0.50
Minimum Investments	0	0.71	1	0.45
All-or-Nothing Principle	0	0.55	1	0.50
Altruistic experience	0	0.41	1	0.49
Rewards	0	0.39	1	0.49
Pre-ordered Products	0	0.06	1	0.24
Interests	0	0.14	1	0.35
Profit Shares	0	0.22	1	0.42
Due Diligence & Creditworthiness Checks	0	0.29	1	0.45
Feasibility Assessments	0	0.29	1	0.46
Project Description	0	0.98	1	0.14
Videos and Pictures	0	0.92	1	0.27
Background Information about Capital Seeker	0	0.74	1	0.44
Funding History	0	0.70	1	0.46
Communication Function	0	0.69	1	0.46

### ***Alignment of Crowdfunding Intermediation Model***

We conceptualized the alignment of a crowdfunding intermediary's intermediation model by determining its deviation from its relevant archetype. In greater detail, we calculated the distance of each crowdfunding intermediary to the average representative of the cluster with which a crowdfunding intermediary is associated with. For determining these measures of alignment, we used the following schematic algorithm:

1. We determined the cluster membership for each crowdfunding intermediary.
2. We determined the crowdfunding intermediary that reflects the archetypical crowdfunding intermediary for each cluster (i.e., the average representative or the "centroid" for each cluster).
3. We calculated the distance between each crowdfunding intermediary and its respective archetypical crowdfunding intermediary using the distance measures that has been used within the cluster analysis in order to obtain the original clustering.
4. We rescaled the obtained distance measures in order to increase the interpretability of our results. We divided the obtained distances by the absolute distances between the two intermediaries. Consequently, the rescaled distances reflect multiples of the average incremental increase in distance when one design choice is made that diverges from the relevant archetypical intermediation model.

### ***Effectiveness of Crowdfunding Intermediation***

In line with existing research that frequently conceptualizes the effectiveness of different strategic options as firm survival on the market (Bayus 2007), we operationalize the effectiveness of different crowdfunding intermediation models as the survival of the crowdfunding intermediary operating a given intermediation model. In greater detail, we collected data on the crowdfunding intermediaries survival including the year of market entry (i.e., the year the crowdfunding intermediary was founded or started to provide crowdfunding services) and if applicable the market exit (i.e., the liquidation of the crowdfunding intermediary or termination of the crowdfunding business). Based on this data we created two variables. The number of survived years in the crowdfunding market and a market survival dummy (0 = crowdfunding intermediary has left market, 1 = crowdfunding intermediary is still active).

## **Cluster Analysis: Identifying Archetypes of Crowdfunding Intermediation Models**

Cluster analyses group entities such that the in-group variation is small in relation to inter-group variation (Malhotra et al. 2005). By defining distinctive variables (i.e., instantiations of mechanisms), cluster analysis groups entities (i.e., crowdfunding intermediaries) according to their reciprocal similarities and distances describing natural groups (Leisch 2006; Rendón et al. 2011). Although there are different clustering techniques, all of them share the idea that similarities/distances between entities are determined and that these metrics are used to group entities into homogenous groups (Leisch 2006; Rendón et al. 2011).

In order to avoid idiosyncratic errors specific to a certain clustering technique, we used different cluster algorithms applying distinct similarity and distance metrics. In particular, we used Ward's algorithm and K-Means clustering as they produce accurate clusterings with smaller data sets (Gong and Richman 1995), are able to deal with dichotomous data (Finch 2005; Leisch 2006), and are widespread clustering techniques (Malhotra et al. 2005; Provost and Fawcett 2013). Ward's algorithm is a hierarchical-agglomerative approach, recursively grouping entities according to the smallest distances or biggest similarities. We used Ward's algorithm with Hamming and Jaccard Distances as well as Cosine Similarities that are suited for dichotomous data (Finch 2005). Second, we applied different variations of K-Means clustering<sup>1</sup> that are robust for clustering dichotomous data. In greater detail, we used Spherical K-Means using Cosine Similarity (Foreman 2013; Hornik et al. 2012), K-Medians using Hamming Distance (Foreman 2013; Leisch 2006), and a numeric optimization approach using Jaccard Distance (Leisch 2006).<sup>2</sup> The basic idea of these algorithms is to randomly assign entities to a pre-defined number of clusters (k) and then reassign entities to the closest average representative of that cluster in an iterative fashion.

Determining an appropriate number of clusters, we applied two measures reflecting the quality of clustering that are accurate for K-Means algorithms (Rendón et al. 2011). First, we calculated the Davies-Bouldin-Index that measures the compactness of clusters (i.e., closeness of entities within a cluster) while also taking into account their

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<sup>1</sup> Standard K-Means clustering requires numerical data.

<sup>2</sup> We use the most frequently applied combinations of clustering algorithms and similarity/distance measures for these approaches. Not every algorithm can work with all similarity/distance measures.

separation (i.e., distinctiveness of different clusters) (Harikumar and Surya 2015). Second, we calculate the Dunn-Index that reflects the ratio between the smallest distance within and the largest distance across all clusters (Rendón et al. 2011).

### **Survival Analysis: Evaluating Effectiveness of Archetypical Crowdfunding Intermediation Models**

In order to test the effectiveness of these archetypical configurations of crowdfunding intermediation, we estimate the effect of each crowdfunding intermediation model's alignment (i.e., the deviation from the relevant archetype) on the years elapsed until the respective intermediary has terminated its crowdfunding business. Thus, surviving years in the crowdfunding business reflects our dependent variable. However, this variable is right-censored as we can determine termination of crowdfunding business only for crowdfunding intermediaries that have actually terminated their business in the past; for intermediaries that are still active this data is not available. Thus, we employed Cox proportional hazard regression to estimate whether a crowdfunding intermediary would terminate its crowdfunding business. This approach estimates the hazard rate for each crowdfunding intermediary that reflect the probability that a crowdfunding intermediary terminates its business at time  $t$  given the intermediary is at risk (i.e., it is still in the risk set of survived intermediaries). Equation 1 (Eq.1) shows the hazard rate for the  $i^{\text{th}}$  crowdfunding intermediary where  $\beta_x$  is estimated in the regression model.

$$h(t|x_i) = h_0(t)\exp(x_i\beta_x) \quad (Eq.1)$$

The  $\beta$  coefficients of the Cox proportional hazard regression can be interpreted as the change of the hazard rate for a one unit change in the underlying variable.

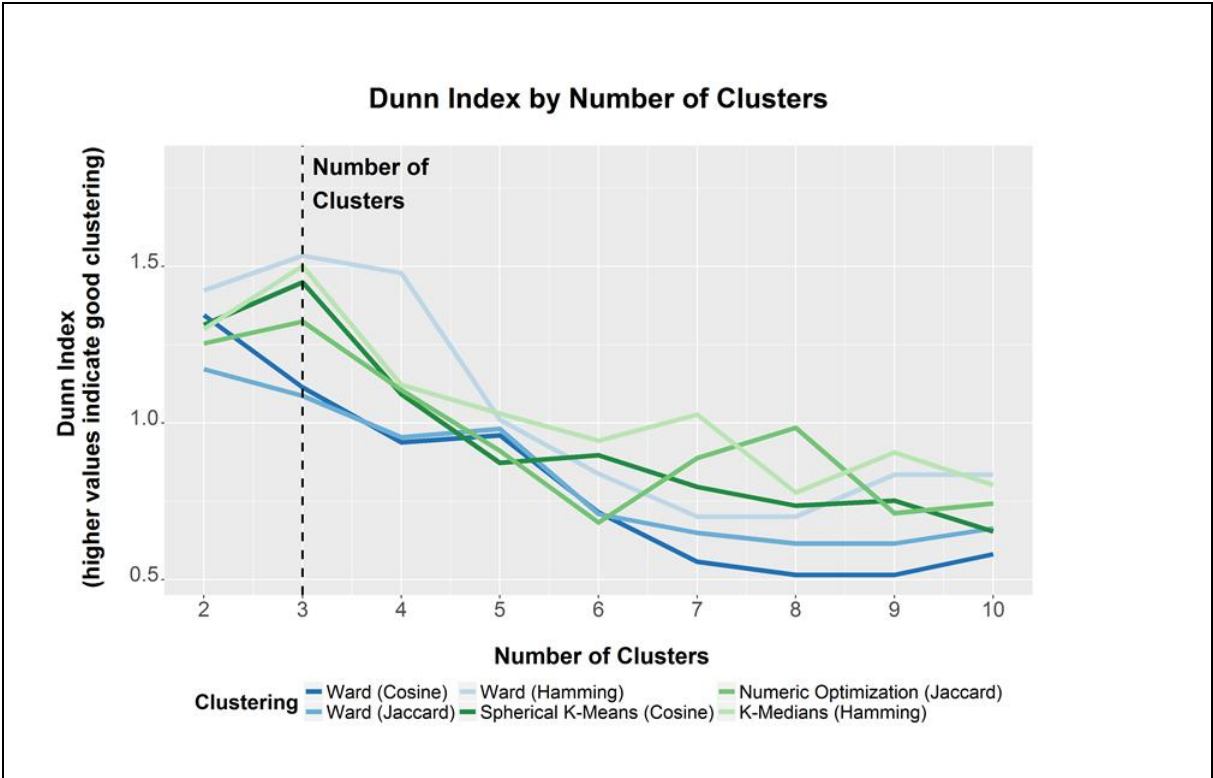
## **6. RESULTS**

### **Cluster Analysis**

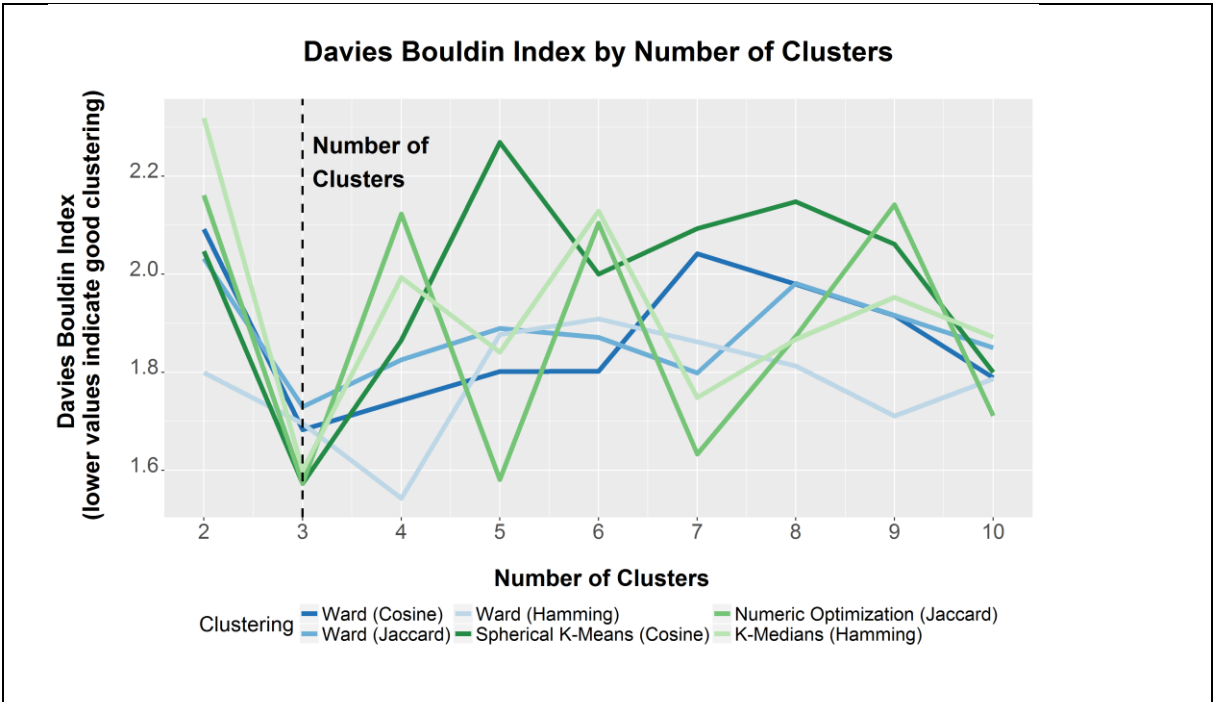
All clusterings and calculations have been done with the *R* language and environment for statistical computing.<sup>3</sup> The cluster analysis indicates a robust three cluster solution that can be clearly interpreted (see Figure 2 and Figure 3). For the clustering solutions produced by Ward's algorithm, we also inspected dendograms that also indicate a three cluster solution.

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<sup>3</sup> We used the R packages "skmeans" (Hornik et al. 2016), "flexclust" (Leisch and Dimitriadou 2013), "cluster" (Maechler et al. 2016), "clusterSim" (Walesiak and Dudek 2015), and "fpc" (Henning 2016)



**Figure 2: Dunn-Index by Number of Clusters**



**Figure 3: Davies-Bouldin-Index by Number of Clusters**

Table 4 exhibits that all clustering approaches produce similar results, i.e., there is an average agreement of 91.6% between the different clustering approaches. This

agreement is backed by Cramer V's indicating high inter-correlation between the nominal clusterings that are statistically significant ( $p < 0.01$ ) and range between 0.84 and 0.95 (1 reflects identical clustering).

**Table 4: Associations and Agreement between Clusters**

Clustering	Cramer-V (Chi-Square)					Percent Agreement				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
(1) Ward (Cosine)										
(2) Ward (Hamming)	0.84***					0.88				
(3) Ward (Jaccard)	0.95***	0.85***				0.97	0.88			
(4) SKMeans (Cosine)	0.86***	0.87***	0.83***			0.91	0.91	0.88		
(5) KMedians (Hamming)	0.88***	0.92***	0.86***	0.93***		0.91	0.94	0.90	0.96	
(6) NumericOptimization (Jaccard)	0.87***	0.86***	0.84***	0.94***	0.92***	0.91	0.90	0.89	0.96	0.94

For our main analysis, we report results for the Spherical K-Means clustering using Cosine Similarity only. Based on our theoretical considerations, the implementation of a given intermediation mechanism reflects a conscious design decision performed by a crowdfunding intermediary in order to perform financial intermediation. Following this line of reasoning, Cosine Similarity has the conceptual beauty that it is an asymmetrical similarity measure and thus takes into account such conscious design decisions only (Foreman 2013). By contrast, other applicable similarity and distance measures such as Hamming Distance also take into account non-implemented intermediation mechanisms for which we cannot infer conscious design. After validating the cluster structure, we conducted descriptive analysis using cross tabulation and contingency analysis to characterize the clusters. As the cluster variables indicated the attribution of crowdfunding intermediaries to the clusters were nominal, we calculated Cramer V's to test whether or not the cluster variables significantly differ across clusters. We analyzed global differences across all three clusters and then applied post-hoc tests, comparing single clusters. In order to ensure that the analysis represents a realistic picture of crowdfunding intermediaries, the assignment of intermediaries to clusters was manually verified for plausibility (Malhotra et al. 2005). Table 5 gives an overview of the cluster results, indicating that our theoretically derived intermediation mechanisms significantly differ among obtained clusters.

**Table 5: Results of the Crosstab Analysis**

Variables	Cluster 1: Profit- Oriented	Cluster 2: Philan- tropic	Cluster 3: Hedonic	Cramer V	Cluster 1 vs. 3	Cluster 2 vs. 3	Cluster 1 vs. 2
<b>N</b>	<b>42</b>	<b>57</b>	<b>61</b>				
Creative Projects & Products	7.14	5.26	73.77	0.71***	1-3***	2-3***	1-2
Start-ups & New Businesses	83.33	1.75	29.51	0.67***	1-3***	2-3***	1-2***
Private Consumption	26.19	8.77	6.56	0.25***	1-3***	2-3	1-2**
Sustainability & Social Action	9.52	89.47	16.39	0.74***	1-3	2-3***	1-2***
Investment Levels	19.05	28.07	93.44	0.68***	1-3***	2-3***	1-2
Minimum Investments	100	57.89	63.93	0.38***	1-3***	2-3	1-2***
All-or-Nothing Principle	66.67	22.81	77.05	0.49***	1-3	2-3***	1-2***
Altruistic experience	4.76	91.23	18.03	0.77***	1-3*	2-3***	1-2***
Reward	4.76	5.26	95.08	0.9***	1-3***	2-3***	1-2
Pre-ordered Products	4.76	1.75	11.48	0.18*	1-3	2-3*	1-2
Interests	42.86	7.02	0	0.51***	1-3***	2-3	1-2***
Profit Shares	69.05	1.75	9.84	0.67***	1-3***	2-3	1-2***
Due Diligence & Creditworthiness Checks	92.86	7.02	4.92	0.85***	1-3***	2-3	1-2***
Feasibility Assessments	2.38	29.82	47.54	0.39***	1-3***	2-3	1-2
Project Description	92.86	100	100	0.23***	1-3	2-3	1-2
Videos and Pictures	76.19	96.49	98.36	0.34***	1-3***	2-3	1-2***
Background Information about Capital Seeker	71.43	66.67	83.61	0.17*	1-3	2-3**	1-2
Funding History	47.62	75.44	80.33	0.29***	1-3***	2-3	1-2***
Communication Function	50	66.67	85.25	0.3***	1-3***	2-3**	1-2

The identified clusters represent dominant configurations of the constituting crowdfunding intermediation mechanisms. Thus, the identified archetypes illustrate how these constituting mechanisms are bundled into systems in order to perform crowdfunding intermediation.

**Archetype 1: Profit-Oriented Crowdfunding Intermediation**

The first archetype focuses on profit-oriented crowdfunding intermediation. With regard to lot size transformation this archetype mainly specializes on *start-ups and new businesses*. Also, the funding of *private consumption* can be assigned to this archetype. Profit-oriented crowdfunding intermediation predominantly implements financial compensations such as *profit shares* or *interests*. Funding mechanisms are

designed in a rather moderate way. Therefore, most frequently, *minimum investments* are implemented in conjecture with the *all-or-nothing principle*. By contrast, *investment levels* are hardly implemented. Thus, this funding mechanism primarily gears at preventing a too complex co-owner structure of capital givers, while also taking care that capital seekers have the requested financial resources in order to satisfy the return expectations of capital givers. As sharing future financial returns embodies a considerable investment risks for capital givers, due to higher sums and the possibility of a total loss, both areas are subject to special legal regulation. Thus, risk transformation is crucial in profit-oriented crowdfunding intermediation. Rigid *due diligence checks* are implemented in order to evaluate default risks of projects. The same is true for information transformation. As participation of capital givers aims at generating profits, crowdfunding intermediaries provide comprehensive information helping capital givers to make investment decisions. Thus, textual *project descriptions* of the investment opportunity, *video and pictures* further improving the understanding of the project, as well as *background information about the capital seeker* and *funding histories of the capital givers* are usually implemented. Also, many crowdfunding intermediaries offer *communication functions*. Typical examples for this archetype include *FundedByMe*<sup>4</sup> or *LendingClub*<sup>5</sup>.

### ***Archetype 2: Philanthropic Crowdfunding Intermediation***

The second archetype performs a philanthropic form of crowdfunding intermediation, where capital givers predominantly support crowdfunding projects by donations. By supporting projects in philanthropic crowdfunding intermediation capital givers are provided with an *altruistic experience*. Thus, philanthropic crowdfunding intermediaries mostly specialize on *sustainability and social action*. Due to the nature of these projects and the absence of direct compensation, funding mechanisms are designed to be very relaxed by setting no entry hurdles in order to support the benevolent fundraising. Therefore, mostly the *keep-it-all-principle* is implemented such that capital seekers receive any collected sum no matter whether the intended funding threshold was reached. Consequently, *investment levels* are not implemented in order to avoid donation barriers. However, *minimum investments* are quite common as capital givers are encouraged to donate higher sums. Due to lower investment sums

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<sup>4</sup> <https://www.fundedbyme.com/>

<sup>5</sup> <https://www.lendingclub.com/>



and the philanthropic orientation risk transformation plays a tangential role such that delegated monitoring mechanisms are implemented rather occasionally. However, information providing plays a crucial role in order to advert for the greater good. Therefore, especially comprehensive *project descriptions* as well as vivid *videos and images* are applied. *Background information about the capital seeker, funding histories of capital givers*, as well as a *communication function* are commonly implemented in order to encourage capital givers to invest higher sums and spread the word. An exemplary intermediary for applying philanthropic crowdfunding intermediation is *Crowdrise*<sup>6</sup>.

### ***Archetype 3: Hedonistic Crowdfunding Intermediation***

The third archetype has a rather hedonistic character. Lot size transformation is primarily performed by specializing on *creative projects and products*, where capital givers mainly receive non-monetary *rewards* or *pre-ordered products* as compensation. Hedonistic crowdfunding intermediation encourages capital seekers to address capital givers' sense of interest, desire, or joy. In so doing, these projects create hedonic value for capital givers. Therefore, both the information providing and communication mechanism are broadly implemented in order to enable quick and comprehensive information transformation. Thus, the implementation of *project descriptions, videos and pictures, background information about capital seeker, funding history of the capital giver, and communication functions* are prevalent in hedonistic crowdfunding intermediation. Funding mechanisms are designed quite rigid. The *all-or-nothing principle, investment levels, and minimum investments* aim at increasing the probability of funding by pushing capital givers to invest higher amounts as they only receive their desired reward in the case of funding success. Additional, proofs of concept in form of *feasibility assessments* are mostly required in hedonistic crowdfunding intermediation in order to transform risks. A prominent example for hedonistic crowdfunding intermediation is *Kickstarter*<sup>7</sup>.

### **Survival Analysis: Effectiveness of Crowdfunding Intermediation Models**

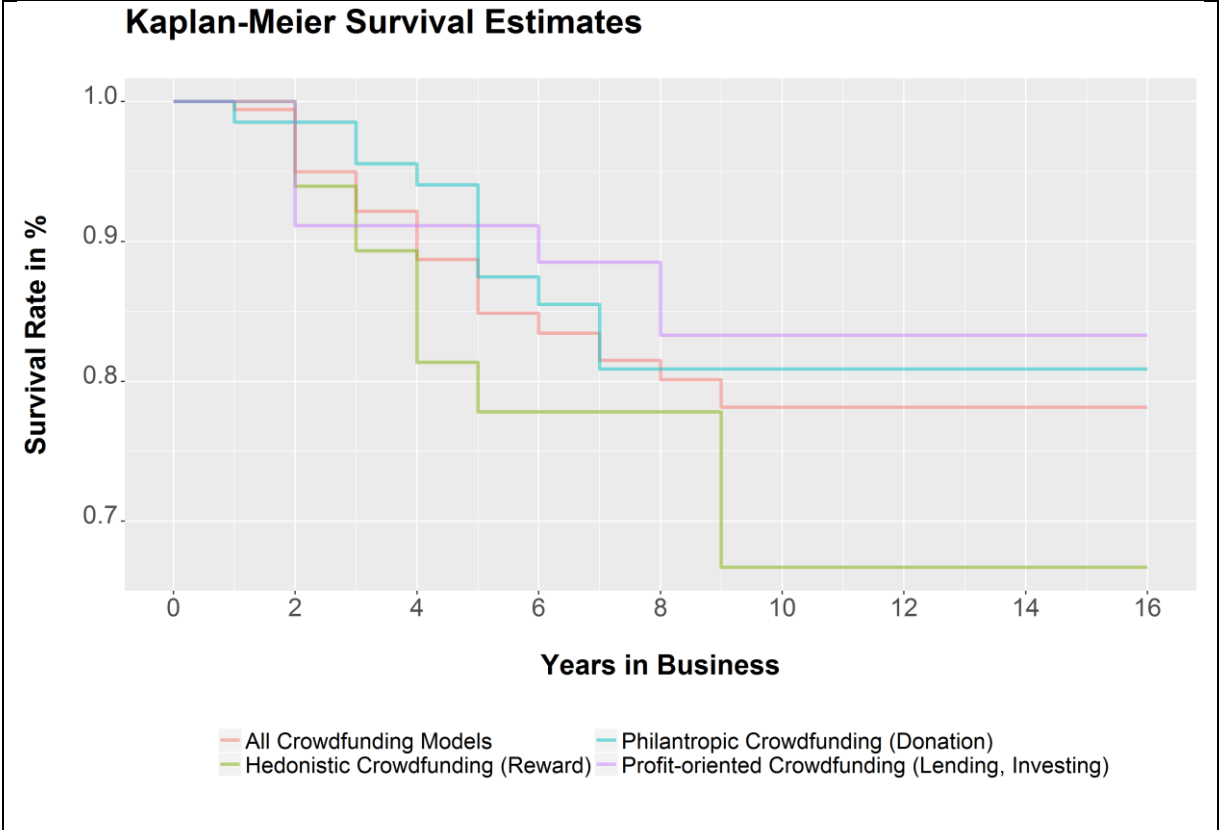
The unconditional Kaplan–Meier survival estimates in Figure 4 suggest that the ten-year survival rate of crowdfunding intermediaries is about 78% across all types of crowdfunding intermediation. In total, profit-oriented crowdfunding intermediaries

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<sup>6</sup> <http://www.crowdrise.com/>

<sup>7</sup> <https://www.kickstarter.com/>

show the highest survival rates although they are only slightly higher than the average baseline. Interestingly, hedonistic crowdfunding intermediaries show the smallest ten-year survival rates with about 68%.



**Figure 4: Kaplan-Meier Survival Estimates**

Table 6 shows the results of the Cox proportional hazard regressions predicting the effectiveness of crowdfunding intermediation, i.e., the years in business before a crowdfunding intermediary terminates its business. Model 1 reflects a baseline model with which we estimate the impact of cluster membership on the years elapsed until the termination of the crowdfunding business. For this purpose, we modeled cluster membership as two dummy variables for cluster 1 and cluster 2.<sup>8</sup> In Model 2, we add the year of market entry as control. In model, Model 3 we add our alignment variable. Model 4 basically reflects a variation of Model 3 in which cluster memberships is modeled as robust sandwich variance estimators. Using such clustered standard errors we can account for the variation within the three clusters. Again, we report results for spherical k-means algorithm only; results for the other clustering approaches lead to

<sup>8</sup> A categorical variable with three levels is represented by two dummy variables. For more details see Aiken et al. (1995)

highly comparable results. As additional robustness check, we also verified that rerunning the analysis with aggregating the alignment variables that have been obtained by the different clustering approaches lead to similar results. It was verified that hazard rates are constant across all models and measures.

Model1 and Model2 show that there is no significant effect of cluster membership on survival time. Model 3 and Model 4 suggest that there is a positive and significant effect of a crowdfunding intermediation model’s alignment on the years elapsed until a crowdfunding intermediary terminates its business. When using clustered standard errors there is also a positive and significant effect of the year of market entry. Obtained hazard rates for alignment indicate that each design choice that diverges from the archetypical crowdfunding intermediation model increases the likelihood of terminating the crowdfunding business by 8% ( $\exp(0.08)$ ). An even bigger effect can be found for the year of market entry – each year of having entered the crowdfunding business later increases the likelihood of termination by 15% ( $\exp(0.14)$ ). Thus, hypothesis 1 – “*Platforms with higher proximity to a context specific dominant configuration, are more likely to survive*” – can be accepted.

**Table 6: Cox proportional hazard regressions**

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Alignment			0.09*	0.08***
Controls				
Birth		0.09	0.11	0.14***
Membership Cluster 1	-0.66	-0.59	-0.66	Yes <sup>a</sup>
Membership Cluster 2	-0.49	-0.38	-0.49	
Wald $\chi^2$	2.52	4	6.75	139.9

N = 179, Number of failures (crowdfunding intermediaries terminating the business) = 32, Time at Risk = 219991 for all models.

\* p < 0.1; \*\*\* p < 0.01

<sup>a</sup> Used for creating clustered standard errors

## 7. CONCLUSION

This study presents crowdfunding as platform-based and digitally transformed financial intermediation by developing a system theory of crowdfunding intermediation. Based on financial intermediation theory, we identified six mostly IT-enabled mechanisms and corresponding instantiations. The instantiations' selective implementation within a system shapes the way of how crowdfunding intermediaries perform financial intermediation. Applying unsupervised (cluster analysis) machine learning techniques (George et al. 2016), we identify the three archetypal configuration patterns of profit-oriented, philanthropic, and hedonistic crowdfunding intermediation that have shown to be highly robust and temporal stable. By conducting survival analyses, we are able to show that the alignment of the crowdfunding intermediaries' system configuration to one of the respective archetypes increases its effectiveness. Therefore, our derived hypothesis can be accepted.

### **Theoretical Implications**

This study makes four major contributions to research by proposing a system theory of crowdfunding intermediation that describes how crowdfunding intermediaries perform financial intermediation (Table 7 gives an overview over crowdfunding intermediation theory). Our contributions provide valuable insights for an in depth understanding about the inner workings of crowdfunding intermediation as well as a holistic view on the crowdfunding intermediary and the innovative field of crowdfunding.

First, we extend existing crowdfunding literature that has primarily investigated characteristics and motivations of capital seekers and givers (Burtch et al. 2013b; Burtch et al. 2016; Ordanini et al. 2011) and factors influencing the successful funding of projects (Ahlers et al. 2015; Mollick 2014). By contrast, research on crowdfunding intermediaries and the associated financial intermediation has been largely neglected. The proposed crowdfunding intermediation theory bridges previous research on crowdfunding and financial intermediation by conceptualizing intermediation mechanisms as central constructs of financial intermediation. Therefore, we are able to describe how crowdfunding intermediaries transform lot size, risk, and information based on the implementation and bundling of a specific set of crowdfunding mechanisms. Unravelling the functioning of crowdfunding intermediation by introducing a systemic perspective enables researchers to take a more fine-grained perspective on single mechanisms and their cause and effects (Mollick 2014; Mollick

and Robb 2016; Younkin and Kuppaswamy 2017). Thus, the theory is generalizable to the field of crowdfunding and can be used to unravel the building blocks of crowdfunding intermediation, classification of crowdfunding intermediaries, and differentiating crowdfunding from traditional financial intermediation.

Second, the proposed crowdfunding intermediation theory does not only describe single components, but also unravels the relationships between these mechanisms and patterns within their configurations resulting in timely stable archetypal systems that effectively balance demand and supply for capital (Burton-Jones et al. 2015) within a specific funding context. Thus, our empirical analysis identifies dominant configurations based on the co-occurrence of the intermediation mechanisms' specific instantiations. The three identified archetypes of profit-oriented, philanthropic, and hedonic crowdfunding intermediation describe the generic orientation and inner workings of how the crowdfunding intermediation between capital givers and capital seekers is performed and, thus, does account for the multifariousness and complexity of the crowdfunding phenomenon. Thus, the theory of crowdfunding intermediation represents an empirical taxonomy that classifies crowdfunding intermediaries based on how they perform financial intermediation. Thus, crowdfunding intermediation theory extends current classification approaches for crowdfunding (Bradford 2012; Belleflamme et al. 2014; Hemer 2011), because it is theoretically grounded, empirically verified, and provides a more fine-grained perspective on the phenomenon. Our classification approach abstracts from single instantiations of specific mechanisms. It enables generalizable and timely robust classification, which serve as a more solid base for the location of future research on crowdfunding.

Third, the crowdfunding intermediation theory and respectively the identified archetypes also provide formative insights. The archetypes derived from crowdfunding intermediation theory do represent context-specific configurations, which ensure the effectiveness of the intermediation process. Thus, the alignment of a crowdfunding intermediary with its context-specific archetype enhances the effectiveness and thus, sustainability of the platform. This paves the way for more design-oriented questions within the field of crowdfunding, which has been largely neglected in research so far (Tomczak and Brem 2013; Beaulieu et al. 2015). Thus, the theory of crowdfunding intermediation provides general guidance for researchers, investigating the systemic

structure and the effective design of crowdfunding service systems and helps to inform future designs.

Fourth, we extend financial intermediation theory (Allen and Santomero 1998; Diamond 1984) by addressing its previous mentioned shortcomings in the context of crowdfunding – coping with a high degree of digitization by applying innovative information technology, joint co-creation of value in ecosystems, a changed role of the intermediary, and the focus on niche markets. By considering crowdfunding intermediation being performed within an IT-enabled system of interrelated mechanisms it can be shown how financial intermediation is affected by digitization and the Internet.

Crowdfunding intermediation theory helps us better explain industry dynamics in a digitized financial service industry and how digitization provides alternative approaches to providing established and necessary services for modern societies. In a similar vein, crowdfunding intermediation theory captures how financial intermediation is encapsulated in different IT-facilitated intermediation mechanisms within in a multi-sided platform business. Whereas existing financial intermediation theory is agnostic regarding the role of digital technologies for providing financial intermediation, crowdfunding intermediation theory exhibits precisely which constituent parts of financial intermediation are now facilitated by means of digital technologies and specifically how these changes look like.

In greater detail, we demonstrate how different configurations of these IT-enabled mechanisms shape the dominating modes of financial intermediation and thus create highly specialized offerings, which enable the creation of a long-tail. Researching the fast developing crowdfunding industry may improve our understanding of how the Internet and the digitization affect and reconfigure existing industries. This is particularly important as more and more industries are affected by these phenomena.

**Table 7: Profile: Crowdfunding Intermediation Theory**

<b>Theory Overview</b>	
The system theory of crowdfunding intermediation describes how crowdfunding intermediaries perform financial intermediation.	
<b>Theory Components</b>	<b>Instantiation</b>
Form of representation	The crowdfunding intermediation theory is presented by the description of crowdfunding intermediation, which comprises capital givers and seekers as well as the crowdfunding intermediary. The theory provides an explanatory description of how crowdfunding intermediation is performed.
Constructs	The core constructs of crowdfunding intermediation theory are six mechanisms that perform the three functions of transforming lot sizes, risk, and information. These mechanisms are implemented in the crowdfunding intermediation system by certain instantiations, depending on the specific purpose and context of the system.
Relationships	Although the implementation of certain intermediation mechanisms is independent, there are robust patterns of co-occurrence and dominant configurations of them that result in three archetypes of crowdfunding intermediation – hedonism, philanthropic and profit-orientation. The alignment with one of the archetypes enhances the effectiveness of the configuration.
Scope	The theory is generalizable to the field of crowdfunding and can be used to unravel the building blocks of crowdfunding intermediation, classification of crowdfunding intermediaries, and differentiating crowdfunding from traditional financial intermediation

**Practical Implications**

Additionally, our study provides two valuable contributions for practice. First, traditional financial intermediaries get deeper insights into how the Internet affects their industry and how their core functionalities are performed by applying innovative information technology. Characterizing potential competitors based on the empirical taxonomy, derived from crowdfunding intermediation theory, helps incumbents to gain a better understanding of the disruptive potential of crowdfunding and the new competitive arena. Second, for established crowdfunding intermediaries and emerging

new players in the crowdfunding domain, the identified mechanisms of crowdfunding intermediation and the respective archetypes basically represent design choices for implementing effective crowdfunding intermediation. This might encourage current crowdfunding intermediaries to expand their activities and new start-ups to enter the market in order to open up unexploited niche markets, help to establish the phenomenon and to develop it further. In this regard, it may help to identify white spots in the own financial intermediation model such that our results should help facilitate the process of designing and creating more sophistic models of financial intermediation.

### **Limitations and Further Research**

There are certain limitations to our research. First, our sampling procedure was limited to English or German speaking crowdfunding intermediaries. A broader cultural scope might produce slightly different archetypes of crowdfunding intermediation. Following this argument, cultural comparison in the context of crowdfunding archetypes might be promising avenue for future research, as the relationship to money and financial products is highly culture-sensitive. However, our sample shows a broad geographic dispersion, also including a variety of non-English/German speaking countries and a second round of data collection indicates robustness of the results. Further, as the USA, UK, and Germany are among the biggest and most mature crowdfunding markets worldwide, we strongly believe in the generalizability of our results. A second limitation relates to our qualitative coding approach. While we put high effort in ensuring reliability and validity of our data, using objective platform data might have produced an even more sophisticated assessment of crowdfunding intermediaries. However, many of the characteristics investigated in our study have a dichotomous nature such that it was a deliberate decision to collect all data as dummy variables in order to reduce the complexity of data collection. However, the exact implementation of an instantiation of a mechanism and their combination is highly divers with regard to their performance. Future research might elaborate on the identification of successful implementation and configuration patterns. Finally, the crowdfunding industry is highly dynamic with most crowdfunding intermediaries being start-ups. As a consequence, models of financial intermediation are constantly evolving in the crowdfunding industry potentially leading to novel types of crowdfunding intermediation. However, especially due to the two independent rounds of data collection, we strongly believe that our identified mechanisms, instantiations,



and archetypes of crowdfunding intermediation can be seen as stable and timely robust. However, future research might investigate the temporal evolution of crowdfunding intermediation mechanisms, their instantiations, and combinations.

Beyond the already outlined research gaps, our research might encourage other researchers to further unravel the inner workings of crowdfunding intermediaries. Therefore, our system theoretical perspective can be expanded by taking variance or process theoretical perspectives (Burton-Jones et al. 2015). This might help to increase the understanding of causalities and dependencies among the constituting components of crowdfunding intermediation systems and paves the way for generic design theories for crowdfunding intermediation systems.

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