Blueprinting Crowdfunding
Designing a Crowdfunding Service Configuration Framework

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Abstract. Crowdfunding gained momentum over the last few years. In contrast to traditional forms of funding, the service provision of crowdfunding platforms is performed within service systems. These comprise a complex combination of IT and non-IT services, different stakeholders, and diverging contexts and purposes. The design and operation of such service systems represents a tough challenge. Therefore, we developed a crowdfunding service configuration framework in the form of a morphological box and derived three dominant design patterns by following a design science approach. Therefore, we followed three iterations, which comprise in total twelve expert interviews, three case studies and the analysis of 161 crowdfunding platforms. The configuration framework extends research on crowdfunding and service science by providing insights in how to support the systematic design of crowdfunding service systems, reducing their complexity, and giving a comprehensive overview over their building blocks.

Keywords: Crowdfunding, Service Systems, Modularization, Design Science

1   Introduction

Crowdfunding represents a new way of funding projects or companies, involving a diverse crowd of private capital givers over the Internet, and is frequently considered a more transparent, easy, entertaining, and democratic way of funding. Therefore, crowdfunding gained momentum during the last few years and began to establish as an alternative way of funding. As a consequence a variety of complementary crowdfunding platforms emerged, ranging from altruistic to profit oriented offerings. These mostly start-up driven crowdfunding platform providers build innovative offerings for both, the utilization of highly specialized niche markets as well as the mass market for financial products. Crowdfunding start-ups use their high degree of automation, the Internet, the web 2.0, and innovative opportunities such as data analytics. In order to grasp these opportunities, the service provision of crowdfunding platforms is performed within service systems. This allows operators of crowdfunding platforms to provide some services by themselves, whereas they may source others from specialized partners (e.g. payment, banking, dunning) within a service system [1].

Despite the huge growth of the crowdfunding market in terms of origination volume and platform numbers, this growth is not distributed equally among all types of crowdfunding. While the market for crowdlending is booming, the market for crowdinvesting is stagnating. Further, the market in general is characterized by a large fluctuation and shows the tendency of consolidation [2, 3]. As crowdfunding comprises a complex combination of services and stakeholders, the design of such service systems represents a tough challenge. Thus, many attempts to design new crowdfunding service systems struggle, as the complexity of the crowdfunding service system can't be overseen and it lacks knowledge about how to systematically design crowdfunding service systems. In order to overcome this challenge the design has to allow the decomposition of the crowdfunding service system into single components. This approach is known from the concept of service modularization [4, 5]. Especially, during early stages of the development of crowdfunding services and the assessment of design choices, guidance is needed. Despite its relevance, research on crowdfunding has largely neglected the topics of how to systematically design crowdfunding service systems [6]. This hampers the development of new crowdfunding offerings, the exploitations of new market niches and the maturation of the crowdfunding industry. Therefore, this paper pursues the research question of *how potential crowdfunding providers can design crowdfunding service systems systematically*.

In order to answer this research question, this paper follows the design science (DS) paradigm [7, 8] by designing a crowdfunding service configuration framework, which takes the form of a morphological box, by combining a component perspective and a functional perspective. The crowdfunding service configuration framework aims at a structured and comprehensive presentation of crowdfunding service systems by presenting ten constituting service modules with in total 24 differentiating parameters and three dominant design patterns – altruism, hedonism, and profit-orientation.

This paper provides especially two theoretical contributions. First, the paper expands crowdfunding research by proposing a crowdfunding service configuration framework, which describes the building modules of a crowdfunding service system. Thus, the configuration framework provides an overview over required service modules and respective parameters. Second, the paper bridges research on crowdfunding with the field of service science. Thus, we contribute to service science, by proposing a framework for the systematic design of modularized services systems. Therefore, we contribute to the call for the design of novel artefacts, facilitating the engineering and management of service systems [4]. For practice, this paper provides guidance for the systematic design of crowdfunding service systems, the decision support for the assessment of required competences, the identification of white spots for business opportunities, and a better understanding of the disruptive potential of crowdfunding.

The paper proceeds as follows. First, we give an overview over the related work regarding complex service systems and crowdfunding service systems. Second, our DSR approach is presented. Third, the iterative design process of the crowdfunding service configuration framework is described. Fourth, we discuss our findings and present our theoretical and practical contributions.

2 Related Work

2.1 Complex Service Systems

A service is a bundle of activities, which takes place between the user and provider of a service within a service system [9, 10]. Service systems can be described as value-co-creation of stakeholders, technologies, and shared information (e.g., language, laws, measures, and methods) [11]. One can speak of a complex service, if multiple stakeholders are integrated into the service system, various interactions between them are necessary, and IT and non-IT activities are combined in order to harness its value [12]. In order to leverage the value co-creation, service systems follow a modular design, which enables the systematic engineering of service systems [4, 13]. Modularization can be described as decomposition of a single object into decoupled single components, which can be combined in various way to create new configurations [14]. Modularization rests upon the basic principles of cohesion and loose coupling [15, 16] and has been already established in the context of service science [17, 18].

2.2 Crowdfunding Service Systems

Analogous to crowdsourcing, crowdfunding can be defined as collective financing by an undefined crowd by means of an internet-based open call [19, 20]. Despite the large attention the topic of crowdfunding has drawn among the financial service industry, research on crowdfunding has largely neglected the systematic design of crowdfunding service systems. Certain studies aimed at the systemization of crowdfunding services systems [20-23]. Tomczak and Brem [24] aimed at conceptualizing an investment model by taking a process perspective on crowdfunding service systems by applying process modeling technique. Wieck et al. [25] made an early attempt to investigate how to develop, pilot and evaluate an crowdfunding service system, in order to support university startups. Liebenau et al. [26], Hemer [27], and O`Sullivan et al. [28] argue that the advantage of crowdfunding service systems lies in their modular ecosystem structure, which enables the bundling and aggregation of various competences within a complex service system. Recently, Haas et al. [6] reported about the implementation of the modular design of a crowdfunding service system.

3 Research Approach

In order to develop a configuration framework for the systematic design of crowdfunding service systems, a morphological box turned out to be a valid form. A morphological box combines a component perspective by listing the building modules and functional perspective by detailing these modules in single functional characteristics. This makes a morphological box a heuristic method for capturing complex issues [29, 30] such as the design of crowdfunding service systems. Besides, morphological boxes have been successfully applied to the context of complex IT services before [31, 32].

In order to develop and evaluate the crowdfunding service configuration framework, which supports potential providers of crowdfunding service system, we followed a design science approach. Design science research is highly suitable in solving a real world problem such as the systematic design of crowdfunding service systems. Therefore, design science aims at the iterative development of an innovative IT artefact. The design science paradigm, as suggested by Hevner [7, 8], aims at rigor and relevance of the proposed design by following three integrated cycles: relevance cycle, design cycle, and rigor cycle. The relevance cycle aims at bridging the design activities with its practical environment. Thus, it helps specifying the real-world problem, eliciting the needs and requirements for solving it, and the recirculation of the designed artefact to the field of practice. The rigor cycle ensures the interconnection between the designing of the artefact with the existing knowledge base. Thus, the design of the artefact is informed by existing theories and knowledge, while new knowledge, resulting from the design, is recirculated to the knowledge base. Surrounded and influenced by the relevance cycle and the rigor cycle, the design circle is situated in the center. The design cycle represents the iterative design activities, which are necessary in order to construct and evaluate the artefact.

We performed three iterations in order to design and evaluate the crowdfunding service system configuration framework. Within the first design iteration, the problem has been specified and requirements have been elicited from the field. Therefore, we conducted a comprehensive study of related literature and performed three expert interviews. All three interviewed experts aimed at engaging in the crowdfunding market by designing an own crowdfunding service system, but struggled, as they were unable to oversee the complexity of the crowdfunding service systems. The interviews led to a first impression of the scope and form of the configuration framework. Within a second phase, three case studies, comprising one illustrative example for each crowdfunding service system archetype – altruistic, hedonistic, and profit-oriented [22] – have been conducted in order to identify the building components and characteristics of crowdfunding service systems. Further, service modularization technique has been applied [16, 33]. Therefore, the identified services within the crowdfunding service system have been described on a process level in order to derive modularization parameters. Afterwards, these parameters are applied in order to identify the actual service modules. Thereby, a first version of the configuration framework has been designed. In order to evaluate the module validity, the framework's comprehensiveness, its applicability, and usefulness, six interviews have been conducted with crowdfunding experts (bank representatives, platform providers, and researchers), which participated in the design of a crowdfunding service system. This led to further refinement of the artefact. Within a final phase, the configuration framework has been applied to code 161 crowdfunding service systems, in order to identify dominant design patterns, which could serve as starting point for the design of crowdfunding service systems. A final evaluation of the configuration framework and the patterns has been conducted by interviewing the three initial experts again. The experts have been questioned whether the configuration framework meets their mentioned requirements and, by looking back, whether the identified design patterns represent suitable starting points for the design of their crowdfunding service systems.

4 The Crowdfunding Service Configuration Framework

4.1 Iteration 1: Problem Specification and Requirements

Within the first design iteration, including all three cycles, the aim was to specify the problem and to elicit requirements for the configuration framework. In order to specify the problem and elicit requirements from the field, three expert interviews and a comprehensive literature study have been conducted. First, we started performing a relevance cycle by conducting three expert interviews in order to get an impression of the problem of designing crowdfunding service systems and in order to elicit design requirements. The interviews were conducted via Skype during June 2016 and were 30 to 60 minutes long. The interviewees came from two different banks and a start-up incubator. All three experts were responsible for the design of crowdfunding service systems in distinguishing contexts. All three struggled with their attempts to engage in the crowdfunding market, as they overstrained with the complexity of the crowdfunding service systems. They annotated consistently that especially during the beginning of their attempts, they longed for support in overseeing alternative options and dependencies. They had to waste a lot of time and resources in order to figure out basic functionalities of value proposition, value creation, and value capturing and assessing the general fit of a crowdfunding type to their desired objectives. The input from the relevance cycle has been expanded by performing a rigor cycle. Therefore, findings from a comprehensive literature study, regarding literature on crowdfunding and complex service systems has been used to inform the elicitation of the requirements and to bridge the different literature streams, in order to enhance the current body of knowledge. After finishing the rigor cycle, we evaluated and refined our recent design activities – the deducted requirements – by interviewing our experts again, in order to ensure comprehensibility, correctness and applicability. Iteration 1 identified three major requirements: 1) Early-stage applicability and reduction of complexity. 2) Structured and comprehensive presentation of crowdfunding service systems. 3) Dominant design patterns as template. Table 1 gives an overview over the identified and evaluated requirements.

Table 1: Design Requirements

Requirement	Description
Early-stage applicability and reduction of complexity	Crowdfunding is based on components and competencies, which have not been considered relevant so far [6, 26]. Thus, many struggle at early design stages to oversee its complexity and disruptive potential and lack critical competencies. Many different stakeholders are necessary in order to bundle the required knowledge. Therefore, complexity has to be reduced in a heuristic manner, in order to light up the opportunities, objectives, functionalities, and consequences of crowdfunding for the involved stakeholders.

Structured and comprehensive presentation of crowdfunding service systems	Due to its high complexity, the various functionalities and dependencies within the service system are hard to oversee. Therefore, a functional perspective, as well as a component perspective, have to be combined in order to structure the constituting components of a crowdfunding service system. Besides the comprehensive overview over the single services, ensuring flexibility for several configurations is paramount. Therefore, a modular structure of the implicated crowdfunding services within the framework enables the loose coupling and thereby, easy reconfiguration of the components.
Dominant design patterns as template	As crowdfunding service systems can be designed for various purposes, the definition of what to achieve with an own crowdfunding service system and which configuration supports these objectives is often blurry. Providing dominant design patterns have to be identified in order to serve as a starting point for the design activities.

Besides the deducted requirements, Iteration 1 led to a first impression of the scope of the configuration framework and identified a morphological box as a valid and suitable form, due to its ability to capture complex issues, bridging a functional and a component perspective. Its heuristic character reduces complexity and enables early-stage application even for unexperienced co-workers.

4.2 Iteration 2: Designing the Configuration Framework

After specifying the problem and eliciting requirements from the field, we conducted three case studies of the three experts' initiatives for designing a crowdfunding service system, in order to identify the building modules of crowdfunding service systems. These cases represent illustrative examples for each archetype of crowdfunding service system - altruistic, hedonistic, and profit-oriented [22]. In order to collect the data for the case studies and evaluate our findings, we conducted multiple iterative interviews and workshops with the experts and the respective members of the project teams. Further, we studied the business models of each case example by analyzing public information (e.g., website, terms & conditions) and private documents (e.g. business plans, process models). In order to perform a rigor cycle, we studied literature regarding process and ecosystem modelling and service modularization in order to find heuristic methods for their illustrations and analyzes. Thus, we identified three suitable methods - activity chain modelling for processes [34], e3 value for the illustration of ecosystems [35], and TM3 as method for service modularization [16]. We began the design cycle by modelling the customer journey and the ecosystems. We continued by modelling the single complementary activities of each stakeholder, which supports the customer journey or the crowdfunding process. Thereby, participating stakeholders, interfaces, information-, and money flows have been considered and evaluated. Afterwards, the activities have been modularized according to defined modularizing parameters, which aim at ensuring internal cohesion and loose coupling [16]. These parameters have been defined as 1) representing a pivotal topic within the crowdfunding process; 2) represents

a closed activity; 3) is performed and provided by one stakeholder. Each identified service module represents a bundle of activities regarding specific processes within the configuration framework. These activities have been grouped by analyzing the intra service module cohesion, in order to identify the major parameters of a service module. The three case studies indicated a robust set of the similar ten service modules with in total 24 differentiating parameters. As the characteristic of the modules differentiate between each of the analyzed service systems, variations of the parameters have been defined. Defining these characteristics as variations of the module, allows the parallel selection of different characteristics for each module, within the crowdfunding service system. In order to ensure completeness and generalizability of our findings we performed another relevance cycle. We extended the identification of further parameter variations to a dataset of 161 crowdfunding service systems, which have been identified by conducting an online search. Search criterions included that: 1) it is active; 2) it is in German or English language; 3) the necessary information are publicly available; 4) it refers to a crowdfunding mechanism (e.g. mentioning the term crowdfunding). We reviewed each module parameter on each of the 161 crowdfunding service systems, included new variations and aggregated similar ones. In total one to six parameter variations have been identified and finally included in the crowdfunding service configuration framework.

Table 2 gives an overview over the identified service modules and the according characteristics.

Table 2: Overview Service Modules

Service Module	Description
Matchmaking	Matchmaking between capital givers and capital seekers represents a pivotal service within the service system. Therefore, an e-market place is operated in order to provide information, and to register funding decisions. As the matchmaking takes place in a two-sided market, we identified the two parameters capital seekers and capital givers, which showed two respectively three variations. Thus, we identified *individual* and *institutional capital givers* and *individuals, non-profit organizations, and for-profit organizations* as capital seekers.
Crowd Activation	Crowdfunding includes the attraction, activation, and balancing of the 'right' crowd of capital givers and seekers in order to ensure funding success, attractive returns, and to generate thick markets and network effects. Therefore, activating activities are performed online and offline. These two parameters showed three variations respectively – *none, mass advertising and personalized advertising*.
Customer Support	Crowdfunding aims at being more unbureaucratic and easier. Therefore, overcoming initial barriers and to clarify customer issues is addressed by providing comprehensive support for both capital givers and capital seekers. Both parameters showed the same five variations – *none, offline support, online support, personalized support, and automatized support*.

Market Differentiation	Crowdfunding mainly focuses on niche markets and serves the long tail of the financial service industry. Thus, it provides funding for project which cannot be served profitably by the traditional financial service industry. As crowdfunding service systems serve highly heterogeneous needs, a precise market differentiation is undertaken. Thus, we identified three market differentiating parameters – the motivation of the crowd, the market specialization of the service system, and the type of compensation, which is provided by the capital seekers. The motivation of the crowd differentiates between *altruism*, which aims at doing good, *hedonism*, which aims at satisfying own curiosity, and *profit-orientation*, which aims at satisfying monetary expectations. The specialization of crowdfunding intermediaries varies between *sustainability & social action, startup & new business, private consumption*, and *creative projects & products*. The compensations range from a *greater good*, where no compensation is provided, non-monetary *rewards*, *interest*, to proportional *profit-shares* according the success of the supported project.
Investor Relations	Crowdfunding as a more transparent and democratic way of investing aims at fostering communication between capital givers and capital seekers and enables a performance monitoring of the projects. The communication channels between capital givers and capital seekers revealed three variations- *none, traditional communication channels* (such as e-mails, telephone, fax), and *web 2.0 communication channels* (such as social media, blogs, and chats). As a second parameter performance monitoring is implemented by three variations – *none, progress bar*, which shows the actual funding status, or a *portfolio management system*, which enables an aggregated overview over the invested capital or even an automatized (re-)investment process regarding to the portfolio specifications.
Contracting	Contracting is essential for ensuring liability and compliance. Therefore, we identified two major parameters within this service module. First, terms and conditions mainly regulates the use of the crowdfunding service in general. We found four variations – *none, standardized terms of use, privacy policy regulations,* and *payment regulations*. Second, the legal relationship between capital seekers and capital givers after funding success represents a differentiating parameter. This parameter showed the two variations *direct legal relationship*, in the case of a direct peer-to-peer relationship, and *indirect relationship*, in the case of a legal intermediation (e.g., a bank).

Risk Assessment	Overcoming information asymmetries is essential in order to provide funding for capital seekers and reduce default risks for capital giver. Two parameters have been identified – due diligence and feasibility. The due diligence aims at assessing the credit-, and trustworthiness of a project and the capital seekers. The due diligence parameter shows three variations – *none, traditional forms,* by assessing personal data and documents*,* and *big data analyses*, which includes information based on data analytics (e.g., behavioral information). The second parameter aims at assessing the feasibility of a project, which can be performed by three variations – *none, business/project plan*, and *prototype.*
IT Functionality & Operations	A reliable platform with satisfying functionality is pivotal, as it represents the digital point of contact between capital seekers and givers. Overall, three parameters have been identified. First, the development and hosting of the platform, which shows the three variations *in-house, external service provision*, and *white-label solution.* Second, the registration process for capital givers and seekers, which is performed by the three variations *none, website login (via e-mail and password)*, or *social login* (Facebook or Google). Third, the form of the application can be differentiated into the two variations *web app*, or *mobile app*.
Payment	Payment represents a pivotal service as a fast, reliable, and efficient flow of money can be provided. Four parameters have been identified. First, the actual form of the payment system, which shows four variations – *offline payment* (e.g., cash in-payment), *traditional direct payment* (e.g., credit card), *online direct payment* (e.g., PayPal), and *direct debiting*. Second, the time of the payment, which can be *pre-paid, instant-paid*, and *post-paid*. Third, in case of debt default four variations can be differentiated – *none, notifications, dunning,* and *debt collection.* Fourth, the form of the payment processing – *directly* between the capital giver and seeker or *indirectly* via a financial intermediary (e.g., a bank).
Authentication	In order to meet certain legal regulations, prevent fraud, and reduce risks for capital seekers and givers, know your customer (KYC) services are applied regarding capital seekers and capital givers. Both parameters show four variations – *none, personal offline identification* (e.g., via a post office, notary)*, automated digital identification* (e.g., digital passport, CAPTCHA)*,* and personal online identification (e.g., via webcam)

These modules have been summarized within a morphological box, which represents the crowdfunding service configuration framework. For evaluating the proposed design of the configuration framework, with regard to module validity, the framework's comprehensiveness, its applicability, and usefulness, we conducted six interviews in total. Therefore, we re-interviewed the three initial experts plus three additional crowdfunding experts, which participated in the design or operation of a crowdfunding service system as well. One of the new consulted experts came from a bank and two from academia. First, the experts were asked to apply the configuration framework to their

crowdfunding service system. Second, we asked them to rate the configuration framework with regard to comprehensiveness, its applicability, usefulness, and whether it meets the design requirements. The evaluation indicated good fit to the design requirements and confirmed comprehensiveness of the stated parameters and characteristics, high applicability for early design phases, and usefulness as it reduces complexity in a heuristic manner. The experts' feedback was taken into account thoroughly and led to further refinement of the configuration framework. The evaluated and refined version is presented in Table 3.

4.3 Iteration 3: Dominant Design Patterns

The three cases and our search for parameter variations revealed fundamental differences in the module characteristics and the module configurations. Nevertheless, we assumed the existence of dominant design patterns, as these differences are related to the basic orientation of the crowdfunding service system, which ranges from altruistic, hedonistic, to profit oriented purposes [22]. A rigor cycle regarding literature on the systemization of crowdfunding service systems revealed that these respective archetypes require different configurations due to differentiating target markets, related risks, legal reasons, and the motivation of capital givers and seekers [6, 21, 24]. Thus, the identification of basic design patterns would serve as a useful starting point for the design of crowdfunding service systems. Therefore, a relevance cycle has been conducted by applying the configuration framework to the 161 crowdfunding service systems from our previous platform analysis, which have been grouped according to its respective crowdfunding archetype – altruism (N=53), hedonism (N=60), and profit-orientation (N=48). Thus, the three groups showed large internal proximity with regard to four service modules, which differentiates clearly against the other groups - market differentiation, risk assessment, payment, and authentication. Thus, performing a design cycle, we defined three design patterns for crowdfunding service systems, which correspond to the three crowdfunding service system archetypes altruism, hedonism, and profit orientation. The predominant parameter variations of the three design patterns are indicated by color-coding in the configuration framework (see Table 3) - altruism: bright grey; hedonism: dark grey; profit-orientation: black.

The altruism design pattern is characterized by altruistic motives of the capital seekers and givers. Therefore, it focuses on sustainable and social caring projects and provides no compensation besides a sense for supporting a greater good. In contrast to the other design patterns non-governmental organizations appear as capital seekers. Typical examples for the altruistic design pattern might be *Benevolent*, *100Days*, or *Kiva*.

The hedonistic design pattern satisfies hedonistic motives and therefore, offers reward-based compensations and focuses mostly on the funding of creative projects. In order to reduce investment risks and to ensure the feasibility of the proposed crowdfunding projects, a feasibility check based on business or project plans or even prototypes is applied. Further, a basic level of activity in the case of debt default is performed by actively notifying defaulting capital seekers or givers. Typical examples for the hedonistic design pattern might be *Kickstarter*, *Startnext*, or *WeMakeIt*.

The most rigid pattern is represented by profit-oriented crowdfunding service systems, due to higher default risks and stronger legal regulation. Capital givers are motivated by gaining profits. Therefore, this pattern focuses on the funding of either start-ups or new businesses, where profit shares a predominant as compensation, or funding private consumption by granting loans and providing interests as compensation. Providing a portfolio-management system for fostering investor relations enables both, risk diversification and maximizing profits. Effective risk assessment is crucial due to the higher risk. Therefore, comprehensive due diligences based on traditional documentary are necessary. In the case of private capital seekers, these due diligences are often extended by data analyses based on the online behavior of the capital seekers (such as online times, previous visited websites, etc.). In the case of debt default, activities regarding dunning or even debt collection are predominant. Due to anti money laundering legislation, KYC activities are necessary in the profit-oriented design pattern. Typical examples might be *Companisto*, *Lendico*, or *Investiere*.

5   Discussion & Implications

This study presents a rigor and relevant crowdfunding service configuration framework in the form of a morphological box, which supports potential providers to systematically design crowdfunding service systems. By applying service modularization technique, we identified ten service modules, which represent required constituting blocks of a crowdfunding service system. This modules can be implemented via 24 module parameters with two to six parameter variations. Thus the parameter variations represent instantiations of a service module within a crowdfunding service system, which represents design choices for the early-stage blueprinting of crowdfunding service systems. Our evaluation showed that the configuration framework is comprehensive, useful, and applicable. Further, we derived three dominant design patterns – altruism, hedonism, and profit-orientation. Thus, this patterns support previous findings of crowdfunding research [22]. We identified strong in-group homogeneity among the characterization of several modules, which differentiates clearly in contrast to the other patterns. These differences can be explained by the basic orientation of the crowdfunding service systems, the differentiating motivation, risk, and legal requirements.

The configuration framework can be applied for both, the design of new crowdfunding service systems and the analysis of existing ones. In order to apply the configuration framework, each module has been assessed according to the desired output of the service system. The dominant design patterns may serve as a starting point. The parameter characteristics are designed as variations. Therefore, one can chose multiple variations for each parameter.

This paper contributes to research on crowdfunding and service science and provides especially two theoretical contributions. First, the paper expands crowdfunding research by proposing a crowdfunding service configuration framework, which describes the building modules of a crowdfunding service system and three dominant design patterns. Thus, the configuration framework and the dominant design patterns provide an

overview over required service modules and respective parameters. By empirically deriving the dominant design patterns, thus verifying the appearance of certain design modules in specific contexts, we provide insights in the differentiating designs of crowdfunding service systems. This indicates that specific contexts (altruistic, hedonistic, and profit-oriented) require different modules in order to perform the context-specific service provision. By providing empirical evidence this paper supports and extends previous purely conceptual research on the modular structure of crowdfunding [6, 26, 27]. Further, considering the variety of crowdfunding service systems, the configuration framework may allow for the comparison of crowdfunding service systems on both, a functional and a component perspective, which might provide interesting results for a better understanding of crowdfunding in general and the design of crowdfunding service systems. Besides, the crowdfunding configuration framework possess predictive quality as the dominant design patterns indicate both, intra-group homogeneity and inter-group heterogeneity. Thus, the design patterns can be applied in order to predict the classification of a crowdfunding service systems to a certain crowdfunding archetype.

Second, the paper bridges research on crowdfunding with the field of service science. Thus, we contribute to service science, by proposing a framework for the systematic design of modularized services systems, which has been instantiated on the example of crowdfunding. Therefore, we contribute to the call for the design of novel artefacts, facilitating the engineering and management of service systems [4].

For practice, this paper provides guidance for potential providers to systematically design crowdfunding service systems. Further, it enables the decision support for the assessment of required competences, the identification of white spots for business opportunities, and a better understanding of the disruptive potential of crowdfunding. The three dominant design patterns serves as an initial blueprint for the implementation of a crowdfunding service system. Besides encouraging new market entrants e.g., banks or start-ups to systematically exploit white spots of the crowdfunding market and to develop new crowdfunding offerings, our findings might support established providers of crowdfunding service systems to evaluate their current system configurations.

We hope our study will encourage future research to take up the idea of crowdfunding as modular service systems. This might facilitate future studies to analyze the building modules of these service systems and their interrelations in more detail.

Table 3 Crowdfunding Service Configuration Framework

Service Modules	Parameters	Variations			
Market Differentiation	Crowd Motivation	Altruism	Hedonism	Profit-Orientation	
	Specialization	Sustainability & Social Action	Startup & New Business	Private Consumption	Creative Projects & Products
	Compensation	Greater Good	Reward	Interest	Profit Share
Matchmaking	Capital Giver	Individuals		Institutional Investors	
	Capital Seeker	Individuals	Non-Profit Organizations	Non-Governmental Organizations	For Profit Organizations
Crowd Activation	Offline	None	Mass Advertising	Personalized Advertising	
	Online	None	Mass Advertising	Personalized Advertising	
Customer Support	Capital Giver Support	None	Offline Support	Online Support	
		Personalized Support	Automatized Support	Peer-to-Peer Support	
	Capital Seeker Support	None	Offline Support	Online Support	
		Personalized Support	Automatized Support	Peer-to-Peer Support	
Investor Relations	Communication Channels between capital givers/seekers	None	Traditional Communication Channel (E-Mail, Telephone, Fax etc.)	Modern Communication Channels (Social Media, Blog)	
	Performance Monitoring	None	Progress Bar	Portfolio Management System	
Contracting	Terms and Conditions	None	Standardized Terms of Use	Privacy Policy Regulations	Payment Regulations
	Legal Relationships after Funding Success	Directly between Capital Seekers and Givers		Indirect (via financial intermediaries e.g., banks)	
Risk Assessment	Due Diligence	None	Traditional (personal data & documents)	Data Analysis	
	Feasibility	None	Business Plan / Project Plan	Prototype	
IT Functionality & Operations	Platform Development & Hosting	In-House	External Service Provider	White-Label Solution	
	Registration Process	None	Website Login (E-mail & Password)	Social Login (Facebook/Google)	
	Applications	Web Application		Mobile Application	
Payment	Forms of Payment	Offline Payment	Traditional Direct Payment	Online Direct Payment	Direct Debiting
	Time of Payment	Pre-paid	Instant-paid	Post-paid	
	Debt Default Actions	None	Notifications	Dunning	Debt Collection
	Payment Processing	Directly between Peers (capital seeker and giver)		Indirect via Financial Intermediaries	
Authentication	KYC Capital Giver	None	Personal Offline Identification	Automated Digital Identification	Personal Online Identification
	KYC Capital Seeker	None	Personal Offline Identification	Automated Digital Identification	Personal Online Identification

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