Towards Successful Crowdsourcing Projects: Evaluating the Implementation of Governance Mechanisms

Research-in-Progress

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Abstract

The last decade has witnessed the proliferation of crowdsourcing in various academic domains including strategic management, computer science, or IS research. Numerous companies have drawn on this concept and leveraged the wisdom of crowds for various purposes. However, not all crowdsourcing projects turn out to be a striking success. Hence, research and practice are on the lookout for the main factors influencing the success of crowdsourcing projects. In this context, proper governance is considered as the key to success by several researchers. However, little is known about governance mechanisms and their impact on project outcomes. We address this issue by means of a multiple case analysis in the scope of which we examine crowdsourcing projects on collaboration-based and/or competition-based crowdsourcing systems. Our initial study reveals that task definition mechanisms and quality assurance mechanisms have the highest impact on the success of crowdsourcing projects, whereas task allocation mechanisms are less decisive.

Keywords: crowdsourcing, crowdsourcing intermediary, control and governance mechanisms, case study

Introduction

Crowdsourcing initiatives are considerably growing in quantity and scope and can be considered to be on the verge of changing the way how value creation and organizational coordination takes place as we know it from today's business. Research and practice report on various successful crowdsourcing projects in different application fields: For instance, *TopCoder* offers a community of software coders who frequently produce more effective software algorithms at lower cost than do traditional software engineering approaches. Lakhani et al. (2013) demonstrate that *TopCoder's* users were able to produce a software algorithm for DNA sequencing that outperformed the existing gold standard by factor 1000. Inspired by these examples, various leading companies such as *IBM* (Bjelland and Wood 2008), *SAP* (Leimeister et al. 2009), *Dell* (Di Gangi and Wasko 2009), *Procter & Gamble* (Huston and Sakkab 2006), or LEGO (Schlagwein and Bjørn-Andersen 2014) have leveraged the wisdom of crowds. However, not all crowdsourcing projects turn out to be a striking success. For instance, *Henkel*, a manufacturer of chemical products, built a crowdsourcing platform to encourage its customers to submit novel designs for the bottle labels for a dishwashing detergent. However, the project was ill-designed such that the crowd voted submissions like "tastes like jummy chicken dishwashing detergent" among the most popular ones. Similarly, many crowdsourcing projects fail due to lacking participation of the crowd. In this context, Simula (2013) exemplarily refers to *CrowdSpirit* and *Cambrian House* as two crowdsourcing intermediaries that have experienced great problems in actuating their crowds to generate appropriate solutions. Meanwhile, Downs et al. (2010) as well as Eickhoff and de Vries (2011) report on Internet users who submit random or erroneous results on different crowdsourcing platforms, thereby endangering the success of the respective crowdsourcing initiatives.

Hence, irrespective of different successful examples, research and practice show that crowds, a good many times, may either not reach the desired outcomes or generate unfavorable results. But what are ways or measures to ensure the generation of valuable results? According to Pedersen et al. (2013), who report on a literature review on crowdsourcing in the Information Systems field, "minimal research [has been] related to governance, but proper governance was offered as the key to success by several researchers." Indeed, a review of literature on crowdsourcing reveals that a considerable part of existing research centralizes around the definition (Estellés-Arolas and González-Ladrón-de-Guevara 2012; Zhao and Zhu 2014), preliminary taxonomies, typologies and categorizations of crowdsourcing (Brabham 2012; Rouse 2010; Yuen et al. 2011), or around its application to various domains (Brabham 2010; Lakhani et al. 2013; Lintott et al. 2008). However, there is still comparatively little well-founded knowledge on the *governance* of crowdsourcing initiatives (Jain 2010; Pedersen et al. 2013).

Alongside Pedersen et al. (2013), Boudreau and Lakhani (2013), Jain (2010) and Spiegeler et al. (2011) indicate as well that governance is a crucial challenge especially with respect to successfully performing a crowdsourcing project. The presented unsuccessful crowdsourcing initiatives stress the importance of governance within crowdsourcing projects and, accordingly, of *mechanisms* that are required to effectively govern the crowd and its activities during the projects. We lack insight on established governance structures and corresponding mechanisms, whose examination we regard as essential for benefiting from the potentials of crowdsourcing (Blohm et al. 2013; Boudreau and Lakhani 2013; Jain 2010; Pedersen et al. 2013). We do so because in similar settings – such as Open Source Software (OSS) projects – the use of appropriate governance mechanisms is seen as a proper solution to collective action dilemmas and coordination problems, whereas it also may promote the motivation as well as the effort to contribute to a project (De Laat 2007; Forte et al. 2009; Hertel 2007; Markus 2007; von Krogh et al. 2012). Further, the implementation of effective *governance mechanisms* has been shown to have positive effects on various key outcomes, such as outsourcing success (e.g., Clark et al. 1995; Kern and Willcocks 2002), innovation success (e.g., Moos et al. 2011) or IT flexibility (e.g., Joachim et al. 2013).

With regard to the sparse research on governance in the context of crowdsourcing, however, questions arise as what kind of *governance mechanisms* exist and how these are arranged and implemented. Moreover, "research is needed to show which governance mechanisms are most effective" (Pedersen et al. 2013) when it comes to successfully performing crowdsourcing projects – and which are most effective by crowdsourcing type. Taking the latter issue into account is quite essential since various articles – as well as the previously mentioned examples – highlight the diverse nature of crowdsourcing (Afuah and Tucci 2012; Brabham 2012; Geiger et al. 2012). Therefore, a differentiated analysis is required when approaching governance within crowdsourcing. In this context, we define crowdsourcing systems and

differentiate between the two basic forms – i.e., collaboration-based and competition-based crowdsourcing systems. In a previous study, we have been able to identify six basic groups of governance mechanisms that we label as follows: Task definition mechanisms, task allocation mechanisms, quality assurance mechanisms, incentive mechanisms, crowd qualification mechanisms and regulatory mechanisms. For each group, we identified several governance mechanisms implemented in different crowdsourcing systems. The challenge is now to analyze how the applied governance mechanisms are linked with the quality of a crowdsourcing initiative's outcomes – i.e., *crowdsourcing project success*. To achieve this objective, we must perform in-depth analyses for each type of crowdsourcing initiative with respect to the effects of implemented governance mechanisms on crowdsourcing project success. Accordingly, this paper aims to answer the following research question: How do implemented governance mechanisms affect project success in different types of crowdsourcing systems?

In this research-in-progress, we start out this research project and present insights from the first in-depth analysis with Testbirds.com and focus on crowdtesting as one distinctive form of competition-based crowdsourcing. Thus, our study focuses only on one specific field of crowdsourcing and presents the impact of the here implemented governance mechanism on crowdsourcing project success as the most critical intended outcome. Our findings contribute to crowdsourcing research by means of exploring the effect of various governance mechanisms on crowdsourcing project success. Thereby, we address an existing research gap and provide first insights on the successful governance of crowdsourcing projects (Pedersen et al. 2013; Simula 2013). With respect to practical implications, the case study helps making crowdsourcing projects more manageable and controllable by stressing the importance of various governance mechanisms. The insights are, most notably, of importance for crowdsourcing intermediaries since we will be able to derive implications for the configuration of different governance structures with respect to different types of crowdsourcing initiatives. However, so far, our elaborated knowledge only applies only on crowdtesting projects so that our upcoming studies are to analyze governance structures in other types of crowdsourcing projects as well. The remainder of our paper is structured as follows: In section two, we first provide the theoretical background by briefly approaching crowdsourcing and the specific case of crowdtesting. In section three, we outline the theoretical foundation that underpins our research approach by presenting related work on governance and project success. Based on this discussion, we subsequently describe our methodology before reporting results in section five. Drawing on our preliminary results, we conclude our work by outlining the expected contributions and providing an outlook on the next steps.

Literature Review

Crowdsourcing describes a new form of outsourcing tasks, or more accurately, value creation activities and functions. The term itself is a neologism that combines crowd and outsourcing (Rouse 2010), originated by Jeff Howe, who defines crowdsourcing as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call" (Howe 2010). In a crowdsourcing model, at least two types of actors are engaged: the initiating organization that crowdsources specific tasks and the individuals from the crowd who perform these tasks. The first entity we denote as *crowdsourcer* ["designated agent" (Howe 2006)]. The latter, the undefined contractors from the crowd, we label as *crowdsourcees*. In some cases, the crowdsourcer establishes and hosts a crowdsourcing platform within the organization (internal crowdsourcing platform) (Leimeister 2012; Leimeister 2015). However, in most crowdsourcing initiatives, there is also a third type of agent: the *crowdsourcing intermediary*. Crowdsourcing intermediaries mediate between the crowdsourcer and the crowdsourcees by providing a platform where these parties are able to interact (Zogaj et al. 2014).

Although research on crowdsourcing is still in its inception, we can observe that number of studies on this issue have rapidly increased over the last few years – especially with respect to two perspectives, i.e.: the crowdsourcer's and the crowdsourcees' perspective. Studies focusing on the crowdsourcer's perspective mainly deal with the general questions of whether or not organizations should engage in crowdsourcing and, in greater detail, which projects are appropriate for crowdsourcing (Schenk and Guittard 2011). Researchers tried to address these questions pre-dominantly by addressing the theoretical antecedents of crowdsourcing adoption and exploring application domains of crowdsourcing (Afuah and Tucci 2012). The dominating theoretical lenses for explaining such organizational crowdsourcing decisions include

transaction cost theory (TCT) and the knowledge-based view (KBT) (Burger-Helmchen and Penin 2010; Penin and Burger-Helmchen 2011) as well as the search theory (Afuah and Tucci 2012). From TCT's perspective, firms would not decide to crowdsource tasks due to the high transaction costs that arise from high specificity, frequency and uncertainty. Similarly, considering KBT, firms would avoid using crowdsourcing since high effort is needed to interchange, respectively exchange knowledge, with the crowdsourcees. Further, crowdsourcing includes the risk of revealing critical knowledge. Using the search theory Afuah and Tucci (2012) discuss how under what circumstances organization implement crowdsourcing. These studies provide first insights on why and when organizations should engage in crowdsourcing; however, the determinants and antecedents of such organizational crowdsourcing decisions are not well understood yet. The second stream of research focuses on crowdsourcees' perspective – i.e., research on the individual-level that concerns, for instance, crowdsourcees' attitudes, preferences, needs or behaviors when performing tasks on a crowdsourcing platform. In this context, studies on crowdsourcees' motivational factors for participation in crowdsourcing have mainly been the focus of research (Kaufmann et al. 2011; Leimeister et al. 2009; Muhdi and Boutellier 2011; Zheng et al. 2011a). For instance, Leimeister et al. (2009) have used the Motive-Incentive-Activation-Behavior Model (MIAB) to analyze crowdsources motives. Besides motives, crowdsourcees' task perception and crowdsourcees' trust in a crowdsourcing marketplace setting have also been subjects of investigation (Guo et al. 2013; Moussawi and Koufaris 2013).

Meanwhile, there is much less insights with respect to crowdsourcing platforms, which constitute the IT-based system where crowdsourcing initiatives are actually applied on, and which we consider as the key aspect within crowdsourcing. We follow Kittur et al. (2013) and rather speak of *crowdsourcing systems*, which can be defined as "a sociotechnical work system constituted through a set of relationships that connect organizations, individuals, technologies and work activities" (Kittur et al. 2013). Building on insights on how (knowledge) work is traditionally approached (e.g., von Krogh and Roos 1996) as well as on basic characteristics of the work within crowdsourcing initiatives suggested by several researchers (e.g., Blohm et al. 2011; Hutter et al. 2011; Leimeister et al. 2009; Schweitzer et al. 2012), we distinguish between two basic types of crowdsourcing systems: *collaboration-based* and *competition-based crowdsourcing systems*. In collaboration-based crowdsourcing systems, crowdsourcees team up and collectively create one common solution (Boudreau et al. 2014). Such solutions are the result of many small contributions that individually have minimal value (Schenk and Guittard 2011). Usually, crowdsourcees submit solutions that can be altered or expanded by peers, e.g., using comments or wikis (Majchrzak and Malhotra 2013). Typical examples of such systems are ideas communities such as Quirky, SAPiens by SAP or Nokia's IdeasProject community, where crowdsourcees submit ideas and elaborate them together. By contrast, in competition-based crowdsourcing systems, crowdsourcees work independently and generate corresponding solutions individually (Archak and Sundararajan 2009; Zheng et al. 2011b). The competition may be *output-oriented* or *time-oriented*. Within the output-oriented approach, crowdsourcees can submit a solution within a defined time period and only the "best" solutions (from the perspective of the crowdsourcer) are rewarded (Jeppesen and Lakhani 2010; Leimeister et al. 2009). Competitions on Innocentive.com or Atizo.com are organized in such a way (Muhdi and Boutellier 2011). By contrast, in time-oriented approaches, a "first-come-first-serve" rule applies – i.e., the first crowdsourcee(s) submitting a solution that meets predefined quality requirements is(are) rewarded. Prominent examples of such systems are predominantly platforms for crowdsourced software testing – such as Applause.com or Testbirds.com – where crowdsourcees take part in software testing projects. In this research-in-progress, we focus on this specific form of crowdsourcing, which has grown particularly rapidly in recent years. However, before we describe crowdtesting and the associated case more in-depth, we first elaborate the theoretical framing by outlining related work on governance and governance mechanisms as well as on project success and its measurement.

Theoretical Framing

For more than a decade, researchers have analyzed various kinds of Internet-based communities and networks in order to understand the herein prevailing processes and, consequently, to establish measures and mechanisms to control and regulate user behaviors (Preece 2004; Ridings et al. 2006; Smith and Kollock 1999). In this context, scholars have especially laid emphasis on *governance* issues within different kinds of online communities, e.g., open innovation or open source communities (e.g., Bowles and Gintis 2002; Dahlander et al. 2008; Markus 2007; O'Mahony and Ferraro 2007). According to Forte

et al. (2009), governance generally refers to a system for organizing the rules and processes that regulate people's behavior in a particular setting. Applying this to online community setting, it, inter alia, refers to structures of roles and responsibilities, formal and informal rules, outcome control measures, IT-enabled communications processes, as well as task allocation within a specific online community (Markus 2007; Sagers et al. 2004; Shah 2006a; Vincent and Camp 2004). For our work, we build on the definition by Markus (2007) for OSS governance (Open Source Software; e.g., Linux operating system, Firefox web browser), and think of governance in crowdsourcing as *the means of achieving the direction, control and coordination of wholly or partially autonomous individuals on behalf of a crowdsourcing initiative to which they either jointly – in case of collaboration-based crowdsourcing – or self-reliantly contribute – in case of tournament-based crowdsourcing*. Meanwhile, governance is carried out by means of different mechanisms, so-called governance mechanisms (Dahlander et al. 2008; Forte et al. 2009; Joachim et al. 2013; Moos et al. 2011; Schlosser et al. 2015).

In a previous study, we first outlined governance mechanisms examined in OSS research and the related field of peer-production (Benkler and Nissenbaum 2006) and then conducted a multiple case analysis in the scope of which we examine the governance mechanisms implemented in 20 crowdsourcing systems. All in all, we identified a total of 18 governance mechanisms used in collaboration-based and/or competition-based crowdsourcing systems. Our findings are briefly summarized in Table 1.

Table 1. Governance Structure of Analyzed Crowdsourcing Systems		
Category	**Gov. Mechanisms**	**Description**
Task Definition Mechanisms	*(1) Task modularization*	Provision of functionalities enabling crowdsourcers to divide tasks into fine-grained sub-tasks
	(2) Solution requirements	Provision of functionalities enabling crowdsourcers to define solution requirements
	(3) Pre-testing	Provision of functionalities enabling crowdsourcers to pre-test their tasks with a small group of crowdsourcees
Task Allocation Mechanisms	*(4) Skill-based Selection*	Provision of functionalities allowing crowdsourcers to restrict the group of potential participants by means of personal skills
	(5) Demographic-based Selection	Provision of functionalities allowing crowdsourcers to restrict the group of potential participants by means of demographics
	(6) Task-history-based Selection	Implementation of functionalities that track and display a crowdsourcee's task history, thereby allowing crowdsourcers to restrict the group of participants by means of the task history
Quality Assurance Mechanisms	*(7) Manual Control*	Perpetually sample crowdsourcees' solutions manually
	(8) Automatization	(Partially) automatize quality assurance by establishing computer engines that counter-check solutions
	(9) Peer-assessment	Establishment of a workflow that enables crowdsourcees to evaluate other crowdsourcees' solutions
Incentive Mechanisms	*(10) Monetary Rewards*	Provision of a monetary payment system
	(11) Badging	Establishment of functionalities (such as badges) that signalize a crowdsourcees' features and skills
	(12) Peer-communication Forum	Provision of a forum, where crowdsourcees can discuss with other members on crowdsourcing system
	(13) Gamification	Organization of games in the context of certain crowdsourcing projects
Crowd Qualification Mechanisms	*(14) Crowd Coaching*	Provision of a coaching forum on the platform, where experienced crowdsourcees and system managers provide advice for new members
	(15) Tutorials	Provision of text-based as well as video-based trainings and instructions on how to solve ideal-typical tasks
	(16) Induction Process	Provision of sample tasks for getting used to the work on the platform

Regulatory Mechanisms	*(17) NDAs*	Establishment non-disclosure-agreements in order to avoid exploitation of solutions outside the crowdsourcing system
	(18) Netiquette	Definition of formal and informal rules for avoiding crowd misbehavior

Our previous findings show what kinds of, and how, govern mechanisms are used in collaboration-based as well as in tournament-based crowdsourcing systems. Thereby, we get a hint on the overall governance structure established in these two types of systems. Our findings are consistent with existing studies. Although these studies do not analyze these aspects from a governance perspective, they – in some way or another – follow the idea that issues such as the design of tasks (Moussawi and Koufaris 2013), incentives (Leimeister et al. 2009) or controlling procedures (Downs et al. 2010) will have some effects on the "outcomes" – or, more specifically, on the "success" – of a crowdsourcing initiative. However, what we understand by "success of a crowdsourcing project" and how to approach this construct remains unclear.

For addressing this issue, we first need to review the core insights from the literature on project management with respect to "project success", in general, and subsequently transfer these insights on the context of crowdsourcing. The nature of projects and their effective management have been one of the core research topics within information systems research over the last decades (Kirsch 1997; Singh et al. 2011). A review of old and recent literature on project management reveals that researchers have struggled on defining the construct of project success and how it is measured (Belout 1998; Berssaneti and Carvalho 2015; de Vries 2009; Jha and Iyer 2006; Mullaly 2006; Papke-Shields et al. 2010; Pinto and Slevin 1987; Yu et al. 2005). Most of them agree that project success is a subjective construct, which is dependent on the perspective of those who are measuring it (Berssaneti and Carvalho 2015; Jha and Iyer 2006). Furthermore, project success criteria vary from project to project as they depend on project specific organizational (e.g., company-size, project portfolio), customer-related (e.g., customer structure or requirements) or contextual (e.g., market, industry, governmental issues) factors. Nevertheless, researchers have, then again, agreed upon some core *objective* and *subjective criteria* for measuring project success. *Time*, *cost* and *quality* comprise the "iron triangle" and are used as objective criteria (Atkinson 1999; Meredith 1998). These three criteria are defined prior to the project start date. Moreover, they are broken down into definite variables [e.g.: definite milestones measured in day/weeks (time); definite expenditures for team/tools/etc. (cost); definite quality specifications], which constitute the requirements against which the project results are measured. Thus, a project is considered as successful when the defined schedule is met, the costs do not exceed the initial budget planned and the quality criteria are fulfilled (Berssaneti and Carvalho 2015).

However, various researchers have shown that a subjective evaluation by the key stakeholders is also an inevitable criterion (Chou and Yang 2012; de Vries 2009; De Wit 1988). In this context, the key stakeholders' perception is to be analyzed by acquiring variables such as the overall perceived success, perceived satisfaction, perceived challenges and pitfalls as well as perceived project success compared to other or similar projects (Berssaneti and Carvalho 2015; Turner 1993; Wateridge 1998). The mentioned objective and subjective criteria have been acknowledged to be important for evaluating the performance of different kinds of projects and IS projects respectively (Agarwal and Rathod 2006; Belout and Gauvreau 2004; Besner and Hobbs 2006; Bryde 2005; Rai et al. 2009; Raymond and Bergeron 2008). Thus, we will measure the success of crowdsourcing projects accordingly by acquiring and examining objective as well as subjective criteria. While there have been investigations on project success in online based projects (such as OSS projects), the influence of governance mechanism on project success is almost neglected (Crowston et al. 2003). So far, this relationship is discussed on a theoretical basis only in the field of open source software development (Howison and Crowston 2005; Markus 2007). However, we do not know anything about this correlation in crowdsourcing initiatives. In this study, we examine this relation in considerable depth and consider the full set of possible governance mechanisms. By focusing our study on crowdsourcing projects, our results are the first shifting light into the influence of governance mechanism on the quality of output in crowdsourcing initiatives.

Methodology and Case Selection

Many researchers suggest a qualitative approach when examining project success, especially when the research subject is uninvestigated (Akkermans and van Helden ; Lim and Mohamed 1999; Linberg 1999; Procaccinoa et al. 2002; Ruuska and Teigland 2009; Shenhar et al. 2001). Multiple case studies can often

shed useful light on, and provide a deeper understanding of, important issues when the available data are limited, since they allow observing, exploring and explaining new phenomena within their real-life setting (Steinfield et al. 2011; Yin 2009). According to Eisenhardt (1989) and Yin (2009), case studies are useful when the phenomenon has not yet received appropriate ascertainment within the existing literature, and when theoretical knowledge lacks clearness and certainty with respect to the underlying issue. The evaluation of the effects of crowdsourcing governance mechanisms exhibits the above-mentioned features. Therefore, we suggest the case study approach to be suitable for investigating governance mechanisms for crowdsourcing projects.

However, as we stressed in the sections above, it is imperative to consider the diverse nature of crowdsourcing when analyzing this phenomenon. Therefore, a differentiated analysis is required when approaching governance within crowdsourcing. Hence, we align the selection of cases based on these central types of crowdsourcing systems system (competition-based or collaboration-based): For our study, we decided to analyze at least *two cases – i.e., projects (from the initiation to the end) – for each type* of crowdsourcing system. Hitherto, we have analyzed one case – i.e., as a time-oriented, competition-based crowdsourcing project on the leading *crowdtesting platform Testbirds* in Europe, which is based in Germany. Founded in 2011, the company has grown significantly since then and now counts about 65.000 registered users, respectively testers on their platform. The company offers crowdsourced functional as well as usability testing for basically all types of software, but is specialized in web- and native mobile applications. The intermediary uses a self-developed platform for its intermediation process and offers a variety of services as well as a project manager, who provides full support throughout an entire project.

In order to gain valuable insights from the different cases, we proceeded as follows: We first analyzed the governance structure on the different types of crowdsourcing platforms (previous study). In the second step, we now analyze the impact of the implemented governance mechanisms on project success. For this, we accompanied a crowdsourcing project on Testbirds' platform from the beginning to its end: The certain project we analyzed was conducted with a large Swiss bank counting over 500 employees in its IT department. The scope of the project was the testing of the mobile banking application provided by the Swiss bank for its customers. To enhance testing quality, a senior manager decided to apply crowdtesting for this purpose. The whole project was divided in two testing-phases: Focus of the first test was solely the functional testing of the public areas in the app – i.e. all parts were users do not need log in. Since the company was also interested in users' feedback, a combined usability-functional test was conducted two weeks after the first test run. Overall, the time frame from project initiation – i.e. kick off meeting with the two parties – to project closure was eight weeks.

We followed the guidelines presented by Dubé and Paré (2003) on how to approach, conduct and report cases studies, and thus used multiple methods and tools for data collection from a number of entities. Data sources for our studies include semi-structured, in-depth interviews conducted *before* and *after* the project – i.e., from January to March 2015 – with the core involved stakeholders – i.e., a senior manager and two operative test-mangers at the Swiss bank as well as one operative project manager of Testbirds. All these individuals were involved in the whole project and thus managed all project work. We developed a roughly structured guideline with open questions which addressed our targeted variables before and after the project – such as the project requirements (time, cost and quality), perceived project success and the governance mechanisms' effect on the outcomes (Table 2). All interviews were recorded and subsequently transcribed. In each situation, detailed notes were taken during interviews. In addition to the interviews, we also measured *objective criteria* – i.e., definite budget plan (cost), time-schedule and associated milestones (time) as well as definite testing requirements (quality) – *before* and *after* by accompanying the whole project and reviewing several documents provided by the interviewees, such as slide decks, company presentations and organizational decks, etc.

Table 2. Description of Data Sources for the Qualitative Study	
Pre-Interviews	
Interviewee(s)	*Content/Subject*
Group-Interview (all Interviewees together)	• Determination of overall project requirements (time, cost, quality) • Determination of specific testing specifications
1 Project Manager at Swiss bank	• Inquiry of expectations
2 Test-Managers at Swiss bank	• Inquiry of perceived project progression

1 Project Manager at Testbirds	• Inquiry of implemented governance mechanisms
Post-Interviews	
Interviewee(s)	*Content/Subject*
1 Project Manager at Swiss bank	• Inquiry of perceived project success
1 Test-Manager at Swiss bank	• Inquiry of satisfaction with project progress, work and results
1 Project Manager at Testbirds	• Assessment of the importance and effect of implemented governance mechanisms on project outcomes • Comparison with other/similar projects

The units of analysis concern mechanisms implemented on Testbirds' platforms for the purpose of governing crowdsourcing projects. Consistent with our objectives, we followed an inductive approach in order to reveal relevant relationships and structures available in the data (Strauss and Corbin 1990). Due to the fact that we have already identified various governance mechanisms in a previous study, we used conceptual frameworks from existing research to organize the identified concepts, but at the same time induced concepts from the data without drawing on predefined hypotheses (Kirsch 2004; Racherla and Mandviwalla 2013). Thus, we had pre-determined codes and categories with respect to the governance mechanisms and project success. In this step, we broke down the qualitative data line-by-line into separate units and attributed the codes to the different categories (e.g., 'task modularization', 'badging', etc.) (Racherla and Mandviwalla 2013). By means of axial coding, we tried to find plausible relationships between the identified concepts (i.e., group of governance mechanisms and project success) as well as relationships between a key concept and its sub-concepts (i.e., relationships between the identified mechanisms within a group) (Miles and Huberman 1994). Finally, we re-examined the qualitative data to ensure that we covered all information available in our data set.

Preliminary Findings

By the end of the project, the 26 participating crowdsources (81% from Germany and 19% from Switzerland) had found a total of 39 Bugs. Most of the crowdsources had a professional testing background (69%), whereas 15% were leisure time testers and 16% crowdsources with basic testing experiences. The crowdsources went through previously defined use cases and were also asked various pre-defined questions regarding the usability of the application. The identified bugs were classified in 4 categories depending on the severity level: critical (3 bugs), high (2 bugs), medium (13 bugs) and low (21 bugs). The crowdsources tested the mobile application 60 minutes on average. All in all, this specific project was regarded as a successful one by all stakeholders – especially the Swiss bank as the crowdsourcer. All time, budget and quality requirements were met. This was proven not only by objective criteria – set forth in the analyzed summary minutes and documents – but also by subjective criteria:

"In my opinion, the project was successful. We were able to identify a large number of bugs (…). We met all the standards we defined before the project started." (Swiss bank test manager)
"The project was indeed a successful one. The crowd found different kinds of bugs within hours (…) and we were able to meet the requirements of our customer." (Testbird manager)

Thus, we consider the project as being successful to a high degree. Meanwhile, regarding the impact of the implemented governance mechanisms on this outcome, we found that some of the mechanisms are considered to have had a great influence, whereas others have been rather neglected: *(1) task modularization* and *(2) solution requirements* have the greatest impact on project success according to all stakeholders. These are the issues the project team spend most time with (i.e., several meetings for clearly, defining the use cases, usability questions, etc.). Further, the *(7) manual control* of submitted bugs (quality assurance) was regarded as an important factor, which made sure that only real and existing bugs were reported to the Swiss bank. However, the *(16) induction process*, which has to be passed by all crowdsources, is considered as an influential mechanism since even the crowdsources with low testing experiences reported valuable bugs in this project. The choice of incentive mechanisms – i.e.*, (10) monetary rewards* in form of a flexible ("pay per bug") an a fix (basic salary for a written bug report) remuneration, as well as the implementation of *(11) badging features* – was also considered as a main driver since crowdsources were motivated to find as many bugs as possible, as fast as possible.

"We spent much time for clearly outlining our testing requirements – but it was worth it because without doing it that precisely, I think the project had not been successful." (Swiss bank test manager)
"I think that defining the solution requirements and the use cases as well were the two most decisive factors in this project (...). The quality control that we perform ourselves was also crucial since – we did not want to give our first-time customer any non-existing bugs." (Testbird manager)

However, the stakeholders pointed also some mechanisms out, which did not strongly affect the project outcomes: The *task allocation mechanisms (mechanisms 4-6)* were not decisive since the selection of crowdsources was set to be limited to predominantly Swiss testers; however, this was not achieved so that the task was opened for all crowdsourcees of the platform. Further, the stakeholders planned to gather about 40 crowdsourcess; however, only 26 tested the application. Based on the findings, we suggest that a *(12) peer-communication forum*, where the testing project could have been announced and discussed beforehand, and the organization of games in the context of this specific project *(13: gamification)* could have motivated the crowd more extensively, which, in turn, might have led to even better project results.

Expected Contribution and Future Work

Given the lack of empirical research on the impact of governance mechanisms on the success of crowdsourcing projects, we initiated a research project that comprises in-depth analyses of crowdsourcing projects on various kinds of crowdsourcing systems (collaboration-based and competition-based). An initial comparison of the implemented governance mechanisms in this setting shows that task definition mechanisms and quality assurance mechanisms have the highest impact on the success of crowdsourcing projects, whereas task allocation mechanisms are less decisive. The insights presented here constitute a first step for identifying governance mechanisms that have a greater impact on project success; however, all mechanisms should not be considered in isolation – they are rather a part of a specific governance configuration. Thus, the challenge in the upcoming completed research is to analyze role of implementation of different governance mechanism configurations – or combinations – with respect to their impact on crowdsourcing project success. In the next steps, we will analyze another time-oriented, competition-based crowdsourcing project – we think of Clickworker.com – before we then examine two cases on the other types of crowdsourcing systems – i.e., output-oriented, competition-based crowdsourcing as well as collaboration-based crowdsourcing systems. For this, we have already had first interviews with the following platforms: Healthtap.com and SAPiens.info (collaboration-based), as well as 99design.de and Innovationskraftwerk.de (output-oriented competitions). Further, we will carry out a comparative examination in order to explain differences in the impact of governance mechanisms. Hence, our study contributes to the research field of crowdsourcing as well as to governance research. Hence, our study contributes to the research field of crowdsourcing as well as to governance research. With respect to governance research, we contribute to the understanding of the effect of governance mechanisms implemented on crowdsourcing platforms as one specific form of online platforms. Hitherto, governance has mainly been examined in the field of open source projects (De Laat 2007; Markus 2007; Shah 2006b), whereas other kinds of online-based platforms have been neglected. We, thus, enlarge insights on governance in internet-based information systems. Following de Laats' (2007) framework, our study sheds light on "internal governance" issues by examining mechanisms by means of which optimal outcomes can be achieved. As for the research stream on crowdsourcing, our results help understanding how different governance mechanisms impact the success of projects on different types of crowd production systems. Due to the fact that governance issues have not been thoroughly analyzed (see e.g., Pedersen et al. 2013), our study paves the way for future research on the operation of governance mechanisms within different crowdsourcing initiatives. According to Gregor (2006), these are theoretical contributions of the type of explaining by expanding the scientific body of knowledge with empirical results of several case studies which will serve to management of crowdsourcing initiatives. The multiple case studies help to bring more rigor to the management, coordination and control crowdsourcing initiatives. Hence, the insights help make crowdsourcing more manageable.

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