

# UTILIZING THE CROWD – A LITERATURE REVIEW ON FACTORS INFLUENCING CROWDSOURCING INITIATIVE SUCCESS

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## Abstract

*With the progress of Web 2.0 technologies and corresponding organizational capabilities, new information technology sourcing mechanisms emerged. Crowdsourcing is such a promising new form of sourcing, wherein organizations take a function such as innovation-focused product or software development and outsource it to an undefined and generally large network of people in the form of an open call. Despite the practical impact of crowdsourcing on organizations, research on this phenomenon remains scarce and our knowledge on critical success factors for crowdsourcing initiatives is still fragmentary. Our study addresses this gap in our knowledge by identifying, categorizing and analyzing 41 unique success factors for crowdsourcing initiatives based on a structured literature review. With this analysis, we provide important insights for managing crowdsourcing initiatives in practice and lay the groundwork for further knowledge generation on crowdsourcing, which needs to be detailed in further empirical research.*

*Keywords: Information Technology Outsourcing, Crowdsourcing, Success Factors, Literature Review.*

# 1 INTRODUCTION

Information technology outsourcing (ITO), the practice of obtaining information technology related services such as software development and infrastructure maintenance by contracting external organizations (Jin Kim, Shin, & Lee, 2013), is a well-known phenomenon. With the progress of Web 2.0 technologies and corresponding organizational capabilities, many new sourcing mechanisms have emerged in recent years (Zhao & Zhu, 2012). *Crowdsourcing* is such a promising new form of sourcing, wherein organizations take a function such as product development or software development and outsource it to an undefined and generally large network of people in the form of an open call (Howe, 2006). Organizations and other entities are turning to crowdsourcing to obtain external expertise, access collective intelligence and creativity from the virtual crowd and profit from benefits such as reducing costs and increasing speed-to-market, quality, and flexibility (Pedersen et al., 2013). Along with these opportunities, crowdsourcing comes with risks and challenges such as establishing motivation and trust, managing and filtering responses, and thus avoiding the danger of losing control over a crowdsourcing initiative (Jain, 2010). For example, a recent study has shown that difficulties increase according to complexity and size of a crowdsourcing initiative (Pedersen et al., 2013). Hence, a careful evaluation and management of the crowdsourcing success factors is critical to ensure that firms can effectively exploit its full potential (Agafonovas & Alonderienė, 2013).

From a research perspective, an initial body of knowledge already exists for crowdsourcing, although like the phenomenon itself, research is still young and therefore remains scarce. Nevertheless, the topic is gaining interest and the number of published articles on crowdsourcing is steadily increasing (Zhao & Zhu, 2012). As crowdsourcing is a broad field, authors have not agreed upon a commonly accepted definition. Current research offers a variety of definitions and criteria to describe, identify and verify crowdsourcing initiatives (Estellés-Arolas & González-Ladrón-de-Guevara, 2012; Howe, 2010). To get an overview of the different types and characteristics of these initiatives and to distinguish between them, numerous classifications can be found (Geiger, Seedorf, Schulze, Nickerson, & Schader, 2011; Schenk & Guittard, 2011). However, the common ground of different initiatives is the fact that success of crowdsourcing basically depends on participants and their willingness to share ideas (Agafonovas & Alonderienė, 2013).

So far, authors identified success factors for crowdsourcing initiatives (Jain, 2010), for example, willingness to share ideas (Agafonovas & Alonderienė, 2013), while others integrated past research results in general literature reviews without specifically focusing on factors influencing the success of crowdsourcing initiatives (Geiger et al., 2011; Zhao & Zhu, 2012). Despite these already existing studies, research has not identified and categorized the necessary factors for successfully managing crowdsourcing initiatives. Therefore, our research addresses the following general research question to close this gap in our knowledge: “*What are relevant success factors for delivering successful crowdsourcing initiatives?*”

To answer our research question, we conducted a structured literature review (SLR) based on the recommendations by Webster and Watson (2002). Based on the identified articles within our literature review, we categorized the factors based on the crowdsourcing framework from Zhao und Zhu (2012). Furthermore, we identified correlations between influencing factors and listed them accordingly. The result of our study is therefore a comprehensive list of success factors.

After this introduction, the remainder of the paper is structured as follows. The next section offers a brief overview about the theoretical background and related work on crowdsourcing and its influencing factors. Within section 3, we provide details on our research method and design as well as the approach for data collection and analysis. The main section of our paper is section 4, which contains the results of our study with a specific focus on describing the success factors for crowdsourcing. Within section 5 and section 6 we discuss and conclude our results, explain the limitations of our study, and provide directions for future research.

## 2 THEORETICAL BACKGROUND AND RELATED WORK

The term crowdsourcing could generally be defined as “a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task.” (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). Hereby, it is also important to note, that a crowdsourcing initiative should include mutual benefits for both the sponsor as well as the participant (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). Such a benefit could include economic or social recognition, self-esteem or the development of individual skills for the participants as well as the further usage of the participant’s work (e.g. program code) by the sponsor of the crowdsourcing initiative (Howe, 2006).

Crowdsourcing has a very wide field of application and initiatives can differ substantially from another. To distinguish between them, various types of classifications can be found in literature. For example, the framework of Geiger et al. (2011) identified four dimensions that describe how crowdsourcing processes differ. The first dimension, *preselection of contributors*, is concerned with restrictions regarding the group of potential contributors and requirements for participation. Most of the studied crowdsourcing initiatives do *not* restrict the selection of participants, because they place emphasis on the highest possible number and diversion of contributors. Others require a certain level of knowledge or skills to ensure quality. For this *qualification-based* selection, possible participants have to apply. With a *context-specific* selection, for example, an organization, only allows employees, to protect internal knowledge and critical data. In some cases, *both* of the restrictions are used together. The second dimension, accessibility of peer submissions, indicates to what extent participants can access each other’s contributions. The four characteristics of this dimension reflect the degree of access that a crowdsourcing process enables. *None* means contributions are isolated from each other and cannot be seen by other participants. On the lowest level of actual accessibility, the *view* characteristic means that all contributions are visible to any potential participant. Characterized as *assess* are processes where participants can use explicit mechanisms to express their opinion on individual contributions. The highest level of accessibility is *modify*, where participants can alter or delete each other’s contributions in order to improve, correct or update them. The third dimension, *aggregation of contributions*, describes how contributions are used by the crowdsourcing organization to achieve the desired goal. *Integrative* crowdsourcing processes reuse all contributions for the final outcome unless they fail to meet certain quality requirements. They come in use, for example, to gather a collective opinion. On the contrary, *selective* processes follow a more competitive approach, where individual contributions are compared to each other and the ones best to achieve the goal are selected. The final dimension, *remuneration for contributions*, indicates how contributions are paid or otherwise compensated for. In some crowdsourcing processes *no* remuneration is offered at all and they completely rely on other mechanisms to motivate contributors. *Fixed* remuneration means that all contributions that follow the respective terms and conditions generate a fixed compensation, regardless of their value to the final outcome. On the contrary, *success-based* remuneration means that contributions will be paid depending on their individual value to the crowdsourcing goal.

Another well-cited framework for classifying crowdsourcing initiatives is based on the recent work of Zhao and Zhu (2012), who evaluated the current literature on crowdsourcing and defined three crowdsourcing-focussed dimensions which require further research: *organization*, *system* and *participant*. Hereby, the organization is the purchaser of the crowdsourcing solutions. The system represents the carrier and maintainer of the crowdsourcing platform and may be the organization itself or another intermediary. The participants are people in the crowd solving the given problem or task.

Within our research, we used the framework of Geiger et al. (2011) as the terminological and logical base for the later sections of this paper and especially the factor descriptions listed in Section 4 of this paper. Furthermore, we used the framework of Zhao and Zhu (2012) categorization of the identified factors, because our work should, in line with Zhao and Zhu (2012), represent the current status of our knowledge on crowdsourcing to foster further research on this important phenomenon.

### 3 RESEARCH DESIGN

#### 3.1 Research Method Overview

To identify the success factors for delivering successful crowdsourcing initiatives, we conducted a structured literature review (SLR) based on the recommendations by Webster and Watson (2002). In order to address the research question, we identified success factors stated by prior studies. Therefore, our SLR is context-centred instead of author-centred, meaning that the examined literature itself does not function as object of the study, as we will not analyse or assess any authors or papers, but merely use them as informational resources.

After identifying the success factors based on our SLR, we furthermore coded all relationships between these factors to develop a framework of correlations and relations between the identified factors. Hereby, we relied on a meta-analysis approach similar to Lacity, Khan, Yan, and Willcocks (2010), coding relationships between independent and dependent variables.

#### 3.2 Data Collection and Analysis

Our study used a multi-level data collection and analysis approach including (1) the data collection based on a keyword search, (2) the consolidation of the identified articles, (3) the coding of the articles with a specific focus on success factor descriptions, and (4) the coding of interactions and correlations between the factors.

Within the *data collection phase (1)*, we collected 103 papers on crowdsourcing based on a keyword search using the databases *EBSCO* and *Abi/Inform*. In our literature search we restricted the keyword search to those papers that contained “crowdsourcing” in the title to set our primary focus on the phenomenon and to exclude papers that cover only related topics (e.g., crowdfunding) or that examined crowdsourcing in a too specific field (e.g., medicine instead of information technology).

After collecting the papers based on our keyword search, two researchers independently performed an *initial analysis (2)* of the papers by reading the abstract and specifically searching for factors concerning the successful delivery of crowdsourcing initiatives. Additionally, we identified prior articles by going backwards, as we followed central citations. This step resulted in a final list of 29 papers, which included success factors and were therefore used as the baseline for the data analysis.

Within the *article coding (3)*, we independently coded the remaining 29 papers with a specific focus on success factors for delivering crowdsourcing initiatives. Within the articles, we identified 137 specific references on success factors for crowdsourcing initiatives. All references were collected in a factor database and afterwards consolidated as well as categorized. For the categorization of the factors we used the future research directions by Zhao and Zhu (2012). This step resulted in 41 unique success factors. Table 1 gives an overview on the number of success factors identified per category and subcategory.

Category	Subcategory	Abbr.	Success Factors	Sum
Organization	Adoption	OA	6	22
	Quality and Evaluation	OQ	7	
	Governance	OG	9	
System	Incentive Mechanism	SM	3	6
	Technology Issues	ST	3	

Category	Subcategory	Abbr.	Success Factors	Sum
Participant	Motivation	PM	9	13
	Behavior	PB	4	

Table 1. Identified factors including categories based on Zhao and Zhu (2012)

The coding of the success factors revealed that the majority of factors do not have a direct influence on the success of a crowdsourcing initiative, but instead influence other factors, which in turn lead to success. Therefore, in *the interaction and correlation coding (4)*, we extended the factor database by interactions and correlations between factors to collect all direct and indirect relations between the identified success factors and crowdsourcing initiative success. Within this step, we identified 81 correlations between the factors and coded the following data for each correlation:

(1)	<b>The Factors Names</b>	
(2)	<b>The Direction of the Relationship</b>	
(a)	The first factor influences the second one (uni-directional relationship)	←;→
(b)	Both factors influence each other (bi-directional relationship)	↔
(3)	<b>The Relationship Effect</b>	
(a)	Positive	+;++
(b)	Negative	-;--
(c)	Not Steady	*,**
(4)	<b>The Statistical Significance of the Relationship</b>	
(a)	Proved Significance with Significance Level $p < 0.05$	++; --; **
(b)	Disproved Significance	not shown in graph
(c)	No Significance mentioned in source	+;-;*
(5)	<b>The Literature Resource Mentioning the Relationship</b>	

Table 2. Legend for Interaction and Correlation Coding

## 4 FINDINGS AND RESULTS

Figure 1 in the appendix of this paper shows a directed graph of all identified success factors and their relations (correlations). The nodes (rectangles) of the graph represent the direct and indirect factors on crowdsourcing initiative success. The graph is centred on the success of crowdsourcing initiative, as it is the target dimension. The other big nodes (e.g., *motivation*) represent intermediate targets, which cannot be influenced directly by the stakeholders and are highly depended on other factors. In contrast, small nodes (with rounded corners) merely represent indented and indirect factors. This distinction is not fixed and mainly provided for clarity. The edges (arrows) of the graph represent the correlations and relations between these factors, pointing at the influenced factor in a uni-directional relationship and pointing at both factors in a bi-directional relationship. Positive correlations and amplifying effects are marked as “+”, whereas negative correlations and debilitating effects are marked as “-“. More complicated and not steady correlations and effects are marked with “\*”. If the referenced literature has proven statistical significance (significance level  $p < 0.05$ ) they are marked with two symbols (“++”, “--“, “\*\*”). The border styles of the nodes represent the factors influence on success (congruent to the style of the arrows and the effect of the represented correlation). The tendency is determined by recursively following the directed edges towards success. For example, *fraud detection* does not have a steady tendency, because it has a positive effect on *security* (positive), but increases *expenses* (negative).

In addition, Table 3 lists all identified success factors, the corresponding authors and a short description. The ID includes the abbreviation of the category the factor is assigned to (cf. Table 1).

<b>ID</b>	<b>Success Factor</b>	<b>References</b>	<b>Description</b>
OA1	<b>Answer type</b>	Walter and Back (2011)	The four possible <i>answer types</i> are: Naming, designing, engineering and business solutions. The <i>answer type</i> has an influence on <i>quality</i> and <i>duration</i> , but no effect on the <i>number</i> of submission.
OA2	<b>Meaning of task</b>	Chandler and Kapelner (2013)	The <i>meaning</i> of a task reflects how important a task seems to be in the eyes of the participants. On the one hand a high <i>meaning</i> (e.g. cancer research) leads to a higher <i>number of submissions</i> with steady <i>quality</i> . On the other hand a low <i>meaning</i> (e.g. dismissing the submissions) only affects the <i>quality</i> negatively, but does not affect the <i>quantity</i> of submissions.
OA3	<b>Brand-strength</b>	Agafonovas and Alonderienė (2013), Walter and Back (2011)	In order to reach a critical mass of participants, public attention is needed. A well-known <i>brand</i> can be used to draw this kind of attention.
OA4	<b>Market maturity</b>	Walter and Back (2011)	The market of crowdsourcing is subject to maturation. Therefore, the later a task is formulated, the higher the <i>quality</i> as well as <i>quantity</i> of submissions is received.
OA5	<b>Specificity of task</b>	Walter and Back (2011)	The more specific a task, the more <i>knowhow</i> is needed to solve it, leading to a lower <i>quality</i> and <i>quantity</i> of submissions.
OA6	<b>Tacitness</b>	Afuah and Tucci (2012), Zheng, Li, and Hou (2011)	<i>Tacitness</i> describes how much implied and silent knowledge is needed to solve the task. This knowledge can hardly be transferred between the organization and the crowd. It has a negative effect on the <i>motivation</i> of the participants.
OQ1	<b>Evaluation criteria</b>	Di Gangi and Wasko (2009), Jain (2010), Pmnetwork (2009)	The <i>evaluation criteria</i> define the rules of assessing the submission and contain a certain set of acceptance criteria a submission has to fulfill. Submissions rated the highest by the crowd are not necessarily of the highest use. The organization needs to be aware of strategic decisions and should rely on inter decisions in some cases. If the organization wants to keep the option to decide intern, there is a loss of <i>transparency</i> . Therefore, there is a trade-off between intern decisions and the effectiveness of an <i>evaluation by the crowd</i> .
OQ2	<b>Fraud detection</b>	Kittur, Chi, and Suh (2008)	Especially if there are <i>monetary rewards</i> for participating, there will be people trying to get this reward without doing the assigned work or solving the related problem. A broad variety of mechanisms and measurements can be implemented and combined to detect these fraud attempts. Integration and management of <i>fraud detection</i> is <i>costly</i> .

<b>ID</b>	<b>Success Factor</b>	<b>References</b>	<b>Description</b>
OQ3	<b>Experience-good orientation</b>	Afuah and Tucci (2012), (Laudon, Laudon, & Schoder, 2010)	The value of an <i>experience-good</i> cannot be appraised until the good has been consumed. If the solution submitted by the participants is not an <i>experience-good</i> , the organization has the option of evaluating the submission intern or of outsourcing or crowdsourcing the evaluation. This freedom of choice can be used to reduce <i>costs</i> . Yet, if the solution is an <i>experience-good</i> , the <i>evaluation should be crowdsourced</i> to potential consumers and customers.
OQ4	<b>Crowd evaluation</b>	Afuah and Tucci (2012), Zheng et al. (2011)	Not only task solving itself, but also the evaluation of the submissions can be crowdsourced. Thereby, <i>costs</i> related to intern or extern evaluation can be reduced and the participants' need for <i>acknowledgement</i> can be satisfied. The higher the <i>number</i> of evaluators in the crowd, the more successful is a crowdsourcing initiative, but it should be marked, that the crowd has to be capable of doing so.
OQ5	<b>Quality of solution</b>	Agafonovas and Alonderienė (2013), Pedersen et al. (2013)	The <i>quality</i> of the submissions is essential for the success of a crowdsourcing initiative, following the definition. The <i>quality</i> is directly influenced by <i>answer type, meaning, market maturity, specificity, quality management, ease of use, range of function, existence of a reserve and know-how</i> .
OQ6	<b>Quality management</b>	Agafonovas and Alonderienė (2013) , Keen (2007) Zhao and Zhu (2012)	<i>Quality management</i> evaluates and ensures <i>quality of submissions</i> . The success of <i>quality management</i> is dependent on many other success factors. <i>Evaluation criteria</i> define how submitted solutions are evaluated. The higher the <i>number of participants</i> , the harder the <i>quality management</i> . <i>Quality management</i> is one of the highest <i>expenses</i> of crowdsourcing initiatives.
OQ7	<b>Verifiability</b>	Kittur et al. (2008)	By making the submission easy to <i>verify</i> , <i>quality management</i> will be facilitated. When crowdsourcing includes small tasks, it is helpful, to build in questions that are easy to validate.
OG1	<b>Duration</b>	Agafonovas and Alonderienė (2013), Walter and Back (2011)	The <i>duration</i> between the beginning of the open call and the deadline has a positive effect on the <i>number of submissions</i> , but there is not significant effect on the <i>quality</i> .
OG2	<b>Task allocation</b>	Jain (2010), Karger, Oh, and Shah (2014)	The <i>task allocation</i> describes the granularity of single tasks. A given task can be decomposed to smaller tasks. These tasks are easier to distribute to participants, but are harder to <i>verify, detect frauds and encourage of good faith</i> .
OG3	<b>Level of detail of contract</b>	Jain (2010)	A high <i>level of detail</i> is usual in business-contracts. Organizations try to accomplish maximal legal <i>security</i> by covering all possibilities in the contract. This high level of detail might deter participants and lower their <i>trust</i> .

<b>ID</b>	<b>Success Factor</b>	<b>References</b>	<b>Description</b>
OG4	<b>Transparency</b>	Agafonovas and Alonderiené (2013), Bonabeau (2009), Jain (2010)	This factor includes the <i>transparency</i> of the evaluation process as well as a clear legal situation. It is not about the content or consequences of these rules, but about disclosure and comprehensibility. <i>Transparency</i> promotes <i>trust</i> . If there is a lack of <i>transparency</i> , doubts regarding the integrity and manipulation charges can accrue. <i>Transparency</i> of the evaluation process can be achieved by clear evaluation criteria. In selective competitions the chances of winning should be communicated.
OG5	<b>Expenses</b>	Agafonovas and Alonderiené (2013)	The <i>expenses</i> of a crowdsourcing initiative have a negative effect on the success, flowing the definition. They are mainly composed of <i>monetary rewards</i> , implantation of the <i>system</i> and infrastructure, maintenance costs, <i>governance</i> and <i>quality management</i> .
OG6	<b>Publicity of individual submissions</b>	Agafonovas and Alonderiené (2013), Geiger et al. (2011)	This factor describes whether the submitted solutions are public and how much information about these solutions is public.
OG7	<b>Security</b>	Jain (2010), Winsor (2009)	<i>Security</i> positively affects the success, by reducing the risks, mainly of unforeseen expenses. This applies to all stakeholders, but mainly the crowdsourcing organization. The most important security aspects can be found in the factors <i>fraud detection</i> , <i>level of detail of contracts</i> , <i>encouragement of good faith</i> and <i>access restrictions</i> . There may be trade-off between <i>security</i> and <i>transparency</i> .
OG8	<b>Support through Organization</b>	Agafonovas and Alonderiené (2013), Jain (2010)	An active and public support of the crowdsourcing initiative through the crowdsourcing organization leads to additional <i>trust</i> . This requires first of all the organization and the purchaser of the produced solution to be known. Active support could include (financial) incubation of participants' ideas and solutions.
OG9	<b>Access restrictions</b>	Agafonovas and Alonderiené (2013), Geiger et al. (2011)	Access restrictions are used to preselect the participants. The <i>diversity</i> of the crowd will be limited, as only qualification-specific and/or context-specific participants grant access. Any form of access restrictions lower the <i>number of participants</i> .
SM1	<b>Encouragement of good faith</b>	Kittur et al. (2008)	Encouragement of good faith can be achieved by designing the tasks the way that seriously solving the related problem is more time and resource efficient for the participant than a malicious manipulation attempt. Thereby, the effort put in <i>fraud detection</i> can be decreased.
SM2	<b>Profiling options</b>	Leimeister, Huber, Bretschneider, and Krcmar (2009)	Self-marketing is one of the motives for participants. <i>Profiling options</i> is an incentive for that motive, as they enable participants to show their achievements, knowledge and work.



<b>ID</b>	<b>Success Factor</b>	<b>References</b>	<b>Description</b>
SM3	<b>Access to knowledge</b>	Kosonen, Gan, Olander, and Blomqvist (2013), Leimeister et al. (2009)	An <i>intrinsic motive</i> for participating in a crowdsourcing initiative is learning. Granting the participants <i>access to knowledge</i> is an effective incentive. On the one hand experts can provide their expertise e.g. via audio- or videoconferences. These can be mentors or qualified teachers. On the other hand the participants can learn from each other, if they are given the right tools and <i>individual submissions are public</i> .
ST1	<b>Ease of use</b>	Agafonovas and Alonderienè (2013), Casaló, Flavián, and Guinalú (2010), Kosonen et al. (2013), Valck, Langerak, Verhoef, and Verlegh (2007)	<i>Ease of use</i> is a necessity for the success of crowdsourcing initiatives. The support of multiple languages and accessibility lowers the entrance barriers and facilitates higher productivity. A perceived <i>ease of use</i> has a positive effect on the attitude towards participating in a digital platform and sharing knowledge.
ST2	<b>Ranking tools</b>	Agafonovas and Alonderienè (2013)	Ranking tools enable and support <i>crowd evaluation</i> . Most common are rating and comment functionalities. The more interactive the tools, the more Collaboration is possible and the more accurate the <i>crowd evaluation</i> .
ST3	<b>Range of functions</b>	Agafonovas and Alonderienè (2013)	A high <i>range of functions</i> in general supports the participants to perform their tasks. E.g. mobile access allows task solving in real time and at any given place. <i>Range of functions</i> usually correlates with <i>ease of use</i> . There is a positive effect on <i>quality</i> and <i>quantity</i> of submissions.
PM1	<b>Variety</b>	Zheng et al. (2011)	<i>Variety</i> of a task is defined by the number and diversity of skills needed to solve the task. Participants feel challenged and have more fun working on such a task. <i>Variety</i> has a significant positive effect on <i>intrinsic motivation</i> . A task lacking variety bores participants and the perceived <i>meaning</i> is lowered.
PM2	<b>Acknowledgement</b>	Agafonovas and Alonderienè (2013), Leimeister et al. (2009), Zheng et al. (2011)	<i>Acknowledgment</i> by the crowd or the organization is a significant success factor on the <i>extrinsic motivation</i> of participants.
PM3	<b>Autonomy</b>	Zheng et al. (2011)	<i>Autonomy</i> is the grade of freedom and independence at solving the given task. This includes methods, planning and executing their work. A task, which is not depended on the organization and their processes leads to a higher <i>autonomy</i> .
PM4	<b>Career options</b>	Leimeister et al. (2009)	Offered <i>career options</i> can cause an <i>extrinsic</i> incentive for the participants. These options are a directed compensation for the effort like <i>monetary rewards</i> .

<b>ID</b>	<b>Success Factor</b>	<b>References</b>	<b>Description</b>
PM5	<b>Motivation</b>	Doan, Ramakrishnan, and Halevy (2011), Kaufmann, Schulze, and Veit (2011), Zheng et al. (2011)	The <i>motivation</i> of participants and the related recruiting and preserving of work forces are essential for the success of a crowdsourcing initiative. There are intrinsic and extrinsic motives. Extrinsic motives are direct compensation, anticipated compensation and social motives. Intrinsic motives are personal interest, fun and social interaction. Both have a significant positive effect on <i>quantity</i> and <i>quality</i> of submissions.
PM6	<b>Monetary Rewards</b>	Geiger et al. (2011), Leimeister et al. (2009), Liu, Yang, Adamic, and Chen (2014), Walter and Back (2011), Zheng et al. (2011)	<i>Monetary rewards</i> are a direct compensation for performed work and are therefore an extrinsic motive. Studies have shown that there is a significant influence on the <i>number of submissions</i> , whereas a positive effect on the <i>quality</i> is contested.
PM7	<b>Support through government or NGOs</b>	Agafonovas and Alonderienė (2013)	<i>Support through a government or NGO</i> grants perceived stability and helps building up <i>trust</i> .
PM8	<b>Trust</b>	Kosonen et al. (2013), Zheng et al. (2011)	The crowd's <i>trust</i> in the crowdsourcing initiative and in the organization is an often proven significant positive success factor on the <i>motivation</i> of participate.
PM9	<b>Previous success stories</b>	Agafonovas and Alonderienė (2013), Pedersen et al. (2013)	<i>Previous success stories</i> support <i>trust</i> . Thereby, the actual outcome of previous initiatives is less important than the perceived success. Therefore, it is hard to measure it.
PB1	<b>Number of participants</b>	Agafonovas and Alonderienė (2013), Pedersen et al. (2013), Shapiro and Varian (1999)	The <i>number of participants</i> is an essential success factor on the success of crowdsourcing. It is in the nature of crowdsourcing that the advantages of a large number of people are used. Growing numbers of participants increase <i>diversity</i> and raise the expenses of <i>quality management</i> .
PB2	<b>Existence of a reserve</b>	Liu et al. (2014)	A <i>reserve</i> is a solution to a task that is stated to be picked if no better solutions are submitted. While there is no effect on the total number of submissions, the number of invalid and useful solutions increases, if there is a <i>reserve</i> . Early submitted <i>public solutions</i> can be perceived as a <i>reserve</i> and lower the overall <i>quality</i> of further submissions.
PB3	<b>Diversity of Crowd</b>	Afuah and Tucci (2012), Agafonovas and Alonderienė (2013), Jain (2010), Liu et al. (2014), Pedersen et al. (2013), Sharma (2010)	The benefits of a high <i>number of participants</i> can only be used, if there is a certain <i>diversity of the crowd</i> . Thereby, crowdsourcing is empowered to push geographical, political and economic boundaries. The higher the <i>diversity</i> , the higher are the chances of someone with the right <i>know-how</i> and knowledge is beneath the participants.

ID	Success Factor	References	Description
PB4	<b>Know-How</b>	Afuah and Tucci (2012), Liu et al. (2014),	<i>Know-how</i> of the crowd includes the experience and the skills to solve the given task. <i>Quality</i> of submissions increases with the <i>knowhow of the crowd</i> , but experienced participants take more time and <i>duration</i> may be increased.

Table 3. Crowdsourcing Success Factor Overview

## 5 DISCUSSION

### 5.1 Summary of Findings and Implications for Theory and Practice

Crowdsourcing is a relatively novel phenomenon in both theory and practice. Therefore, the main goal of our research was an initial literature-based identification of relevant factors for delivering successful crowdsourcing initiatives to identify our current level of knowledge and foster further research on the concept of crowdsourcing. Based on our research approach, we were able to identify a total number of 41 germane success factors for crowdsourcing initiatives, which we furthermore categorized into the recent framework on crowdsourcing by Zhao and Zhu (2012). Hence, this literature review and the corresponding novel research results enable a further evaluation of these factors by the research community, for example through an empirical evaluation of the factor's importance for crowdsourcing in practice. Based on the identified factor list and the correlations between the factors itself, we advise further empirical tests of the factor's application in practice, for example by evaluating specific anti-fraud or transparency mechanisms through case-study research. So far, our knowledge on crowdsourcing success is scarce, therefore further research on all identified factors and correlations will increase our knowledge on this emerging phenomenon. Another potential field of research arising from our work is the comparison of success factors for, on the one hand, common information technology outsourcing initiatives (e.g. outsourcing of activities to one vendor) and crowdsourcing initiatives on the other hand. With such comparative studies, we could support organizations in practice by choosing the right sourcing option in future based on the underlying sourcing object.

In addition to laying some groundwork for further scientific research on crowdsourcing, our study aims at providing useful knowledge on crowdsourcing for practitioners. To the best of our knowledge, no comprehensive list on success factors for crowdsourcing initiatives existed so far, neither in academic nor in practice-focused literature. Therefore, our research closed this important knowledge gap by providing such a comprehensive factor list, which could be used by practitioners to manage crowdsourcing initiatives within their organizations. Hereby, we would recommend the usage of our study results as a reference list when planning and executing such initiatives and adopt the listed factors as required.

### 5.2 Limitations and Future Research

While the identified success factor list enhances our current knowledge on crowdsourcing, there are limitations and corresponding future research directions that need to be acknowledged.

As already mentioned, the current level of knowledge on crowdsourcing is very limited, which led to some issues within our literature review. In the beginning, we identified 103 papers on crowdsourcing in general, which were evaluated in detail (cf. Section 3). The final list of papers, we used for our analysis included 24 papers only, which is a relatively small number of articles for conducting an in-depth literature-based analysis on success factors. Due to the strict limitation of exclusively searching in title and secondly searching only for the term "crowdsourcing" (excluding e.g. "open innovation"), a comprehensive view including all research fields may not be given. In addition, despite the fact that we used only peer-reviewed journals, we included articles from journals with doubtful heritage and a relatively low impact factor. Therefore, based on current level of knowledge and the published research on crowdsourcing, we cannot be confident, that the identified list of factors is accurate to explain

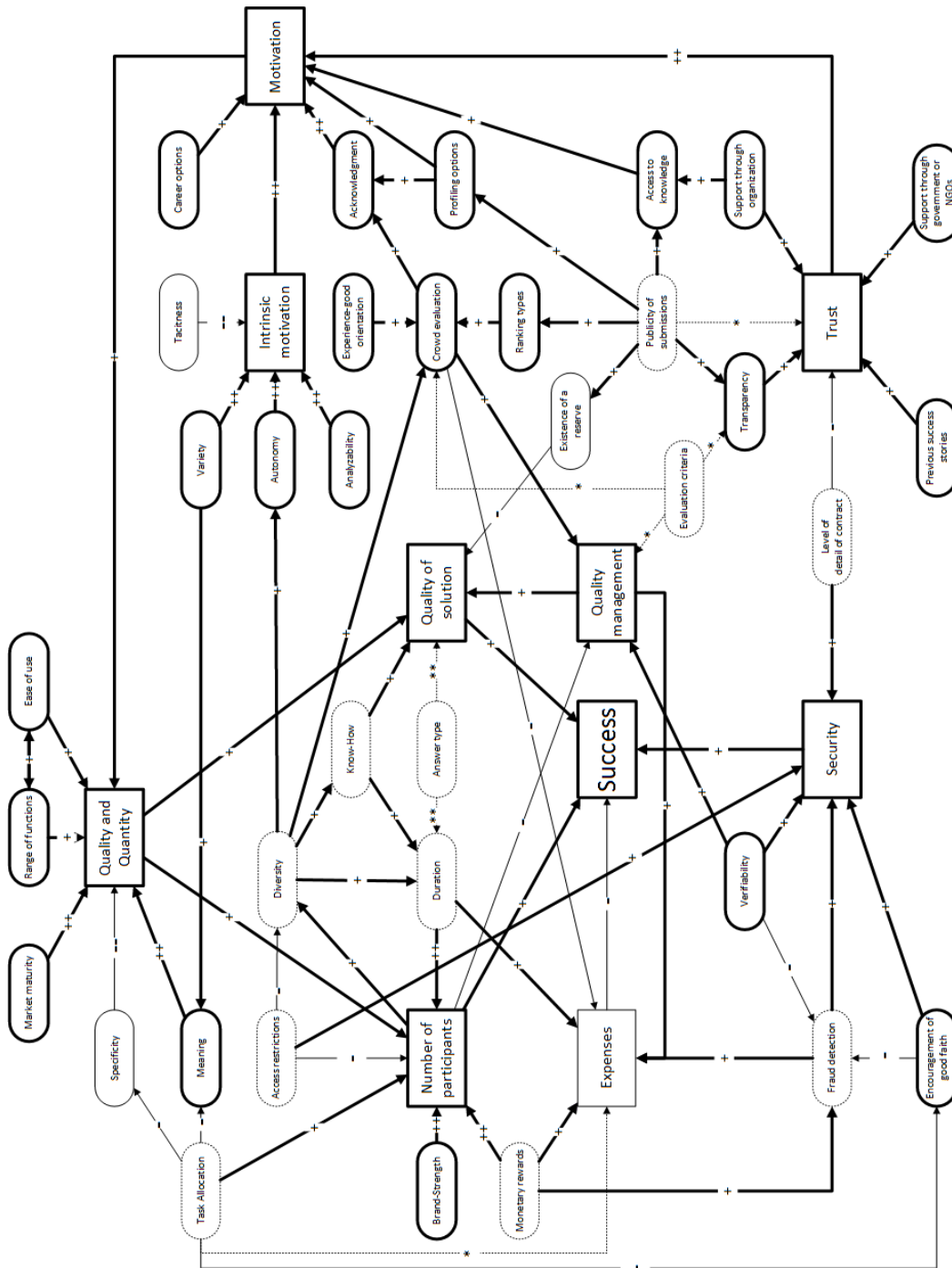
crowdsourcing success. Therefore, we strongly emphasize additional empirical research on the identified factors to further test the factor's validity in practice.

Another limitation of our study is the chosen framework of Zhao and Zhu (2012). As the baseline for our factor categorization, we wanted to use a published and therefore already accepted framework. Based on our initial research on such frameworks, the used framework was one of the only crowdsourcing frameworks available, which met our criteria (e.g. published in a high-ranked journal). Nevertheless, despite the assumed fit of the framework for describing crowdsourcing initiative, we cannot be sure, that the framework explains all aspects of crowdsourcing. Therefore, in line with Zhao and Zhu (2012), we strongly emphasize additional empirical research on crowdsourcing initiatives in general to further develop our knowledge on crowdsourcing aspects and enhance the existing frameworks.

## **6 CONCLUSION**

For the very first time, our study provides an overview about factors relevant for delivering successful crowdsourcing initiatives. By using a structured literature review approach, we were able to identify a set of 41 germane success factors for crowdsourcing. Based on the chosen approach, we are confident that our results have a certain degree of generalizability. In addition to our theoretical contribution, our study provides guidance for practitioners in terms of planning and managing successful crowdsourcing initiatives. Furthermore, based on the current scare level of knowledge on crowdsourcing, our research showed the need for further research on crowdsourcing in general and corresponding success factors in particular. Therefore, we lay the groundwork for further knowledge generation on crowdsourcing, which needs to be detailed in further research.

# APPENDIX



**Legend:**

- Positive tendency **(bold border)** e.g. Motivation
- Negative tendency (normal border) e.g. Tacitness
- Not steady tendency (dashed border)..... e.g. Fraud detection

Figure 1. Relationship Map of Crowdsourcing Factors

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