Open Innovation Software

A study of feature-related problems in idea management systems

Christopher Cedernaes

Kristoffer Eriksson

Supervisors: Dr Jenny Eriksson-Lundström and Håkan Ozan.

Date: 15/10-2012
Abstract

With the transition from closed to open innovation in recent years, the next trend for companies has been to bring in new ideas from external stakeholders using innovation tools, known as Open Innovation Software (OIS). The most common type of OIS, called idea management systems, allows participants to submit, evaluate, and engage in discussions around ideas. However, implementing software to support innovation is not a sure success and potential problems may arise.

The purpose of this thesis is to research problems within features in current idea management systems, and to provide guidelines that suggest ways that may eliminate or reduce the impact of the particular problems.

Interviews were conducted with representatives from five different idea management systems. The respondents demonstrated their systems, which made it possible to gather features and to learn about problems that exist in these systems.

Five problems within features were found; these were related to engagement, duplicates, idea evaluation, complexity, and bias. Numerous recommendations regarding how the impact of these problems may be reduced have been identified.

The findings of this thesis show that Problems with engagement is best dealt with using features that delivers better feedback in order to give more motivation to the participants. As for managing duplicates, it is recommended to implement a feature that suggests similar ideas during the idea submission phase. It was found that allowing users to have an unlimited amount of votes should be avoided. To prevent bias, managers should be careful of having features that displays idea ratings before users have casted their vote, features that allow users to edit their casted vote unless an idea has been edited, and for instance features that show ideas in order of popularity.
Acknowledgements

Special thanks to our tutor Jenny Eriksson Lundström for her support and guidance through the whole process of writing this thesis. We would also like to thank the individuals that allowed us to interview them, for using their time to help us. Without them, it probably would not have been possible to complete this thesis.
# Table of contents

1. Introduction .................................................................................................................. 1
   1.1. Research question ................................................................................................. 2
   1.2. Purpose .................................................................................................................. 2
   1.3. Demarcations ......................................................................................................... 3
   1.4. Disposition ............................................................................................................ 3

2. Open innovation and OIS .............................................................................................. 4
   2.1. Open innovation .................................................................................................... 4
   2.2. Open innovation software (OIS) ......................................................................... 6
   2.3. Idea management systems .................................................................................... 6

3. Literature review ......................................................................................................... 9
   3.1. Related research .................................................................................................. 10

4. Method ......................................................................................................................... 12
   4.1. Interpretive research ......................................................................................... 12
   4.2. Method outline .................................................................................................... 12
   4.3. Grounded theory ................................................................................................. 13
   4.4. Data collection methodology ............................................................................. 15
       4.4.1. How the systems were selected ................................................................. 16
       4.4.2. Interviews .................................................................................................. 16
   4.5. Data analysis: Interviews .................................................................................. 18
   4.6. Data analysis: Features in idea management systems ....................................... 19
   4.7. Reliability and Validity ...................................................................................... 20
   4.8. Method limitations ............................................................................................. 21

5. Pilot study ................................................................................................................... 23
   5.1. Overview .............................................................................................................. 23
   5.2. Resulting categories and features ............................................................... 25
   5.3. Lessons learned .................................................................................................. 28

6. Results and Analysis .................................................................................................. 29
   6.1. Resulting categories ......................................................................................... 29
       6.1.1. Changes in final categories after the pilot study .................................... 30
6.2. What feature-related problems exist in current idea management systems? ........................................... 31
  6.2.1. Problems with engagement ................................................................................................................. 31
  6.2.2. Problems with duplicates .................................................................................................................... 34
  6.2.3. Problems with evaluation models ...................................................................................................... 41
  6.2.4. Problems with system complexity ..................................................................................................... 44
  6.2.5. Problems with bias ............................................................................................................................ 46

6.3. Guidelines for idea management systems ............................................................................................... 49

7. Limitations .............................................................................................................................................. 52

8. Conclusions ............................................................................................................................................... 53
  8.2. Research contribution ............................................................................................................................ 54
  8.3. Further research ..................................................................................................................................... 55

References .................................................................................................................................................... 56

Appendix A – Categories and Features ....................................................................................................... 60
List of figures

Figure 1: Open innovation (Chesbrough, 2003b) .................................................................................................. 4
Figure 2: Open innovation processes (Gassmann and Enkel, 2004) ................................................................. 5
Figure 3: Method outline .................................................................................................................................. 12
Figure 4: My Starbucks idea ........................................................................................................................... 23

List of tables

Table 1: Four types of OIS (Hrastinski et al., 2010). ....................................................................................... 6
Table 2: Systems A-E and respondents 1-5 ......................................................................................................... 17
Table 3: Categories for Idea management systems .......................................................................................... 25
Table 4: Final categories .................................................................................................................................. 29
Table 5: Problems with engagement .............................................................................................................. 33
Table 6: Problems with duplicates .................................................................................................................. 39
Table 7: Problems with evaluation ................................................................................................................ 44
Table 8: Problems with system complexity ...................................................................................................... 46
Table 9: Problems with bias ............................................................................................................................ 48
Table 10: Summary of Problems with engagement ....................................................................................... 49
Table 11: Summary of Problems with duplicates .......................................................................................... 50
Table 12: Summary of Problems with idea evaluation .................................................................................. 50
Table 13: Summary of Problems with complexity ........................................................................................ 51
Table 14: Summary of Problems with bias ..................................................................................................... 51
Table 15: User recognition .............................................................................................................................. 60
Table 16: User communication ....................................................................................................................... 60
Table 17: Idea submission ............................................................................................................................... 61
Table 18: Manage content ............................................................................................................................... 61
Table 19: Idea browsing .................................................................................................................................. 62
Table 20: Voting ................................................................................................................................................ 62
Table 21: Subscribe ........................................................................................................................................... 63
Table 22: Idea feedback ................................................................................................................................... 63
Table 23: Idea stats .......................................................................................................................................... 64
Table 24: Miscellaneous .................................................................................................................................. 64
Table 25: Brainstorm creation ........................................................................................................................ 65
Table 26: Back-end & Administrator options ................................................................................................. 66
1. Introduction

In a survey (McKinsey, 2010) executives were asked if they believed innovation was important to their growth strategy, 84% of the executives answered that it is extremely or very important. As innovation has become more important to companies, innovation management has as well.

Innovation is divided into two separate strategies, closed and open innovation. The latter approach opens up the innovation process and invites users outside the research and development department of an organization to participate in the innovation process. In the model of closed innovation, organizations rely solely on their internal research and development (Chesbrough, 2003b). Previously, closed innovation has been the strategy of choice for companies that want to innovate. Although, now there is an upcoming innovation paradigm shift where more and more companies begin to realize that “not all the smart people work for us. We need to work with smart people inside and outside our company” (Chesbrough, 2003a, p.xxiv, Chesbrough, 2006).

While open innovation is still a new term in innovation strategies, a majority of the companies in a study (McKinsey, 2010) were engaging in open innovation activities. Some ways to tackle the challenges of managing innovation is with open innovation software (OIS). These tools help organizations bring structure to open innovation activities of gathering outside resources for innovation.

OIS allow external users and employees come together and discuss ideas online. There are four different types of OIS, one of them is called idea management system (see section 2.2 for all types of OIS), which is the most common among the different sorts of OIS, and the type of system which this thesis focuses on (Hrastinski et al., 2010, Leitzelman and Trouse, 2011, Hüsig and Kohn, 2009). An idea management system (IMS) allows users to submit, score, and discuss ideas among other features (Bailey and Horvitz, 2010, Hrastinski et al., 2010).

Many articles on the subject of innovation tools, including open innovation software, have been categorizing the current systems on the web in different ways. Riedl et al. (2009) focused on classifying idea management systems in which a total of 25 OIS, such as My Starbucks Idea, on the web were analyzed. The aim of their study was to create a common idea ontology for innovation tools. One paper (Hrastinski et al., 2010) studied and classified features of OIS to shed some light on the overlooked use of IT to support open innovation. In their study, they concluded that most OIS are not that innovative considering they provide similar features. They predicted that one of the challenges of using technology in Open Innovation (OI) would be handling the overflow of information by participants in OIS with large volumes of innovation materials being submitted. The suggestion was to have administrative tools, which could help sort through the potential ideas. This thesis has continued to discuss this problem in the perspective of handling overflow of idea submissions and filtering those that are duplicates.

Introducing a new system into an organization does not come without potential problems (Bailey and Horvitz, 2010). If a system is to be implemented into an organization, managers must be prepared to face certain challenges along the way before taking advantage of its full potential. Bailey and Horvitz (2010, p.2065) stated regarding idea management systems and their features that: “Design choices may
therefore affect ideation outcomes and perceptions and adoption within the organization.” This could mean that depending on how or if a system has implemented specific features may lead to a better or worse ideation process.

Specific problems revolved around features in idea management systems found during this research are brought up in this thesis and will hopefully help managers in preventing them from surfacing when deciding to implement their own open innovation software inside the organization. The current state of research in this area is limited. This thesis will stress the importance of the need of further exploring problems within features related to idea management systems and best practices. The utilization of idea management systems does not necessarily have to limit itself to businesses creating profitable innovations; it could be of use to non-profitable organizations or governmental agencies that for instance could bring in ideas or suggestions from the public on matters of improvement for the community.

This leads to the research question of this thesis.

1.1. Research question
The research question this thesis is based upon is:

- What feature-related problems exist in current idea management systems?

1.2. Purpose
The purpose of this thesis is to explore a type of OIS, categorized as idea management systems, to gather information regarding the features of these systems in order to investigate if there are any challenges with the current set of available features (Bailey and Horvitz, 2010). The problems found are analyzed to see what measures can be taken to prevent potential failures in idea management system implementations.

The contribution of this thesis is a list of feature-related problems within idea management systems and suggestions on how organizations can improve their systems in order to possibly reduce the impact of these problems. In addition, a list of current features in idea management systems is provided, however considering the low number of systems evaluated, it may not be generalized to all systems, but should give a good idea regarding what features are available.

This thesis can be interesting to companies that have or are interested in investing in an idea management system. Companies that already have an idea management system might experience the same-challenges mentioned in this thesis and learn how to resolve them. In addition, they may learn about useful features that they did not know existed nor understood their purpose and desires to have them in their own idea management system that could lead to improvements in their process of gathering-ideas.
Considering to the best of the authors knowledge there exist no previous research specifically focusing on feature related problems in Idea management system, this thesis will also add to the body of knowledge within OIS and the ways it supports innovation.

1.3. Demarcations
The research is limited to studying feature-related problems in idea management systems. Applying this research to other types of OIS will not be analyzed. The features were only gathered and analyzed, from a strict functional perspective.

1.4. Disposition
In chapter two, the theory, with its background in open innovation and open innovation software is described.

In chapter three, the literature review is presented. It also includes related research, which describes articles where similar fields have been studied.

The method of the study, grounded theory, and how it was applied on data collection, and data analysis is explained in chapter four.

In chapter five, the results of the pilot study are presented. This includes the initial set of features gathered from three different idea management systems.

In chapter six, the results and the analysis of the main study are presented.

The limitations of this study are discussed in chapter seven.

In chapter eight, the conclusions based on this study are presented together with the research contribution and suggestions for future research.
2. Open innovation and OIS

This chapter describes the theory used, in this thesis, to explain and analyze our research.

This chapter describes open innovation (OI) and open innovation software (OIS).

2.1. Open innovation

This section describes open innovation in order to help the reader understand how idea management system works.

The idea of the open innovation model is that for an organization, all valuable knowledge cannot be found inside the formal boundaries, like the closed innovation model, external channels have to be used as well, illustrated in Figure 1 (Chesbrough, 2003b). It encourages a flow of knowledge outside of organizations regular boundaries from both customers and other stakeholders (Gassmann and Enkel, 2004). This business model involves finding ways to commercialize knowledge found outside of a company or adding value to the business through sharing its knowledge with other companies, for example with licensing agreements on its intellectual property (Chesbrough, 2003b).
As shown in Figure 2, there are three archetypes of open innovation processes: outbound, inbound, and coupled where outbound (or inside-out) innovation refers to an open exploitation process through which a company will produce additional revenues and profits from selling in-house research outputs to other companies. Inbound (or outside-in) open innovation is an open exploration process through which a company can gather resources in its environment to take innovation to its current market. Locus of innovation is where the innovation is located. The coupled process integrates both the inside-out and outside-in processes by teaming up with complementary partners where give and take is vital for success (Gassmann and Enkel, 2004, Lichtenthaler, 2009, Chesbrough, 2003a). These three processes represent an open innovation strategy. Despite that, not all are equally important for every company. According to Gassmann and Enkel (2004), companies choose one primary process and integrate some elements of the others.

One way of bringing in knowledge outside the company and turn it into value is through crowdsourcing. It is “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 and González-Ladrón-de-Guevara, 2012). Some examples of crowdsourcing activities are Wikipedia where millions of people have contributed to the free website, the online platform Amazon Mechanical Turk where a crowd of people can work to solve small problems for rewards, or the website Threadless that allows customers to design their own t-shirts. The result of working together in crowdsourcing is always a mutual benefit for both partners. A user will receive some kind of monetary compensation as reward for contributions and the crowdsourcer gains more knowledge that can bring business value (Vukovic, 2009, Estellés-Arolas and González-Ladrón-de-Guevara, 2012, Puah et al., 2011).
A company focusing on the outside-in process as their open innovation approach would invest in collaborating with suppliers and customers and to integrate the external knowledge acquired (Gassmann and Enkel, 2004). A company can use open innovation software to support this process (Hrastinski et al., 2010).

### 2.2. Open innovation software (OIS)

This section describes OIS in order to provide more details regarding the type of software that has been studied in the research.

According to Gassmann et al. (2010) the concepts and research areas of open innovation can be divided into nine perspectives. The perspective useful to this thesis is called the tool perspective. It involves connecting with customers, external users and other idea contributors via web communities. The innovation communities link individuals and enables information transfer via face-to-face or electronic communication, where users and manufacturers connect to share their ideas. As the information is published it can be used by manufacturers to turn it into innovations (Von Hippel, 2005).

Four types of OIS (Hrastinski et al., 2010) have been identified which can be seen in Table 1.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea management system</td>
<td>Lets users suggest, evaluate and discuss ideas openly or within predefined categories.</td>
</tr>
<tr>
<td>Problem solving system</td>
<td>Provides opportunities for defining problems and then suggesting, evaluating and discussing solutions.</td>
</tr>
<tr>
<td>Innovation marketplace</td>
<td>Asks users to suggest solutions to problems defined by an organization, and use rewards and recognition as an incentive.</td>
</tr>
<tr>
<td>Innovation analysis system</td>
<td>Provides sophisticated tools for evaluating and analyzing the quality and potential of ideas and solutions.</td>
</tr>
</tbody>
</table>

As previously mentioned, this thesis focuses on Idea management systems which are explained in greater detail in the following section.

### 2.3. Idea management systems

This section describes different types of idea management systems, a subset of OIS, in addition to the purpose and functionalities of these systems, as described by previous research.

Idea management systems are collaborative systems. It is an innovation strategy that brings out ideas from a bottom-up approach, called grassroots innovation pipeline, meaning that the source of innovations comes from the people who are the “least likely to have access to the resources to make them happen” (Bailey and Horvitz, 2010). It is usually available for the entire company. According to
Bailey and Horvitz, idea management systems enable users to create, vote, and comment ideas as well as browse and search for existing ideas in the system. Examples are My Starbucks Idea\(^1\) or Dell IdeaStorm\(^2\) (ibid).

The Dell IdeaStorm allows users to set up user names and post ideas, which in turn Dell can use to improve or create new products and services. The ideas are placed into a category, with a title, and a detailed description of the idea. In addition to post ideas, users can also comment on existing ideas and score them with a personal up or down vote. The votes are shown as points and give indication on which ideas are most popular (Di Gangi and Wasko, 2009).

Bailey and Horvitz (2010) mention a type of system called a brainstorming system which is similar to an idea management system. Howbeit, a brainstorming system differs in that it lacks the support of discussing and rating of ideas, and that it is usually not opened to the entire company.

Another type of idea management system is called prediction market, also known as information aggregation markets, which is similar to a stock market. Participants are given a set of starting points or currency to use for investing in what they believe is the best idea. In this context the users are forced to make an informed decision on what they believe will be the idea that succeeds and becomes implemented (Bothos et al., 2012).

These are some of the typical features found in idea management systems, found in the literature review:

- **Comments and discussions** are used to help discover shortcomings within the original idea and to develop and improve it more towards the needs of the users (Franke and Shah, 2003, Piller and Walcher, 2006).

- **Ratings** are used for filtering the best ideas in idea management systems (Bailey and Horvitz, 2010). There are several different rating mechanisms among idea management systems. These rating mechanisms differ considerably in (a) the rating subject (who has the permission to rate), (b) the rating object (what aspects are rated), and (c) the rating scale (Riedl et al., 2009).

- **Grouping and clustering** approaches help to keep track of idea submissions, particularly within large idea portfolios. The two main methods used to group ideas are hierarchical classification systems and tagging mechanisms. The findings of Riedl et al (2009) indicate that the two approaches are often used in parallel.

\(^1\) [http://mystarbucksidea.force.com/](http://mystarbucksidea.force.com/)

• **Statuses** are often used in order to arrange the idea portfolio. Many idea management systems assign an explicit development state to each idea, such as “ongoing”, “evaluated”, “rejected”, “approved”, etc. (Riedl et al., 2009).
3. Literature review

This chapter describes the approach of gathering data, which articles were important to understand current research for the problem area, and to show how this thesis differentiates from previous studies.

A paper about the classification of OIS was provided to the authors, the classification of OIS is described in Chapter 2 of this thesis (Hrastinski et al., 2010). Using this paper the initial study started with a review of the references, which made it possible for a list of some important articles in the field of study could be assembled and used to get a first general idea of open innovation and in particular OIS. Around 20+ articles were found when using Scopus while searching for “idea management systems”, but approximately 5-6 of these were in scope for the subject in question.

The primary sources of articles used in this thesis were found in materials written in English on academic databases Scopus\(^3\), Google Scholar\(^4\) and IEEE Xplore\(^5\). Specific keywords used for searches included open innovation, open innovation software, open innovation systems, open innovation management, innovation or idea management systems, innovation communities, crowdsourcing, and ideation. To find specific articles written on open innovation software some searches were also made using keywords containing implemented versions of OIS such as My Starbucks Idea, Dell IdeaStorm and other mentions of implementations of vendors to find specific studies. Other articles found were connected to some well-known academic field experts in open innovation research such as Chesbrough, von Hippel and Lichtentaler. The final set of collected articles were then categorized based on theme and summarized for the theory chapter of this thesis to give the reader an introduction to the field of study (see 2.1-2.4).

Specific searches were carried out to find previous research concerning the feature-related problems discovered after the interviews were conducted. The articles mentioning problem areas were found using keywords such as voting bias, evaluation models, duplicates, usability, system complexity and design, engagement, gamification and motivation. The specific keywords were chosen based on the themes found in the interviews. A lot of these problems occur in less specific areas outside open innovation software, therefore some of the articles found about the problem areas, such as voting bias, were written in other fields of research and not specifically around research for innovation management.

\(^3\) http://www.scopus.com

\(^4\) http://scholar.google.com

\(^5\) http://ieeexplore.ieee.org
3.1. Related research

This section describes the previous work conducted within OIS and the contribution of this thesis.

As explained in previous sections of this chapter there are several categories of OIS. During the review of literature and related research for this study, demarcations were made to focus only on articles regarding idea management systems to ensure the credibility of the study.

Similar research (Leitzelman and Trousse, 2011) continued to build upon the existing set of systems mentioned by Hrastinski et al. (2010) and added more systems, however still focusing on classifying the systems, not the features within the respective system. Another study (Sjaunja, 2010) focused on the definition of OIS used by Hrastinski et al. and examined the features of several types of web-based systems and their relationship to different schools of creativity.

Stoetzel et al., (2011) categorized 44 innovation platforms freely accessible on the web and compared five attributes that characterized these systems: platform operator, user input, task specificity, user type, and motivation. Platform operator is for example the approach taken to host the OIS, whether it is locally or at a third party operator. No particular features were addressed. This study differentiates in the manner that the authors also study systems that are not freely accessible for the public. The author suggested looking into answering the questions in further research section to find “what is the risk of annoying customers if their ideas are not followed up?” which is also brought up to discussion in the study of Dell IdeaStorm (Di Gangi and Wasko, 2009).

Hüsig and Kohn (2011) took a different approach and defined a new concept and umbrella term of open innovation tools, called Open Computer Aided Innovation 2.0 (CAI 2.0) developed from their earlier concept, closed CAI 1.0 (Hüsig and Kohn, 2009). Benefits and challenges with current OIS were also discussed, namely the issues of overflow of ideas with large open innovation processes and crowdsourcing the solution out to the users for evaluation of the ideas. The issue with handing over control to users in evaluation of ideas with the risk of receiving top ranked ideas contradicting the business strategy of the company was also mentioned as a potential problem to be prepared for.

One article (Frey et al., 2011) discussed how different types of motivation can lead to higher or lower quality and quantities of ideas. The empirical setting was on an innovation marketplace platform, Atizo, similar to the platform of Innocentive. This thesis will also bring this theme up for discussion and apply the articles knowledge in the perspective of the engagement of participants and different forms of motivation that can be triggered from certain features in OIS. However, this research setting includes no innovation marketplaces.

Bailey and Horvitz (2010) outlined idea management systems and some of the challenges with current systems. The recommendations included ways of giving ideas longer lifetime and attention within idea management systems, setting a limited time to submit ideas for maximum visibility, distribution of incentives to participants, different models of voting, and so forth. This thesis is not limited to one system of study, but instead five unique systems have been analyzed and will extend to the results of Bailey and Horvitz to give recommendations on how to approach the discovered problems.
Furthermore, the scope of this thesis is specifically with problems related to features, not the process of using idea management systems.

Gangi and Wasko (2009) conducted a case study about the idea management system of Dell called IdeaStorm with the purpose of finding the factors that influence the adoption decision innovation of an organization that come from outside the organizations formal boundaries. The study brought up interesting discussions regarding the management with transparency in the decision-making of Dell around the top-ranked ideas of the participants not being committed to and implemented by Dell. The results showed that the participants in the community must be able to communicate their needs to Dell precisely in order for them to be able to understand and adopt ideas generated in the community.

The authors of this thesis plan to bridge these gaps in knowledge, mentioned previously, regarding problems related to features in idea management systems, more specifically problems regarding filtering duplicates, managing participants motivation, bias, voting models, and system design complexity. This study will hopefully raise awareness of the potential pitfalls and issues that exist within idea management systems and the need for more extensive research of these problems. Based on searches and the best of the authors’ knowledge, no other research has been conducted in finding feature-related problems specifically in idea management systems. There may be companies, which currently have an idea management system implemented but are interesting in improving the ideation process in their system, using the recommendations provided by this study.
4. Method

This chapter will explain methods of data collection, grounded theory, analysis, and pilot study, how they were used, and why they were used, in order to give an understanding of this research and how it was conducted.

4.1. Interpretive research

This section describes the underlying philosophical paradigm used in this thesis.

The underlying philosophical paradigm chosen for this thesis is interpretivism due to the qualitative data gathered, interpretivism is defined within IS research as, “concerned with understanding the social context of an information system: the social processes by which it is developed and construed by people and through which it influences, and is influenced by, its social setting.” (Oates, 2006, p.292) As opposed to positivistic paradigm which is the scientific method often involving quantitative data analysis with the purpose of testing and developing hypothesis, interpretivism involves studying phenomena through the meanings and values that people attach to them with the goal of understanding the world (ibid).

4.2. Method outline

This section illustrates how this study was conducted, depicting the individual steps in each part of the method in order to give the reader a descriptive outline of this study.

Figure 3: Method outline
Figure 3 describes the method of this thesis. The iterative steps of grounded theory and reviewing literature are depicted in the upper left corner of the rectangle. It is illustrated in chronological order, beginning with the pilot study, followed by the data collection in step 2 with interviews and finally the data analysis in step 3 and 4. The results are shown in boxes, representing the outcome from each individual step and illustrate how the results were used as basis for the next research step. Grounded theory and the processes in figure 3 are explained in the remaining sections of the methodology chapter.

4.3. Grounded theory

In this section, the core principles of grounded theory are explained, because they are important to understand, considering it is the method of choice for both the data collection and the analysis. The remaining sections of the methodology chapter will explain how grounded theory was used for: the data collection, the pilot study, and the analysis.

Barney Glaser and Anselm Strauss first introduced the method grounded theory in the book The discovery of grounded theory: Strategies for qualitative research (1967). The procedures of Grounded theory have been elaborated in some detail since it was first introduced. Still, it has not changed in form. The purpose of the procedures of grounded theory is according to Corbin and Strauss (1990): “to develop a well integrated set of concepts that provide a thorough theoretical explanation of social phenomena under study.” A grounded theory should both explain and describe.

Urquhart et al. (2010) described four distinctive characteristics of the grounded theory method, these are as follow:

1. Theory building is the main purpose of the grounded theory method.

2. Preformulated hypotheses from previous expert knowledge that the researcher tries to verify should be avoided because they may prevent the emergence of categories, as stated in the first characteristic, which should be firmly rooted in the data.

3. Analysis and data collection are further enabled by the use of the mechanism of Grounded theory called constant comparison in which throughout the gathering of data compares previously found categories or labels with newly discovered data.

4. A process of theoretical sampling chooses samples of data of all kinds, where the researcher decides based on analytical grounds where to sample from next.

While some level of freedom of method adaptation is allowed, “following the procedures with care gives a project rigor” (Corbin and Strauss, 1990). Grounded theory can make use of interviews and observations, books, documents and other written resources (ibid).

As the first principle describes, data collection and analysis are iterative simultaneous procedures that both run from the beginning and as analyzing the data, lead the research towards the next step of where to relevant find data. As these data occur more or less frequent, it gives the researcher some clue
of what is useful to further investigate or ignore when filtering the sets of data. Similar data observed are subsequently labeled and categorized and a researcher can analyze quantities of these data. Labels that relate to each other can later be put into specified categories, and these categories with their relationships to other kinds of categories can demonstrate theories discovered (Corbin and Strauss, 1990). In this thesis, labels and features are interchangeable.

After publishing the method together, Strauss and Glaser parted ways and Strauss went to further develop grounded theory together with Corbin. They added another part in the coding process, called axial coding, which occurs after the open coding phase and before the selective coding phase.

Niekerk and Roode (2009) concluded in their paper about the two branches of grounded theory that “both have merit as research methods, but the researcher must make a decision early on in the research as to which method(s) he wants to use and clearly identify the method in the research writing. They cannot be mixed.”

One core procedure of grounded theory is theoretical sampling. It involves collecting data to generate a theory through which coding and analyzes are conducted simultaneously and this data directs where and what data to collect next. Where to start looking in the research is based on a general subject or problem area the researcher seeks out to investigate (Glaser and Strauss, 1967, p.45).

Although there are multiple ways of coding processes proposed by the alternative versions of grounded theory, it is important to complete all steps prescribed by the one method chosen to make sure relationships between categories are sufficient (Urquhart et al., 2010).

This thesis uses the Straussian approach; the most commonly used in IS research. A grounded theory researcher should not have preconceived ideas regarding what will be useful or relevant but instead approach data analysis with an open mind. In the grounded theory approach of Corbin and Strauss there are 3 phases of coding: open, axial and selective (Oates, 2006, pp.274-276).

**Open coding:** The first phase where the researcher label units of data, based on terms and concepts found in the data.

**Axial coding:** The second phase where a list of codes begins to appear, the researcher starts to look for relationships between the codes. Here some codes are found to be more important (axial) than others and that some codes can be merged under broader headings.

**Selective coding:** The last phase, when all the categories are connected with one single core category that the researcher focuses the attention on. The core category represents the fundamental idea of a study and explains how all the different categories are connected, which is an important step in building theory (Corbin and Strauss, 1990, Oates, 2006).

As the researcher conducts coding, the act of memoing is also encouraged. This involves taking notes during the study. Memoing should not only occur during coding but throughout the analysis until research is completed, it is important to capture ideas and questions to aid the research (Corbin and

The data collection and theoretical sampling following analysis are considered finished at the point when newly gathered materials do not need revision of categories or labels; this is when research has reached theoretical saturation (Oates, 2006, p.274).

Grounded theory was chosen as a method for both data generation and analysis. This was because the method fits the qualitative nature of this study with a systematic data generation and analysis of data from interviews and observed systems. The purpose was not to find evidence for a hypothesis but rather to inductively develop an understanding of a certain phenomenon, in these context problems with features in idea management systems, and eventually generate a theory grounded in the data (Lingard et al., 2008).

4.4. Data collection methodology
This section describes the data collection methodology used for this thesis, how it was used, why it was used, and how the systems that were used to gather features from were selected, in order to give an understanding on how the empirical data was gathered.

The initial reason for researching what features exist in current idea management systems was because the authors planned to use the information in order to get an overview of which features were common and rare. Nevertheless, after the data had been collected, a new research question emerged. The authors believed that in order to answer their new research question: “What feature-related problems exist in current Idea management systems?” it was necessary to know which features exist. By knowing, what features exist in a system, and in addition, the problems of that system, it may be possible, in case several systems have been studied, to find patterns in order to explain what needs to be done to solve or reduce the impact of the problems.

An assembled list with idea management systems, innovation marketplaces, prediction markets was provided to the authors. The systems in the list had been found using the search engine of Google with the following search terms: “idea management systems”, “ideation”, “crowdsourcing”, “innovation management”, and “prediction markets”. Google search alerts for “open innovation” and “idea management” were also used. The systems in the list were ordered in what the authors for that list believed to contain more features and the smaller systems, i.e. with fewer features, placed in the bottom.

The primary resource in collecting data was from interviews conducted with representatives from OIS vendors. The representatives were contacted by email or contact forms on the websites of the vendors. The sellers or consultants that replied for interviews were then contacted. Their knowledge would help the authors understand the features of each analyzed system during live demonstrations online. During these interviews, the authors asked questions regarding features, their intended functionality, and how these features supported the ideation process. However, there were no interview questions that directly asked about feature-related problems, because the research question emerged after the
interviews had been conducted. Additional documents, such as commercial material that could support as background knowledge in preparation for the interviews were collected, if it were publicly available, on the websites of the vendors.

4.4.1. How the systems were selected
The list of available idea management systems was evaluated to see if they met the following criteria:

- It should be web-based
- Available in English
- A system that is in its vanilla state e.g. uncustomized in its original form

These specific criteria were chosen because originally the authors had the intention to investigate whether or not some features present in the systems of the vendors were unrequested by the customers, and if so, why?

If all criteria were met, the system was added to the list of possible systems to be analyzed. Otherwise, the authors would contact the company by email, if an email address was available, schedule an interview where the system would be presented and a demo version could be evaluated. If the company did not respond, or did not want to be interviewed nor demonstrate the system, then it would be excluded from the list and would not be analyzed.

4.4.2. Interviews
39 companies were contacted in order to schedule interviews, ten companies answered, where five replied that they were interested in being interviewed. Out of the other five, there were a few that showed some interest in being interviewed, yet, after the authors had tried to contact them again, no reply was sent back.

By request of some of the interviewees to be anonymous, the authors decided that all companies and the respective interviewees were to be anonymous; instead a general description of the system and the title of the interviewees are given.

4.4.2.1. Respondents and systems
A general description of the systems and the titles of the respective respondents that participated in the interviews are presented in Table 2. All of the systems and representatives were given aliases in the form of System X and Represent Y, where X was an uppercase letter from A to E, and Y was a number from 1 to 5.
Table 2: Systems A-E and respondents 1-5

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
<th>Respondent</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A closed system which is not available to the public and uses a prediction market-oriented approach to idea management. The company is based in Portugal.</td>
<td>1</td>
<td>Salesman</td>
</tr>
<tr>
<td>B</td>
<td>A system that is located in India, which is open to the public, and is in its current state more of a brainstorming system than an idea management system.</td>
<td>2</td>
<td>Developer/Owner</td>
</tr>
<tr>
<td>C</td>
<td>A closed system based in Denmark, which is not opened to the public.</td>
<td>3</td>
<td>Student employee</td>
</tr>
<tr>
<td>D</td>
<td>The system is based in Finland, like System A and System C; it is also a private system, not available to the public.</td>
<td>4</td>
<td>Independent sales consultant</td>
</tr>
<tr>
<td>E</td>
<td>The system is based in Canada and is tailored for each client with a different configuration depending on their needs.</td>
<td>5</td>
<td>Salesman</td>
</tr>
</tbody>
</table>

4.4.2.2. Interview method

Semi-structured interviews were used, which is when the conductor have a list of themes to be covered and questions to ask, but the order of the questions may not always be the same. Additional questions may be asked in case the interviewee mentions issues which the conductor had not prepared any questions for. A benefit with semi-structured interviews is that the interviewees are allowed to describe the raised issues in more detail, in addition to introducing new issues which they believe are relevant to the themes of the conductor. Semi-structured interviews are used where the main purpose is ‘discovery’ rather than ‘checking’, howbeit they are not useful when a researcher wants to generalize their conclusions regarding the whole population. This was the reason why semi-structured interviews were the chosen data collection method for this study, considering the purpose leans more towards discovering something new rather than checking already existing information. In addition, the conductor has more control compared to unstructured interviews where the interviewee is presented with a topic and then allowed to speak freely and develop ideas, while the conductor tries to be as unobtrusive as possible by not interrupting (Oates, 2006, p.188).

Themes and questions emerged based on the features and categories found in the pilot study, additional questions and themes were added after each interview if seen appropriate. During the first four out of the five interviews, the screen of the interviewee was displayed in order to show their systems. The interviews, including the screens were recorded by using software called Camtasia studio 7, this allowed the authors to focus on asking questions considering if they missed something they would be able to return to the recorded video. The interviews generally begun with the interviewee showing the respective system, and depending on what the authors saw, different questions were asked. For example, if there was a question on the list regarding a particular type of feature and the interviewee showed a feature of that type, then that question would be skipped. By using a list of features found from the pilot study and previous interviews, the authors could see if the displayed
features were new or not, and if the interviewee did not show or describe a certain feature which was on the list, then a question regarding if a feature similar to it was available was asked instead. The process of adding newly found features on the list would occur at a later stage when the authors reviewed the recordings.

The fifth and final interview was a little different, considering this was the only interview where the interviewee requested the questions beforehand. In addition the respective system was not displayed, however, a lot more questions were asked during this interview in order to retrieve the needed information. The interviewee went through the questions, in order, one by one, and after each question the authors asked related questions if needed. The list retrieved by the interviewee was outdated, which led the authors to review the current list of features during the interview in order to be able to ask questions regarding features which have not yet been mentioned in the interview.

4.5. Data analysis: Interviews

In this section, the process of how collected data was analyzed by using Grounded theory is described. The purpose of this section is to show the approach of the authors to analyze the collected data, in order to make it possible to repeat this research, which should result in an increase of the dependability of this thesis.

When the interviews had been transcribed, the open coding began. The authors begun by reviewing the interviews and then gathered quotes regarding problems. Each quote was placed in a theme, which shortly described what the quote was about. By using the themes, some problem related categories emerged, these were: Problems with engagement, Implications of features, Problems with duplicates, Problems with evaluation models, Problems with system complexity, Lack of transparency in the idea submission process, Participants not using the available features, and about bias when voting. Thereafter, the axial coding phase began.

During the axial coding phase, the authors contemplated which quotes were important and if there existed quotes that could be removed. Some quotes, which the authors believed lacked substance, were removed because they were not about problems relating to features. The authors then considered merging categories, which was the case with the two categories: Problems with engagement and Participants not using the available features. The latter was placed in Problems with engagement, since by reviewing the quotes the authors concluded that participants were not using the features because lack of engagement. The implications of features category had some of its quotes removed because the authors believed they were insignificant, and the remaining were placed either in a new merged category called Problems with bias, or in Problems with system complexity, which were believed to be more suitable categories for the particular quotes. The rest were either removed or merged in Problems with system complexity. The other category which was merged was: About bias when voting, because the authors tried to limit the amount of categories, and the new category about Problems with bias, could contain the quotes from two categories. Thereafter, the selective coding phase began, which was the final coding phase.
In the selective coding phase, a core category encompassing all the other categories was to be decided. Here the research question of this thesis emerged: “What feature-related problems exist in current idea management systems?”. The core category was named Feature-related problems in idea management systems. Not all of the existing categories and quotes described feature-related problems, but instead other problems with idea management systems. An example is the category: Lack of transparency in the idea submission process, which described the importance of companies communicating back to the users, and that the idea submission process should be transparent, as in open in a way where all users can see what happens. Because of the chosen core category, quotes which did not describe feature-related problems within idea management systems and the category “Lack of transparency in the idea submission process” were removed.

4.6. Data analysis: Features in idea management systems
This section describes the analysis that occurred in the pilot study and the main study, which are about the current features in idea management systems. The purpose of this section is to show the approach of the authors to analyze the collected data, in order to make it possible to repeat this research, which should result in an increase of the dependability of this thesis.

In order to answer this thesis the authors started gathering data from the first system by exploring and using the site. When a feature was found, a name was decided and then it was written in a document, creating a list with all features for each system. The process of gathering data was an iterative process, meaning that after data had been gathered from one system the authors went back to the previous systems that already had been explored to investigate if features unintentionally had been neglected that were found in the subsequent analyzed systems.

In the first phase of coding, the open coding phase, the list of features gathered was labeled, starting with the list of features from the first system. Then the features were put in categories for certain functionalities, such as profile management, idea submission, voting, idea browsing and idea feedback. After the features from one list had been labeled and placed in categories then the authors started with the second list of features from another idea management systems. The features from the second list were first compared with the features that had already been categorized to see if the authors believed if they are very similar or completely new. If the authors believed a feature was very similar to an already existing one, then it would not be added to the list. Nevertheless, if a feature was considered by the authors as completely new then it had to be decided if there existed a suitable category already or if a new category had to be added. If a new category was added then the authors would scan through the list of categorized features to see if any of them were better suitable to be in the new category. This process continued until all lists had gone through the open coding phase.

After the open coding phase, the authors proceeded with the next step in the coding process, the axial coding phase. Features, which had too specific functionality description for the different systems, were moved into a comment section under each category. This was done to instead show the main functionality, such as the ability to have a User profile, instead of each part of the user profile features, including register, editing profile, uploading photos, which may be less interesting to any given person.
looking to understand what features are available in a typical idea management system. Some of the categories were reconsidered, as grounded theory suggests in the constant comparative analysis, and it became apparent they were less axial and instead formed into labels under existing categories.

In the final coding step, selective coding, a core category encompassing all the other categories was to be decided. It was decided that all of the categories would fit under the core category called “Features in an Idea management system”, which encompassed all features found in the systems under study.

4.7. Reliability and Validity
This section describes the five concepts trustworthiness, confirmability, dependability, credibility, and transferability, which are used in order to validate the quality of this study. It will also be described what has been done to increase these five for this thesis, in order to increase this thesis credibility.

Validity and reliability are two vital concepts, which can strengthen the quality of a study. The two concepts are not viewed separately in the qualitative research method, as they would be in a quantitative study. Instead, terms that cover both such as credibility, transferability, and trustworthiness are used (Golafshani, 2003).

In interpretivist research, there are five criteria which are used in order to judge the quality of the research. These are trustworthiness, confirmability, dependability, credibility, and transferability (Lincoln and Guba, 1985 cited in Oates, 2006, p. 294). These are used in order to validate the quality of this study.

Trustworthiness involves asking how much trust can be put in the research. The following four criteria validate this thesis trustworthiness:

- **Confirmability** is whether the results in the study are indeed from the data collected, which can be verified by another person looking at the raw data again, revisiting the steps of the original authors to see how the research was conducted. The material gathered in the study have been revisited and re-examined throughout the research process. These materials include interview multimedia files, transcripts and other written documents that were examined by both authors separately and checked for errors, howbeit, no external actors were consulted for auditing this thesis data.

- **Dependability** is about how well the collected data and research process has been documented. If it is possible for another researcher to trace the whole research process. Two people recorded all interviews, in case one of the connections or files would be lost, a backup would still be available. All of the interviews have also been transcribed, in order to be able to use the collected data but also to make it easier for an external actor to view what was said during the interviews. All collected data has been stored in a way, where it is possible to review the revisions, in order to be able to trace the process.

- **Credibility** is the corresponding term to internal validity in positivistic research, where the researchers can assure that they examined the right things from the right source. One approach
is reconnecting with previous interviewees and seeing if the interpretations are in line with their recollection of the interviews. This approach has not been used for this study, which is something that could have been done to increase the credibility of this thesis. Nevertheless, other measures have been taken, such as conducting a pilot study before the actual study, in order to increase the credibility through the gained experience of completing the small study. Triangulation was used, as in using multiple methods of gathering data, including interviews, documents, and direct observation of the features, which increases the credibility (Oates, 2006, p.294).

- **Transferability** in interpretivism puts less focus on generalization than positivism if the research can be transferred to other cases, researchers should provide enough detail for other peers to be to make judgments on the relevance of the research. The measure taken to increase the transferability of this thesis is to store all of the data analysis documents that were used to generate the answer to the research question, these are available upon request. This should allow other researchers to transfer the conclusions to other cases by using these documents, and they should help in case a researcher wants to repeat the procedures of this study.

### 4.8. Method limitations

*This section describes the limitations of the research in this thesis, in order to allow the reader to judge the weaknesses of the approached used.*

The reasoning behind only studying idea management systems that were vanilla software was that originally the authors had the intention to investigate whether or not some features present in the systems of the vendors were unrequested by the customers, and if so, why? Nevertheless, as research progressed further, few of the systems under study had any records of feature packages or did not provide the option for their customers to request specific features in their services. The consequence of this discovery led to a different approach in research focusing on using what materials had been collected during the interviews and finding another research topic. It is difficult to speculate whether the results would have been different if both vanilla and non-vanilla software had been studied. Although, based on the pilot study where three systems were studied which were non-vanilla software, and considering they were quite similar to the ones in the main study. This led the authors to believe that the results would probably have been the same.

The originators of grounded theory advocates that adopters of the method should resist from conducting literature reviews before engaging in the research (Urquhart et al., 2010), nevertheless it was neglected as a result of the authors lack of knowledge on the subject.

The authors decided before starting the survey, memos which previously stated are rarely used with Grounded theory in Information Systems, would not be used for this thesis due to the fact that video interviews were going to be used which would simplify the interview process without the need of taking notes.
Another issue, which occurred, was the fact that due to limitations of time and a lack of response from system vendors, the saturation goal of grounded theory research was never reached, to the knowledge of the authors. The number of systems analyzed in the main study were five, yet, 37 companies were contacted for potential interviews and demonstrations of systems. The total number of system vendors available on the market and their respective features are unknown.

Considering the research question of this thesis is about feature-related problems and since interviews were used as the main method of collecting data, one would believe that questions directly asking about problems would have been asked during the interviews. Howbeit, this was not the case in this thesis because the research question emerged after the interviews had been conducted. Although, the research question was chosen because the authors believed that there were a lot of interesting information gathered regarding the issue from the interviews and the feature analysis. If the authors would have asked direct questions regarding problems with idea management systems, the information would not have been extracted considering the respondents might not want to admit there were any problems, at least not with their respective systems.
5. Pilot study
This section describes the pilot study carried out during the first part of this thesis. The pilot study was conducted to obtain knowledge about idea management systems and the grounded theory method, in order to increase the credibility of this thesis.

5.1. Overview
A pilot study was first conducted before the actual data collection was initiated. The reason being to evaluate how grounded theory could be used, how much time was necessary and learn about the method and OIS. Previous research (Sjaunja, 2010) on master level in open innovation software within the topic of functionalities supporting different types of creativity had been conducted.

<table>
<thead>
<tr>
<th>Ideas so far</th>
<th>Popular Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCT IDEAS</strong></td>
<td></td>
</tr>
<tr>
<td>31,863</td>
<td>Coffee &amp; Espresso Drinks</td>
</tr>
<tr>
<td>3,304</td>
<td>Frappuccino® Beverages</td>
</tr>
<tr>
<td>9,387</td>
<td>Tea &amp; Other Drinks</td>
</tr>
<tr>
<td>14,568</td>
<td>Food</td>
</tr>
<tr>
<td>7,974</td>
<td>Merchandise &amp; Music</td>
</tr>
<tr>
<td>15,560</td>
<td>Starbucks Card</td>
</tr>
<tr>
<td>2,159</td>
<td>New Technology</td>
</tr>
<tr>
<td>10,240</td>
<td>Other Product Ideas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>EXPERIENCE IDEAS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>7,531</td>
</tr>
<tr>
<td>13,666</td>
</tr>
<tr>
<td>10,587</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>INVolVEMENT IDEAs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>4,931</td>
</tr>
<tr>
<td>8,793</td>
</tr>
<tr>
<td>5,055</td>
</tr>
<tr>
<td>1,198</td>
</tr>
</tbody>
</table>

**Figure 4: My Starbucks idea.**
These systems were idea management software, problem solving software and innovation marketplaces. A subset of these systems were initially labeled, categorized, and later analyzed. The systems chosen were My Starbucks Idea (Figure 4), Adobe Idea Labs\(^6\) and Justin.tv\(^7\). My Starbucks Idea used an implementation of Salesforce idea management system; Adobe Lab Ideas was using the platform of Brightidea and JustinTV used Uservoice.

These systems were picked because they were in the category idea management systems. Compared to the demarcations stated previously for this study, in the pilot study, customized implementations (non-vanilla software) of the same systems were used. Please observe that after the research for this thesis was completed some of the services studied in pilot have been significantly modified or even discontinued.

Subsequent sections of this chapter presents the analysis with the resulting categories and lessons learned using grounded theory in this pilot study.

\(^6\) [http://ideas.adobe.com](http://ideas.adobe.com) (since the pilot study it has been re-designed and moved to [http://forums.adobe.com/](http://forums.adobe.com/))

5.2. Resulting categories and features

The resulting 15 categories in the pilot study of idea management systems are found in Table 3.

Table 3: Categories for Idea management systems.

<table>
<thead>
<tr>
<th>#</th>
<th>Categories</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Profile management</td>
<td>A user on the site maintains a personal profile to add details about him/her-self.</td>
</tr>
<tr>
<td>2</td>
<td>User activity stats</td>
<td>The activities of a user, such as recent votes and comments, are stored along with the user profile.</td>
</tr>
<tr>
<td>3</td>
<td>User recognition</td>
<td>A user is given recognition in the form of rewards and points if certain criteria are met, depending on the system.</td>
</tr>
<tr>
<td>4</td>
<td>Idea submission</td>
<td>The features that support the functionality of submitting a new idea into the system.</td>
</tr>
<tr>
<td>5</td>
<td>Support non-duplicate submission</td>
<td>The system can prevent idea duplicates.</td>
</tr>
<tr>
<td>6</td>
<td>Idea browsing</td>
<td>Browse ideas in the system.</td>
</tr>
<tr>
<td>7</td>
<td>Social networking</td>
<td>Sharing an idea to the external networks of a user, such as LinkedIn, Facebook, Google+, Twitter, Blogs, e-mail, etc.</td>
</tr>
<tr>
<td>8</td>
<td>Voting</td>
<td>A user shows his opinion of the idea with a vote.</td>
</tr>
<tr>
<td>9</td>
<td>Subscribe</td>
<td>A user can subscribe to ideas to receive updates in the system.</td>
</tr>
<tr>
<td>10</td>
<td>Idea cleaning/filtering</td>
<td>Users can report an idea to the staff.</td>
</tr>
<tr>
<td>11</td>
<td>Miscellaneous</td>
<td>A general category for miscellaneous labels.</td>
</tr>
<tr>
<td>12</td>
<td>Idea feedback</td>
<td>Different ways to comment and give feedback on ideas.</td>
</tr>
<tr>
<td>13</td>
<td>Idea stats</td>
<td>Statistics of idea votes and points.</td>
</tr>
<tr>
<td>14</td>
<td>User communication</td>
<td>Functionalities that support sending messages between users.</td>
</tr>
<tr>
<td>15</td>
<td>Tags</td>
<td>Keywords that describe the idea submitted to help better categorize it in the system.</td>
</tr>
</tbody>
</table>

1. Profile management

What all three systems have in common is the ability to let users manage a personal profile connected to their user account and login. The labels were initially taken from all the features inside the profile page on the corresponding site. Although this category was changed during later stages of the grounded theory process and eventually split into other separate categories, it contained important labels that related to register, login, edit profile, profile photo, profile inbox, users ideas and users comments, all of which could be connected to the activities of an individual profile and account. While the implementation of User voice by Justin.tv contained less features in general than the other two systems, it kept track of ideas and comments done by the user and profile editing. My Starbucks Idea had a feature which allowed users to receive messages regarding idea updates from submitted ideas. This feature was also present in the Adobe Lab Ideas. All the features of the systems are in some way related to the activities and profile of the user and keeping an individual account connected to ideas and comments seem important in order to reward and connect to the contributions of the user.
2. User activity stats

All of the systems implemented some variant of tracking activities on the site to display stats regarding each the recent activities of a user such as ideas submitted, comments made, or the stats of the community in general.

3. User recognition

Evaluating the user recognition category between the three systems, only My Starbucks Idea uses badges and leaderboards to display the achievements of users on the website. No other system in the pilot study has implemented any kind of rewarding mechanism. The leaderboard on My Starbucks Idea displays the 10 ten point scorers for the past month. Users are awarded points by submitting ideas, voting or commenting the ideas of other users, and receiving positive votes on their own ideas.

4. Idea submission

During idea submission an idea creator is able to give the idea a title and a detailed description of the idea in all three systems. In My Starbucks Idea and Adobe Lab ideas the idea creator is also able to choose an appropriate category which the idea will belong to. In addition, Adobe Lab Ideas also allow the idea creator to add an attachment to the idea submission which may give a clearer picture of the idea to the other users.

5. Support non-duplicate submission

While submitting an idea two of the systems, My Starbucks Idea and Justin.tv, had implemented features that detected similar ideas based on the existing ones to prevent duplicates being submitted into the system. Since a lot of ideas are submitted daily on one single system, automatically preventing duplicates from being entered and instead suggesting the similar ones to improve and increment on the ones in place keeps the site from being flooded with ideas.

6. Idea Browsing

Based on the pilot study all of the idea management systems implemented some sort of browsing to find ideas in the system. The browsing features of the three systems under investigation were very similar. All of them were able to sort based on popular and recent ideas, search for ideas, and filter the ideas based on a selected criterion of development status.

7. Social networking

This was a small category with only one entry encompassing the feature of sharing content to external social networks such as Facebook, Twitter, LinkedIn, social bookmarking sites etc. To spread the ideas over a wider audience this feature helps doing that with a simple widget that often can be seen on news pages, blogs and nearly every internet web page to share content with multiple users seamlessly with a few clicks. Because all three sites carry this feature it seems important to be able to share across the boundaries of the web site to bring in more people for more ideas and comments.
8. Voting

Voting on an idea is a feature, which all three systems have, the voting feature in My Starbucks Idea and Adobe Lab idea is very similar where in My Starbucks Idea, a user can vote up on an idea, which rewards the idea with 10 points, or the user can vote down the idea, which gives -10 points. In Adobe lab ideas the user can promote or demote the idea which awards +1 if promoted and -1 if demoted. The voting feature in Justin.tv is a little different, first off it is not possible for a user to express a negative opinion of a about an idea, instead a user is given a limited amount of votes and is able to award +1, +2 or a maximum of +3 votes per idea. These votes will be returned to the user when the idea is closed. In addition, both Adobe Lab Ideas and Justin.tv allow the user to clear their vote.

9. Subscribe

In both My Starbucks Idea and Adobe Lab ideas the users are able to follow idea updates outside the system by using RSS-readers, the users are also able to set an idea as favorite in order to access the idea with more ease. In Adobe Lab ideas the users are also able to subscribe to a category or an idea to receive updates to their email if any new activity occurs.

10. Idea cleaning/filtering

In My Starbucks Idea and Justin.tv it is possible for users to report content as abuse, such as a duplicated idea, inappropriate comment or idea. This may lead to users focusing more on appropriate submissions than duplicates or inappropriate submissions.

11. Miscellaneous

This category was used for features that had no apparent relationship with any specific categories. The feature that was placed in the Miscellaneous category was a separate widget asking the users a question of the day which only one site carried. Users were asked for a vote each day on an arbitrary question and so had no real connection to the features of ideas and functionalities of the site itself.

12. Idea feedback

In all three systems, it is possible for a user to both post a comment to an idea and to read already posted comments. When a user post a comment to an idea it is usually because they want to suggest an improvement to the idea, which may lead to that the idea, reaches a higher quality. In Adobe Lab ideas, users are able to add an attachment to their comments, which might make it easier for the users to explain their suggestions of improvement to the idea.

13. Idea stats

When a user is viewing an idea in the Adobe Lab Ideas system, the user is able to see which users have promoted or demoted that particular idea. In My Starbucks Idea and Adobe Lab ideas, to find the best ideas the ideas are awarded points if a user votes positively and the ideas receive negative points if voted negatively. This means that the users consider the ideas with the highest score as the best ideas. As explained earlier in Justin.tv the ideas are not able to receive negative votes, but the users can choose how many votes they want to award an idea, of course if a user does not like an idea then it is
possible to not vote at all. The users consider the ideas with the highest amount of votes as the best in the Justin.tv system.

14. User communication

When comparing how users are able to communicate with each other, it is only Adobe Lab ideas which allows users to send private messages to each other, this feature might lead to that users create connections with one another which may result in users collaborating with each other to possibly suggest better ideas or improvements to already submitted ideas.

15. Tags

When submitting an idea in Adobe Lab ideas, an idea creator is able to add tags to further help categorizing the idea. Users are also able to add tags to already existing ideas, which they are not the creator of. Adobe Lab is the only system, which had a tag cloud, which is a list of tags found in the database, displayed as a widget on the site, in order to help visualizing the idea space, to make browsing ideas easier.

5.3. Lessons learned

This section describes what was gained from conducting the pilot study in terms of experience to raise the quality of this thesis method.

By using a list of features and categories obtained from the pilot study, it made it possible for the authors to create questions and themes for the interviews that would be used for the main study. By exploring the three systems and comparing them to one another, the authors learned what features seemed to be the most essential considering all of the systems had them, e.g. being able to submit, discuss, and vote on ideas. Also allowing the user to maintain a personal profile and sharing content to external websites seemed important, the latter may only be important to systems such as those studied considering they were open to the public. Systems which are used in closed settings, where only a company is allowed to use it may not be interested in sharing the content to external websites, which may lead to competitors getting their hands on it. Although, considering all of the studied systems had these features, then the interesting part may be what separates them from each other, as in the different implementations of the particular features and the unique features. Are there any specific problems caused by certain implementations or if the impact of the problems are reduced by a particular feature or implementation. These thoughts are what went through the minds of the authors after the pilot study had been conducted.

As the pilot study was only a small survey of systems, drawing conclusions from any patterns or emerging phenomenon would be difficult to infer with the little data collected. Nevertheless, applying the grounded theory in this context it was still interesting for this thesis work to assemble a list of features in idea management systems and from these results further investigate idea management systems. The resulting categories would later be used as basis for the construction of interview questions in the data collection of the final survey of idea management systems.
6. Results and Analysis

In this chapter, the results of the research in feature-related problems are presented and analyzed including the resulting categories of features found in idea management systems.

6.1. Resulting categories

In this section the categories which was found during the data collection, are presented. The changes that occurred with the categories since the pilot will also be described.

Table 4, is the final set of categories found in the study. The set consists of 12 different categories, narrowed down from 15 in the pilot study. The complete list of features with categories is presented in Appendix A – Categories and Features.

<table>
<thead>
<tr>
<th>#</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User recognition</td>
<td>A user is given recognition in the form of rewards and points if certain criteria are met, depending on the system. A user on the site also maintains a personal profile to add details about him/her-self.</td>
</tr>
<tr>
<td>2</td>
<td>User communication</td>
<td>Functionalities that support sending messages between users.</td>
</tr>
<tr>
<td>3</td>
<td>Idea submission</td>
<td>The features that support the functionality of submitting a new idea into the system.</td>
</tr>
<tr>
<td>4</td>
<td>Manage content</td>
<td>The category encompassing all the features that deal with reporting inappropriate content, duplicates and other tasks that the participants can report into the system.</td>
</tr>
<tr>
<td>5</td>
<td>Idea browsing</td>
<td>Browse ideas in the system.</td>
</tr>
<tr>
<td>6</td>
<td>Voting</td>
<td>A user expresses his/her opinion with a vote.</td>
</tr>
<tr>
<td>7</td>
<td>Subscribing</td>
<td>A user can subscribe to ideas and follow other users to receive updates in the system.</td>
</tr>
<tr>
<td>8</td>
<td>Idea feedback</td>
<td>Different ways to comment and give feedback on ideas.</td>
</tr>
<tr>
<td>9</td>
<td>Idea stats</td>
<td>Statistics of idea votes and points.</td>
</tr>
<tr>
<td>10</td>
<td>Miscellaneous</td>
<td>A general category for miscellaneous labels.</td>
</tr>
<tr>
<td>11</td>
<td>Brainstorm creation</td>
<td>A user can create a brainstorm where participants can submit their own ideas.</td>
</tr>
<tr>
<td>12</td>
<td>Back-end &amp; administrator options</td>
<td>The back-end is the options of an administrator to configure settings about the process and management around ideas.</td>
</tr>
</tbody>
</table>
6.1.1. Changes in final categories after the pilot study

Here are the new categories and their earlier categories placed within parenthesis.

1. User recognition (Profile management)
2. User Communication (Social Networking)
3. User Recognition (User activity stats)
4. Idea Submission (Tags)
5. Brainstorm Creation (new)
6. Manage Content (Support Non-Duplicate Submission, Idea cleaning/filtering)
7. Back-end & Administrator Options (new)

The category Profile management was removed since the authors believed that the features revolving around the profile of a user were suitable to be in a category that encompassed all features related to the recognition of a user. Hence, all of the features in the Profile management category were merged into a feature named User profile, which was added to the category User recognition. User profiles can market the personal brand of a user in an idea management system, which may assist in giving the user recognition.

The Social networking category was removed because it still only contained one feature which the authors believed was not enough for it to have a category on its own. The feature Share-idea to external networks was moved to the category User communication, since sharing an idea to an external network, such as Facebook, LinkedIn, Twitter, or a blog, is a form of user communication.

The category User activity stats was removed since the features it contained were too few (specifically statistics of a user regarding recent activities, submitted ideas and other related stats depending on the system), hence suitable for placement or merging with another category. The decision was made to have a feature called “View the profile of another user”, which contained the features of the previous User activity stats-category, and was placed in the User recognition-category because it was seen as the most suitable category considering it already contained features that were related to activities and settings for the profile of a user.

The Tags category was removed because the authors believed that the three features it contained (idea tags, viewer submitted tags, and tag cloud) would be more suitable under other categories. The feature Tags (keywords that describe and categorize ideas) was placed in the category of “Idea submission” since idea submissions, in some of the idea management systems, are categorized using tags, which are added by an idea creator when submitting an idea. The feature “Tag cloud” was moved to the category “Idea browsing” because it visualizes the idea space in order to make browsing through the ideas easier. Lastly, the viewer-submitted idea tags feature was placed in the idea feedback category since the feature considers tags that other users can add to an already existing idea.
A new category called “Brainstorm creation” was added since there were no systems in the pilot where a user could create their own brainstorms. The system with the brainstorm feature contained several new features related to brainstorms, which made the authors decide that it would be more suitable to add a new category, Brainstorm creation, instead of placing the features in already existing categories.

Initially, before the managing content category was developed during later stages in data collection to comprise several categories, two separate categories, “Support non-duplicate submission,” and “Idea cleaning/filtering”, were formed. The first one encompassing only that feature with the similar name (Automatically suggesting duplicate or similar ideas during idea submission) and Idea cleaning/filtering which also only encompassed one feature, reporting an idea as abuse(such as duplicate or inappropriate). After the final data collection was completed, new features emerged that were added to the final set of gathered features, and a new category was formed to encompass these new features, including the two previous features, called “Manage content”. The new features were Delete idea, Edit idea, and Remove user from brainstorm, which all were connected to functionality serving the purpose of managing content in the system.

As new features were discovered in connection with the interviews made, a need for a category encompassing all features related to back-end and administration arose. Previously in the pilot study no back-end features had been discovered because no access to this category of features was available for the authors to access.

6.2. What feature-related problems exist in current idea management systems?

This section describes five types of problems that respondents have mentioned during the interviews, and an analysis of these problems, with the purpose of possibly preventing or improving idea management systems with this added knowledge.

During the research for this study, some issues with idea management systems surfaced after conducting interviews with representatives of idea management systems. The discovered issues are described and analyzed in the remainder of this section. At the end of each problem section, the relevant features of the respective problem are presented and discussed.

6.2.1. Problems with engagement

One company had recurring problems with their participants not using the available features in System B. Features that provided the core functionality of idea management systems such as voting and rating were ignored by the users. The lack of rating usage led the vendor into changing the approach of their rating system to try and engage the participants in using their features. However, this had no effect on the utilization of the voting feature by users and eventually led the vendor to remove the entire rating feature in the system.

“We used to have voting system but we took it off. Nobody was using it. We had a rating system then we changed it but nobody used the rating system so we changed it to a voting system. It was just like you can vote on which idea is a good idea [...] you could
sort it by the number of people who had marked a particular idea as a good idea and nobody was using that either so we removed that as well. [...] we tried a bunch of different rating systems; none of them seemed valuable to the users, so we just removed all of them.” (Respondent 2)

Where they had open brainstorms, available for all users, no one bothered voting. Respondent 2 said that out of 1000 users, roughly only 3-4 users would engage in evaluation of the ideas of other participant.

“No, no, yeah in the open brainstorms people were not using the votes. Nobody would like, out of 2000 ideas, you would find hardly 4 or 5 of them would vote or like if more than 1000 users was using it you would only get maybe less than 3 or 4 users would actually sit and read other people’s ideas and vote on them.” (Respondent 2)

Respondent 2 believed that incentives were helpful in generating participation. But this approach was not always used in every ideation activity on the system.

“We found that the prizes helped a lot. People come for the prizes.” (Respondent 2)

Respondent 2 also mentioned the ability to report content on the system as spam. This was also something that few users were keen on partaking in, to increase quality of the content, on the system. The respondent or other employees had to individually take care of any inappropriate content on the system.

“Yes, you can report ideas as spam, which is also something very, very few people do. We get a lot of spam junk on the site, but we haven’t found many people who would actually report junk ideas. It’s very difficult, most of the time it’s just me or one of the other people from the company that has to go in and like delete ideas or report them.” (Respondent 2)

Jung et al. (2010) discussed motivation and engagement in their paper about the human-computer interaction. It needs to be taken into consideration about how to motivate users to do their best contribution via motivational affordances, the properties of a system that fulfill the needs of users, in group collaboration environments. Their research was specifically focused on 2 of the 10 design principles of Zhang, in the category of cognitive motivational needs, which were Designing for optimal challenge and Providing timely and positive feedback (Zhang, 2008). Comparisons were made between a group and an individual, whom was given feedback and the group received none, and a group and an individual that was given clear goals with those that did not. Their results found that groups given real-time performance feedback combined with pseudonymity (participants identities were masked with pseudonyms) surpassed all other groups under their tests. Performance was calculated from quantity and quality of feasible ideas. When experimenting with performance goals, derived from the third design principle of Zhang, the researchers found that having goals of what to achieve and receiving the explicit feedback led to greater achievements.
Some conclusions that can be drawn from these results are having feedback and goals in the idea management system could motivate participants to be more engaged in using the system. This could be implemented for the problematic features in the system such as voting, rating or reporting inappropriate content and potentially creating a better community of motivated individual participants and as a whole group. The researchers suggests that in addition to having features that allow voting, a feature that displays top and bottom contributors, to increase participants efforts of reaching a certain goal of contribution could be beneficial.

As internal motivations are hard to influence in the behavior of the participants, external or extrinsic motivations, however, can be influenced with less difficulty (Leimeister et al., 2009). Idea management systems should try to motivate participants in any means possible to increase engagement, which Respondent 2 did with System B that resulted in success. Although, as Frey et al. (2011) discovered, intrinsically motivated participants in idea management systems post higher quality contributions than the extrinsically motivated participants who would post suggestions more often, but with less valued contributions.

One of the companies shared some insights in what they were working on to try to generate more participation implementing game mechanics. This involves creating more game-type functionality in a non-game environment and creating engaging challenges for participants where they complete dull tasks that normally would not have been performed without the game mechanics experience (Law et al., 2011). Customers had been asking about what they could do to further engage their users in System C and the respondent described features such as ranking or other similar functionalities that give recognition to the users of a system based upon their valuable input and participation.

“That has been another demand but some increase about people asking: [...] how can we do a Nosco app to more engage people and put a game layer on it? And we are working a bit on that at the moment so, do more ranking and stuff like that, and see which are the most active users? Who are the users? Who have created the best voted ideas and stuff like that, try to make people a bit more active.” (Respondent 3)

Table 5: Problems with engagement.

<table>
<thead>
<tr>
<th>Relevant features</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vote on idea</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b. Report content as abuse (e.g. duplicate idea or inappropriate idea/comment)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c. Badges</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>d. Leaderboard</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>e. Anonymous user</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

System A had trouble deciding on which path to take regarding evaluation models and switched rating systems to gain more engagement from their user base but unfortunately failed to improve. The current state of the system is without any voting mechanisms at all and is unique for this survey set of systems.
Respondent 2 mentioned the lack of usage towards voting in open brainstorm sessions, howbeit the authors cannot infer if the same problems apply towards the private brainstorms.

The problems System B had with participants, not using the report content features in the system, was not mentioned by other respondents but additionally System A and E used these features. Other systems would implement it only for administrators or site admins to go in and remove junk from the system. When embracing the possibilities of crowdsourcing, it seems that a successful engagement with allowing participants to report inappropriate content would be beneficial.

The leaderboard feature, implemented by three systems (A,B,E), could be proven useful to give feedback to users who are performing accordingly or below expected contribution levels, as suggested by Jung et al. (2010). System C and D choose not to implement the feature and System B had only enabled it for the private brainstorms. The different approaches to recognizing participants and giving them feedback with features such as Badges or letting them compete for a place in the Leaderboard is, if motivated successfully, cheaper. System B noticed an increase in participation when introducing prizes but as mentioned by previous research, in the long term intrinsic motivation should provide higher quality contributions to the idea management system.

All five systems have implemented the feature of enabling pseudonyms, i.e. replacing the real names of the participants in the system with other forms of virtual identities, making them anonymous towards their fellow users. Since it is enabled, the possibility of performance decrease in motivation can, in this case, be ruled out.

6.2.2. Problems with duplicates
Each system had its own way of reducing the amount of idea duplicates that were submitted. In this section, some challenges that system vendors still are facing and struggling with are brought up.

Respondent 5 talked about reducing duplicates using a suggestion feature where the submitter is asked to view similar ideas before publishing the final version. The decision is still in the submitters hands to decide whether to publish the idea or not, the system does not force action, and chances are that idea creators believes it differs in some way and ignores the previously published ideas in favor of their own.

“[...] there is a suggestion engine of other ideas that we think may be similar. Quite frankly, those are only moderately effective and that’s just human nature. Everybody wants to feel like their ideas are a little different. So even if you suggest, you know, 5 other ideas that are almost exactly like their idea, the chances that the person is going to say - ‘oh yeah, my idea is not different’ - is the same as this is probably 30-40% at best. So you know we can do these things but in reality it’s up to the user to kind of determine whether their idea is worthy of submission or not.” (Respondent 5)

Not being able to prevent duplicates of ideas is a recurring problem for System C according to Respondent 3, especially when they do “extremely big ideation processes.” They did not have any features with the purpose of reducing duplicates in their system.
“No we don’t, it’s a problem that keeps coming back and it’s quite difficult to solve how to actually, cause we have seen when we do extremely big ideation processes [with] a lot of people, we cannot avoid that some people come up with more or less [...] duplicates of each other’s ideas.” (Respondent 3)

They do however, have the possibility to merge ideas manually after they have been submitted, and make the idea creators co-creators of the merged idea. Before ideas are merged together, they are checked to see when both ideas were created to find out if one idea creator copied another published idea and the idea submission is examined for uniqueness.

“Then we have to merge the ideas manually and if they are made in more or less the same day or in the same hour for example and seem unique both of them, but of course if they are made within two weeks, one might just have looked on someone else’s idea and oh I will copy that. It’s a bit difficult to handle but if we see ideas what we typically and believe that both have a unique thinking but haven’t seen what the other one did, it would either be the first one to publish that would be the author and the ownership of this idea, or you would merge them together and make them co-creators of the idea.” (Respondent 3)

System A had a manual approach to the problem, with a dedicated group of people for each customer that validated ideas before they were made public. This was part of the solution included in the service package and these consults would manually look for duplicates and see that it is a well written idea and if it turned out to be a duplicate this would not be made public and instead this idea submitter would be encouraged to contribute through comments of the original idea.

“[…] we don’t want all the repeated ideas to be turned public because, then we will have a lot of repeated ideas on the market and that will just make people get confused and that won’t be [valuable] for the process. So what we do is that we validate the first idea that is well written, that is replying to the challenge, and that is innovative and when other similar ideas come, we will notify that person, that a very similar idea have already been validated but that person can contribute with their comments to add value and help co-create the original idea.”(Respondent 1)

This approach is similar to what Bailey and Horvitz (2010) suggest in order to slightly raising the bar for submitted ideas to turn public, to reduce the amount of lower quality ideas in the system. Since a system which has a large number of lower quality ideas may give the perception of “there is nothing good in here”, which reduces the credibility of the pipeline within the organization, and the community waste time reviewing poor ideas. Their suggestion is to place newly created ideas into a separate, non-public space and then only allow the ideas that meet certain criteria to be transferred into the public area. The difference between this suggestion and the approach of System A is that the effort would be assigned to other community participants, for example those who recently had their ideas accepted instead of a dedicated group from the company.
Based on the interviews the authors found the following three approaches to reduce the amount of duplicates in an idea management system:

1. To allow admins to manually merge two ideas into one, and then if seen fit make the creators of the ideas co-creator of the merged idea. Nevertheless, this is not a feature that users may use by themselves and is described as quite difficult to handle by Respondent 3.

2. To have a dedicated group reviewing submitted ideas before they are published to the website. This probably works really well to reduce the amount of duplicates entering the system. Although, it is not a feature of the system, but instead a group of people who do the work, which may take a lot of resources to maintain and be too expensive for some companies.

3. To display similar ideas based on automatic selection of ideas that the systems found similar in order for the idea creator to review them before submitting their own idea. This is a feature, which is handled automatically by the system, and there is no need for additional resources to maintain it. Nevertheless, there are conditions for this feature to actually be effective, which are that the idea creators need to read the suggestions, and the suggestions need to be accurate in a way that it truly shows ideas that are similar. Otherwise, the idea creators will most likely submit their ideas anyway.

The research done by Ford and Mohapatra (2011) regarding de-duplication in an innovation community contains a possible solution to reduce the amount of duplicates that enters an idea management system. Considering that one problem that Ford and Mohapatra mentions is that idea creators usually do not have a lot of incentive to check if their idea already exists in the system, which is a reason why it is difficult to prevent duplicates to enter the system. A problem with having duplicates in the system is that the ideas may split votes which results in a low correlation between the number of votes and the quality of the idea. Since Ford and Mohapatra believes that idea creators usually lack incentive to do the proper research before submitting their ideas, their suggestion for a solution involves to encourage idea creators to research and view similar ideas prior to submission of their own ideas. They concluded that forcing a popup, displaying ideas that are considered similar to the idea of the idea creator, before they are able to submit their own idea was a useful mechanism for encouraging idea creators to study other ideas, considering every single idea creator in their study read through the ideas displayed in the popup the first time it appeared.

Howbeit, in their research the idea creators rarely found the related ideas to be relevant, which could be the reason that idea creators still submitted ideas that were already in the system. Since the search results themselves were inaccurate, it probably resulted in that some idea creators falsely believed that their ideas were, in fact, unique. If the search algorithm used in the study for finding related ideas would be improved in a way that it provided the idea creators with a list of accurately similar ideas, then Ford and Mohapatra believes that idea creators would not submit their own idea if it already exists in the system. The search algorithm implemented for their study used keywords within the title to find similar ideas. The suggestion to improve that search algorithm would be to match keywords from the description as well. Still, a problem which then may arise is that idea creators which have taken the time
to fill out the description do not want to abandon their idea, and vote for another idea because they have become too attached to it (Ford and Mohapatra, 2011).

In the research done by Muthmann et al. (2009) they identified several scenarios which could cause threads with near-duplicate content to occur in forums. Some of them may be applicable to idea management systems, considering creating a thread in a forum is quite similar to submitting an idea in an idea management system. In both occasions, the user adds a title, a description, and a category where it should be placed.

The first scenario Muthmann et al. (2009) gave was called “Impatient aggressive posting user.” It was about old threads being moved from the forums overview page, which could lead to that the idea creator wanted to improve the contents visibility by copying it to a new thread to be displayed once again at the top of the overview page. This could be applicable to an idea management system, depending on which approach is used for displaying ideas; an example would be an approach that always displays new ideas on the front page. In this case, the idea creator may feel that the idea did not get enough visibility or attention, and may submit the same idea again in order for it to receive more visibility. However, in an idea management system with idea evaluation features, the original idea might have been awarded votes, which would not be transferred to the new duplicate, which may serve as a deterrent for this behavior. Although, if the original idea had received a lot of negative votes, the idea creator may submit the duplicate idea in hopes of it receiving more positive feedback since they may fear it will be a downward spiral for the idea. If it receives a lot of negative feedback, it may continue to be awarded negative votes, because the current negative rating of the idea may influence other users.

Muthmann et al. (2009) described a few shortcomings in existing forum engines, one of them can be related to this particular problem, which is the amount of daily created data causes threads to be shifted to the end of a channel before they have received the desired attention from the community in order to provide room for new threads. Their suggestion is similar to one previously mentioned in this thesis, which is to use duplicate detection in order to display existing threads with similar content to a user before the user creates a duplicate to reduce the amount of daily data created. Howbeit, the forum, which was used for their study, focused on answering questions, which the users had submitted, while in an idea management system the focus is on extracting the best ideas by using, for example, evaluation tools, hence this solution may not be optimal for an idea management system. Since in the forum in question, all the user wants is to get answers to the desired questions, where being able to see similar or the exact questions already asked and answered will probably be sufficient, whereas in an idea management system it is usually important for the idea creators to get recognition for their ideas.

An approach that may be more suitable for an idea management system is a combination of displaying similar ideas before idea creators submit their own ideas, and the suggestions given in Table 14 presents a summary of the problems with bias.

Table 14 in section 6.2.5. The suggestions in question are to not display the rating of an idea before a user has voted on it, since this should remove the fear, which the idea creators may feel regarding that other users may become influenced by the rating of the idea. In addition, the ideas should be displayed
in more of a random fashion. It should be a mix of new ideas and old ideas, since then it may not necessarily help to create a duplicate of an idea in order to try to give it more visibility, and even if it is an old idea it may still receive the amount of visibility and attention desired by the idea creator.

Another scenario Muthmann et al. (2009) described was called “Impatient submitter”, which was about a user clicking the submit button several times in case the forum engine reacts slowly. This could lead to the same thread being added several times if the engine is not able to handle the situation. This could possibly occur in an idea management system, if it reacts slowly and does not have some sort of mechanism which prevents multiple copies of the same idea being posted at the same time. Muthmann et al. (2009) mentioned “Slow response time” as another shortcoming of existing forum engines which is a result of a system not being able to cope with the data load. They suggest that the load on the forum can be reduced in case duplicates are removed or prevented from entering the system, which should lead to the response time of the system becomes faster, and users should not feel the need to click the submit button several times. This may also be the case for an idea management system, that the load on the system can be reduced by preventing duplicated ideas from entering the system or removing already existing duplicates, which may result in fewer duplicates entering the system from impatient idea submitters.

Muthmann et al. (2009) mentioned another scenario regarding how near-duplicates threads can occur in a forum, which was called “Correcting mistakes”. It was about users who submit new threads in a hurry without spending much time considering the content, which could then lead to that the users afterward noticed that they had made errors, such as a poorly chosen title. However, this problem can only lead to near duplicates being added to the forum in case it does not support the feature which allows the users to edit their own threads or in case the users are not aware of this feature. Given the previously stated reason that submitting a thread is similar to submitting an idea, this problem may also be applicable to an idea management system. If an idea creator has submitted an idea and then realizes that there are errors, such as spelling errors or a poorly chosen title, then the idea creator would probably first look for an edit idea feature in order to change it. If no such feature exists or the user is unable to find it, it may lead to that the idea creator submits the idea again with the corrections, which would lead to a duplicate entering the system.

Based on the pilot- and the main study of idea management systems in this thesis, there were only one system out of eight which allowed their idea creators to edit their ideas. This could mean that it is a rare feature to be included in an idea management system. A reason for why it might be a rare feature is that if an idea creator can edit an idea which have received votes, then it is possible that the idea would be edited in such a way that the original decision of the users regarding how to vote on the idea also change. Then the idea management system would also need to have a feature which allows users to change their vote, otherwise users may become upset. Including a feature that allows users to change their vote adds problems with bias which is mentioned in section 6.2.5. A possible solution to this particular problem would be to allow idea creators to preview the idea submission before posting it. This could lead to that the idea creators find the errors in the preview phase, and corrects them, instead
of requiring an edit idea feature. Another possible solution would be to only allow idea creators to edit their ideas in case no votes have been awarded to them.

The last scenario that is brought up in this thesis, which was described by Muthmann et al., was called the “Copy and paste” user. It was about forums which identified their most active users by using a ranking system that was based on points. The users would become higher rank the more points they acquired. This led to that users answered duplicates by copying already existing answers, which awarded them points with almost no required effort. This may be applicable to an idea management system considering based on the pilot study conducted for this thesis, there are idea management systems which award their users mainly based on the quantity contributed rather than its quality. An example would be My Starbucks Idea, where users are awarded points by submitting ideas, voting or commenting the ideas of other users, and receiving positive votes on their own ideas. The first three are a quantity measure while the last is a quality measure.

Awarding the contributions of users in an idea management system based upon quantity measures is probably not very efficient if the goal is extracting the best ideas. Since it may lead to idea creators that post the same ideas several times, and not make the effort of trying to submit comments that improve the ideas they comment on. Also if the users are allowed to award as many votes as they want, then the users may not take the content of the ideas into consideration when they vote, since they are only after the points. A suggestion for this specific problem would be to only award the users based on the quality of their contributions rather than its quantity. Such as awarding the users points for each positive vote their ideas receive.

Table 6: Problems with duplicates.

<table>
<thead>
<tr>
<th>Relevant features</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Report content as abuse (e.g. duplicate idea or inappropriate idea/comment)</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>b. Search or suggest similar ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>c. Merge ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>d. Idea submissions are reviewed</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Browse Ideas</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>f. Idea rating</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>g. Preview before post</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Edit idea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

In systems A, B and E, users were able to report duplicated ideas by the use of a feature, and in Systems C, and D users had to contact a moderator in order to report an idea.

It was only System E which used the previously mentioned approach to automatically suggest similar ideas during the submission phase in order to reduce the amount of duplicates entering the system. Although, the respective respondent believed it was only mildly effective, since in the end it comes down to if the idea creator submitting the idea believes it is similar or not. The reason for this might be
that the search algorithm used is not optimal and could be improved by using the previous suggestion by Ford and Mohapatra.

The approach of System C is to merge two ideas which are similar into one, which does not prevent duplicates from entering the system. However, it may reduce the total amount of duplicates in the system. The process of merging two ideas may not be very effective, considering administrators as previously mentioned must manually check to see when both ideas were created to find out if one idea creator copied another published idea and the idea submission is examined for uniqueness.

There was only one approach, as previously mentioned, which the authors found by studying the systems that was able to possibly prevent all duplicated ideas from entering an idea management system. The approach in question is to have a dedicated team which reviews all submissions before they are viewable by the community, this approach was used by System A and sometimes System E. This is not a feature per se, but instead a manual approach.

In all of the systems users were able to browse ideas in various ways, such as searching for ideas by using keywords, or sort them by a particular criterion such as most popular, except for in System B where browsing ideas was basically looking through comments made to a brainstorm. It was only System E which used the approach of displaying ideas in more of a random fashion, which was a mix of new and old ideas, instead of for example displaying all new ideas on the front page. Displaying ideas in a more of a random fashion may lead to fewer duplicates entering the system since idea creators may not submit the same ideas several times in order to get more visibility. A reason for why some idea management systems allow users to sort ideas based on a particular criterion, such as recent ideas, and most popular ideas, is that the customer has requested that feature, since they may not have considered that users can become biased by it.

The approach of only displaying the rating of an idea to users who have already voted on it was only used in System E. This may lead to fewer duplicates from entering an idea management system since the idea creator may not submit an idea with a negative rating again because they fear that the negative rating of the idea rating influences users, and continue giving it negative feedback.

None of the systems in the main study had an additional stage in the idea submission process where idea creators could preview their idea submissions before they were posted. This could lead to that the systems receive more duplicates entering the system because of the previously mentioned scenario called “Correcting mistakes”. None of the systems had a feature which allowed idea creators to edit their ideas after they had been submitted, except for System E. However as previously mentioned, allowing idea creators to edit their ideas can add other problems such as when the idea has received votes and then the idea is changed in way which would change a voters mind about the idea. For System E this should not be a problem since they usually allow users to change their vote in case an idea has been edited. Respondent 5 mentioned the main reason why an idea creator is allowed to edit an idea in their System E, which was:
“[...] as a submitter I can almost always edit my submission and that is by design because [the] whole idea of [...] evolving the idea is that you want the crowd to share their experiences or skill or knowledge with the idea submitter to get the idea better.” (Respondent 5)

This means that they allow idea creators to edit their ideas to add useful information from the comments of other users in order to improve the ideas.

6.2.3. Problems with evaluation models

In all the surveyed systems, each of them have different approaches for users to evaluate submitted ideas, whether it is as simple as giving thumbs up or down to having currencies that are invested in ideas they believe are worth developing. Two of the respondents described why they believe voting systems, where a user has unlimited votes as in for example being able to give all ideas they want five stars, is not very good for filtering ideas.

System C has two ways of evaluating ideas, one where a user can rate different parameters regarding the idea with a score ranging from one to five. The other is that a user can rate an idea by awarding it one to five stars. Users appreciate the ability of being able to show what they believe of an idea and to see what others believe of the idea. However, since they do not have any limits on these stars, it is not very useful for filtering ideas in order to find the best ideas, because there is no consequence of awarding five stars to an idea which is considered as awful. Users can award all ideas five stars if they want to, which means the users do not necessarily need to think about how they are placing their votes.

“[...] there are no limits on these stars, so it might not be a very good proxy for how good an idea is, [because] it’s not that the customer has a limited amount of stars he can actually give to the ideas so the evaluation parameter is actually quite more liked from a top manager perspective but the users who participate like the ability to show what they think of an idea and to see what other people think of the idea. [...] I think it’s appreciated from the user’s perspective but it’s not that much used anymore from the sorting-screening perspective.” (Respondent 3)

In a system where users have a limited amount of votes such as Justin.tv, studied in the pilot, users really have to consider which ideas they want to award their votes to.

Respondent 1 described how their system, known as a prediction market, works which uses credits, where a user starts with a fixed amount of credits and can earn more by submitting and commenting ideas. A user can also gain or lose credits by investing them in ideas that the user feel are the best ideas.

“ [...] the credits you get from the beginning, from the idea submission, from the comment you provide then you will be able as a community to invest in the ideas you believe are the best ideas. By doing so you are investing these credits, you get more credits or you can [lose] credits.” (Respondent 1)
It is also possible for a user to invest to reject an idea if the user believes the idea is a bad one. Still, a user cannot both invest to approve and reject the same idea.

“As well as you invest to say I like this idea, it’s a valuable idea, then you should also the opportunity to say no, this is a crappy idea, I really do not believe this idea should be implemented so I’m going to invest to reject this idea. The only thing you cannot do is invest to approve and reject the idea at the same time which makes sense.” (Respondent 1)

Users can also at any time sell parts of or the whole investment, and it is possible for a user to sell all parts of an investment which are invested to approve an idea to then invest the credits in rejecting the same idea and vice versa. Respondent 1 described why this was important.

“[…] I want to sell part of my investment. Why is this important? Let’s imagine that an idea that seems to be a very good idea had a comment from someone saying that’s not a good idea because there is a legal constraint to that idea, you will never be able to do that because of this law, this law and this law, so it’s interesting to see just like in stock market how people start selling their previous investments or how people will start investing to reject the idea. This is very valuable because you will be able at any time to buy or sell investments in any idea […].” (Respondent 1)

Respondent 1 then continued with describing the similarities with their system and the stock market. Those ideas will get higher value the more people invest in them. With this approach the responsible management will only have to analyze the top ideas that have been invested in, from the collaborative evaluation of the community.

“By having many people collaboratively choosing and evaluating the best ideas, what will happen is that the ideas that get more investment will have a higher value just like in the stock market. The companies that have more people investing in their stocks, [these] stocks will get to higher value because the demand is larger than the offer. So this is going to be the same with the ideas, meaning that the ideas that get more investment are the ideas with the higher value and this will help the organization.” (Respondent 1)

The respondent described why this was better than the approach of voting with the use of stars or giving the attribute “like” to the idea where participants usually have no limit to giving their evaluation on any amount of ideas and can like to ideas that are not necessarily viable. In these systems Respondent 1 describes, contributors are not held responsible for their idea evaluation, and in their system users are instead encouraged to invest in which they believe are the ideas that have the best chances of being implemented.

“[…] this is very valuable because it incentivizes people to be truthful, why? Because people no longer vote on the ideas they believe are the best ideas, that is what happens
in most systems, with this voting systems, in which, just like Facebook, ‘I like this idea’, or you give stars, ‘5 stars to this idea’, and when you have the voting system, you are not holding people responsible for their decisions, so what happens is just people just say they like all the ideas, or they just vote on the ideas of their friends because they are their friends. Here they don’t do that. Why? Because if you invest in an idea of a friend of yours and the idea is a crap idea […] it will not be approved and you lose your credit. You are incentivized to say the truth. You are incentivized to be truthful. It is a very pedagogic method and a very effective model. “(Respondent 1)

This result is in accordance to with Bailey and Horvitz (2010). They give a few suggestions how to improve the voting models which currently allow users to have unlimited votes. The first is a suggestion already mentioned in this thesis, which is to put a limit on the number of votes each user can use, to force choices between ideas. Nevertheless, they recommend it in conjunction with incentives to everyone that contributes to a winning idea. Bailey and Horvitz (2010) suggests that the incentive should be a financial reward distributed proportionally to them (idea creator > commenter > voter). For this model to work, the number of comments a user can submit would also need to be limited. This would lead to that a user needs to choose which ideas to comment on, and it would be in the best interest of this user to submit essential comments that improves the idea, in order to gain a reward if the idea wins. As previously mentioned, extrinsic rewards, does not always lead to contributions of higher quality (Frey et al., 2011). Howbeit, with this model it may reduce the amount of less substantial comments considering the limited amount of comments and that only the creators of comments, which improves a winning an idea, will receive rewards. Further research is required in order to tune this type of model (Bailey and Horvitz, 2010).

Another suggestion is that users could be asked to rate or rank ideas on dimensions important to the business, which can for example be that the idea enhances the current offerings or opens a new market (Bailey and Horvitz, 2010). This is similar to the approach of System C and D.

Chai et al. (2010) reviewed problems discovered in previous research related to rating quality in User Generated Content (UGC) and proposed a model for measuring the quality of content in forums automatically. Some problems were that a large amount of content is not rated and an overflow of data results in more UGC than users are able to rate. Weimer and Gurevych (2007) discovered that one of their analyzed forums, which applied mechanisms for rating posts manually, had only around 0.1% rated posts. The low number of rated posts highlights the problem of information overload and the difficulties in users being responsible for rating the entire content. The automatic quality measurement can possibly be applied to assist in rating quality of idea submissions or comments inside an IMS.

Previous research (Lampe and Resnick, 2004) analyzed the moderation techniques for handling large amounts of users used by the community of the website Slashdot.org. Every user had the ability to act as moderator from time to time and moderate comments to increment or decrement certain comments’ score for in terms of quality. The moderators that would give out fair judgments would be rewarded with more points. Seeing how all the idea management systems in this study had the ability to
comment existing ideas it would seem plausible that allowing the participants to promote or demote good content, like idea comments of high quality, in order to delegate some of moderators responsibilities to the crowd. This feature could also allow participants to evaluate ideas with the motivation to gain more trust in order to get more points, i.e. more weight in their evaluation, when promoting certain ideas they believe in.

Table 7: Problems with evaluation.

<table>
<thead>
<tr>
<th>Relevant features</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vote on idea</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b. Credits</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c. Comment ideas</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>d. Description</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

As mentioned in previous sections, voting or evaluation methods are implemented in one way or another currently in all five systems except System B (see Table 7). Each of these four systems uses different methods to evaluate ideas. It seems as the prediction market method of distributing credits (System A) for investing in ideas could provide more quality to the idea management system with a more dedicated user group. This would allow for more strategic decisions in users investments of their credits, and only investing in feasible ideas. Ideas that seem good in theory but are not or other ideas that the business would typically reject due to cost or other factors are typical ideas that could be up voted when users have unlimited amount of votes to distribute in the system.

Commenting ideas is necessary to let ideas develop in the idea management system, which is present in all systems but System B, including all systems in the pilot study, which infers its importance to the idea development process. In the case of the brainstorming approach in System B, the submissions of ideas description or comments to a brainstorm have no visual difference to the user and are therefore named idea description.

6.2.4. Problems with system complexity

One problem that was found during the research was that it is important not to have a too complex system, which is difficult to use for the desired user base, because this may lead to an exclusion of a big part of that particular user base. Since if they do not understand how to use the system then they will most likely not use it at all.

Respondent 3 also believed that having a system which is simple is very important. It is mentioned as one the most important things together with that it should be intuitive for both participants and administrators.

System C is simple but it still has quite a lot of features and it gradually gets more complex as new features are added. However, they try to limit the amount of new features being put into the system and to keep the design minimalistic.
“[...] the most important thing for us about [System C] is that it should be simple and intuitive both for participants and administrators. It’s not like it’s without features, our software, but we really try to limit what we put into it but of course gradually it gets more and more complex because we add features but we try to really keep it minimalistic in design and everything.” (Respondent 3)

Another respondent described problems they have had, when they implemented lots of new features. Users kept asking for new features to be added, and when the features were added, the system became more complicated. In the end, the management said “No, no more” because they figured it would never stop which lead to that they now try to keep the system simple.

“So we kept adding features on top of things, [...] and the software [became] more complicated [...]. Then [...] we just said no, we said no, no more. Because you know then [it] never [stops], what people want, it never stops, people keep asking for features. So we try to keep it simple right now.” (Respondent 2)

This result is in accordance with Ren et al., (2010) who found that introducing new features to their user base would prove to be more difficult with older users than the new ones. The old users would put up with more resistance towards the newly introduced features therefore authors suggested that caution should be taken when considering adding major changes to the system.

Respondent 4 explained that they had a very simple idea submission process, where there are only three things an idea creator needs to do, which is to phrase an idea, make a short description and then make a classification.

“[…] we only have three things you need to do, and that is to phrase an idea, is to give a name of the idea, a headline here, make a short description and make a classification. And that classification could very well be linking to how your organization looks like and how you operate [...].” (Respondent 4)

Respondent 4 continued with explaining the importance of the system being simple for everyone, independent of their knowledge. Otherwise, some people may be confused and not understand how to use the system, which could lead to fewer participants in the ideation process.

“[…] it’s very simple and easy and that’s very essential because if you meet a big company and you have a lot of different employees and especially if you have employees in service and production and collar workers, and so on. It should be very, very easy to use. It’s no problem if you have a highly [skilled] engineering company that you can make a lot more advanced template but you have to take into consideration a lot of things to fill in an idea. But maybe it all makes sense, it’s very easy to confuse people and [that] can be a barrier [...] to actually use the system.” (Respondent 4)

It depends on what type of company that will use the system, if the system is to be used for example by a highly skilled engineering company then it is possible to have a more advanced idea submission
template. The reflections of Respondent 4 are similar with the ones of von Hippel (2005), who also pointed out importance of user friendliness in the user toolkits for innovation and that toolkits should be available for users in their own language, not requiring special design language, to participate in discussing innovations.

The results show that great care needs to be taken before considering any design or customization decisions that can affect outcomes of the idea submission and other important aspects of the workflow in the system. Another reason why simple systems may be preferred over more complex system is that users tend to spend significantly more time on technology sensemaking when using complex systems (Alavi et al., 2002). Although, a simple system may provide fewer features that can be used for a more sophisticated analysis (Hrastinski et al., 2010) or features needed to give participants more freedom in describing their ideas more creatively (Sjaunja, 2010).

Table 8: Problems with system complexity

<table>
<thead>
<tr>
<th>Relevant features</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Write idea name/title</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>b. Description</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>c. Category</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Idea submission processes in System A, C, D, and E are similar. All of them are simple where idea creators are able to give their ideas a title, a description, and then choose a particular category or theme for them to be placed in. These four systems did not have a problem with being too complex; however, they stress the importance in focusing on keeping it simple, and not overcomplicate things, to allow users with different sets of skills to be able to use the systems.

The idea submission feature of System B is different from the other systems, where an idea submission has no title and is basically a comment to a brainstorm, which means that it is not possible to search for specific comments by title. The system is simple to use, despite that, it may not be very effective in extracting the best ideas, considering the lack of an evaluating system and the possibility to post standalone ideas. Since it is not possible to post standalone ideas, users are also not able to comment and improve the ideas of other users, which is an important feature. System B, being the only system with a unique approach to idea submission, or rather brainstorm creation, this study draws the conclusion that its idea mechanics holds its users back from contributing to successful idea submissions. This means that having a too simple system may not be very efficient as well.

6.2.5. Problems with bias
Respondent 5 explained the importance of trying to give each idea as equal visibility as possible. System E tries to achieve this by displaying the ideas using a combination of randomness and the latest ideas to the participants.
“[…] typically we try and display ideas using a combination of random and kind of latest ones in to the participants. And we do that to try and kind of level the playing field, meaning try to give each idea as equal visibility as possible.” (Respondent 5)

Regarding bias in the display of ideas, that is not something the customer usually worries about and Respondent 5 explained that usually the client wants the most popular ideas displayed at the top.

“[…] In some cases we will show you know the most popular ideas at the top of the list because that’s what the client has asked for, we don’t really like that because that introduces bias. It’s human nature to be attracted to the thing that other people like, right? “(Respondent 5)

People are also generally interested in what other people are interested in, Respondent 5 gave an example of a user that is presented with a list of ideas where one idea had 100 votes and another only had 1 vote, then there is a high probability that the user will view the one with a 100 votes first.

“If you’re presented with a list, and one idea had 100 votes and the other one only had 1, chances are you are gonna look at the one that had a 100 votes first, right?” (Respondent 5)

Respondent 5 also believes that it is biased to display ideas in order of their current rank which is something they try to avoid. Nevertheless, sometimes the clients are not concerned about the bias, and if that is the case then they customize it to meet the needs of the client.

“Showing ideas in order of their current rank is automatic bias so we try to avoid that, but in some cases that’s what the client wants, so they are not as concerned about the bias.” (Respondent 5)

Respondent 5 described the problem if everyone would be allowed to change their votes; bias could be introduced in the process. Participants could change their votes to group conformity, i.e. vote for the same as everyone else.

“[…] you have to think about the process implication of the feature, right so if I let just by default, I’m gonna let anybody change their [vote]. Well, you are actually potentially enabling bias, right? Because now I’m gonna change my vote because […] I just don’t [want to] be the one […] that [voted] against an idea that’s liked by 50 other people, right?” (Respondent 5)

One configuration would be when an idea was changed, when comments or other developments are added to the idea that users are allowed to switch their vote if they for instance do not agree with the revision made to the idea.
“[…] in some cases we don’t allow you to change your vote unless the idea was changed, right? And in some cases we let people change their votes as many times as they want, that’s just a simple configuration we can then turn on or turn off.” (Respondent 5)

Another related problem that Respondent 5 mentioned is that people might be biased when they are browsing for ideas and the most popular ideas are shown on the top. If an idea is popular and has gotten many positive votes, then a user who views the idea and does not necessarily believe it is a good idea might give it a positive vote anyway because the other users voted for it. Since it is considered as a good idea by the other users which may lead to that the user believes he or she is wrong, as in an information cascade or herding (Banerjee, 1992, Bikhchandani et al., 1992). The user believes that the other voters have more information and therefore more informed in their decision. This is also true for the opposite, that is if the user believes an idea is good but it has received terrible rating, and then the user may give it a negative vote instead. In order to try to prevent this, Respondent 5 said they sometimes hide the score of an idea until the user has voted.

“Sometimes we will display the current ranking or points of ideas, sometimes we’ll hide that until somebody has ranked it themselves. So, you know, you don’t want the existing ranking of an idea to bias the participants so that, in some cases we’ll keep the score hidden until after you ranked it yourself and then you can see what everybody else thinks.” (Respondent 5)

By hiding the score until a user has voted should solve the problem that users are influenced by the rating of an idea when voting. Howbeit, if it is allowed for users to change their vote whenever they want to, then this defeats the purpose of hiding the score in the first place. In the research done by Talwar et al. (2007) they found that the ratings following low expectations, where expectation is the average of the previous ratings, are likely to be higher than the ratings following high expectations. Be that as it may, their study was done by using hotel reviews on TripAdvisor, which may not be applicable to ideas in idea management systems.

Table 9: Problems with bias.

<table>
<thead>
<tr>
<th>Relevant features</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vote on idea</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>b. Idea rating</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>c. Clear vote</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>d. Browse ideas</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Fear of automatic bias by allowing users to see the rating of an idea before they vote themselves is not something customers nor most vendors seem to have, considering system A, C and D always show the rating of an idea. This allow users to sort ideas based on popularity, which might be desired, although, this may lead to that they gain a lot more visibility than other ideas. The representative of System E was the only one speaking about this problem and mentioned that they usually do not allow users to see the idea rating before they have voted themselves, howbeit sometimes the customer wants that functionality, which System E then includes.
Having the idea rating always showing, when browsing for ideas, may also influence users in the way they vote on ideas, as mentioned earlier because of information cascade. Nevertheless, removing the functionality of always displaying the rating of an idea will not solve the latter problem, if the system allows users to clear their votes, because then the users can change their votes after they have seen the rating. System E, usually only allows users to clear their vote in case the idea was changed, sometimes however, a user can change their vote as often as they want.

Considering the voting model of System A is different from the other systems as previously mentioned in section 6.2.3, users being biased may not be a problem, since making poor choices when investing credits will have consequences. “Clearing a vote” in System A is considered as selling the investment. In System C, users can change their votes, not clear their votes, although, the users of this system may still be affected by bias even if the idea rating would be hidden until as user has voted.

6.3. Guidelines for idea management systems

This section presents an overview of the problems found during this study, each with a short description of the problem and the negative effects they may cause. Suggestions, which may reduce the impact of the respective problems, are also presented.

In the following tables, the feature-related problems found during this study are presented, containing a short description, the consequences the problems may cause, and suggestions on ways that may reduce the respective problem. These summaries can be seen as possible guidelines for key features in idea management systems.

Table 10 presents a summary of the problems with engagement.

Table 10: Summary of Problems with engagement

<table>
<thead>
<tr>
<th>Problems with engagement</th>
<th>Description</th>
<th>Consequence</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
|                          | Participants are not fully engaging in the available features of a system, such as voting or reporting content. | When participants are not using features, e.g. one for reporting inappropriate content it lowers the overall quality on the system. Participants not fully engaging with scoring ideas will also affect the outcome of the ideation process negatively. | a. Invest more in intrinsic motivated features rather than extrinsic motivation.  
b. Allow users to be masked behind pseudonyms. |
Table 11 presents a summary of the problems with duplicates.

**Table 11: Summary of Problems with duplicates**

<table>
<thead>
<tr>
<th>Problems with duplicates</th>
<th>Description</th>
<th>Consequence</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
| Description              | It is difficult to prevent duplicate ideas from entering an idea management system, and removing them after they have entered may be tricky considering both ideas may have useful comments. | The duplicate ideas may split votes which results in a low correlation between the number of votes and the quality of the idea | a. Allow users to report duplicates  
b. Automatically suggest similar ideas before idea publishing  
c. Merge ideas manually after publishing  
d. Allow moderators to review ideas manually before they are published  
e. Only show the rating of an idea to the users which have already voted on the idea.  
f. Display ideas in a more random fashion that is a mix of new ideas and old ideas.  
g. Add an additional stage in the idea submission process where users can preview their idea submissions before they are made public.  
h. Only allow idea creators to edit their own idea submissions if the ideas have not received any votes yet, or include a feature which allows users to change their votes in case an idea has been edited. If the latter feature is implemented then idea creators should be able to edit their ideas at any time. |

Table 12 presents an overview of the problems with idea evaluation.

**Table 12: Summary of Problems with idea evaluation**

<table>
<thead>
<tr>
<th>Problems with idea evaluation</th>
<th>Description</th>
<th>Consequence</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
| Description                  | The choice of evaluation method, the approach taken to score ideas, can affect the outcome of what level of quality ideas receive more votes. | Users may vote on all ideas without even reading the content since there are no limit to the amounts of votes a user can reward, and there are no consequences for voting recklessly. | a. Try implementing prediction market approach to evaluate ideas.  
b. The feature of commenting ideas is necessary for ideas to develop  
c. To handle the risk of information overload, try implementing automatic mechanisms for rating idea posts and comments.  
d. Reward the crowd with more evaluation rights when behaving correctly. |
Table 13 presents a summary of the problems with complexity.

**Table 13: Summary of Problems with complexity**

<table>
<thead>
<tr>
<th>Problems with complexity</th>
<th>Description</th>
<th>Consequence</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
|                          | The user interface is not intuitive or lacks certain key features.          | Users may avoid using the system since they do not understand how it works. Without certain key features the process of developing ideas is almost impossible. | a. Take great care before considering implementing any design or customization decisions that can affect outcomes of the idea submission and other important aspects of the workflow in the system.  
   b. Keep the system simple in a way where all of its users can contribute. However do not remove certain key features such as allowing users to comment the ideas of other users, since this will prevent ideas from being developed into even better ideas. |

Table 14 presents a summary of the problems with bias.

**Table 14: Summary of Problems with bias**

<table>
<thead>
<tr>
<th>Problems with bias</th>
<th>Description</th>
<th>Consequence</th>
<th>Suggestions</th>
</tr>
</thead>
</table>
|                    | Ideas are for example listed to participants in the order of popularity, most commented, or in a way that shows the browsing user which choices other users have made. | If the users see the opinions of other users before they have made their choice, potential biased can be introduced, where users copy the opinions of their peers. | a. Only show the rating of an idea to the users which have already voted on the idea.  
   b. Do not allow users to change their votes unless the idea itself has changed.  
   c. Display ideas in a more random fashion that is a mix of new ideas and old ideas. |
7. Limitations

In this chapter, the limitations of this study are discussed in order to allow the reader to judge the weaknesses of the findings.

One limitation of this study is that the problems and suggested solutions are only based on theory. No case studies were conducted in order to verify if the solutions work. This means that it is no guarantee that an idea management system which has applied the suggestions given for the particular feature related problems would not experience the respective problems. However, most of the suggestions that are described are not meant to be solutions which eliminates the problems completely, but instead meant to reduce the impact of the problem effects. Although, once again, since no case studies have been conducted, the amount of impact that the suggestions reduce have not been verified. This could mean that there would be no reduction at all.

Due to limitations of time and lack of response, only five systems were analyzed in this study. The features and problems found from the five systems never met theoretical saturation, meaning that no new information in the study emerges. It would have been interesting to see what the same research would result in with more systems.

Another limitation is that the authors did not use all of the systems themselves, but used the transcribed interviews and the video footage of when the interviewees were using their systems. In the case of System E, the authors did not get to see the vanilla system itself; however, they were presented with an implementation of System E, in the form of a published website. A reason for why the authors did not get to see the vanilla system is that they may not have a template with the available features, since they seemed to be very flexible when it came to which features were going to be implemented in the system of a customer. It all depended on what the customer wanted. This may have led to that the authors possibly missed some features in the studied systems.

One of the systems studied, System B, might not be considered as an idea management system, since it lacked certain key features that are important for the ideation process, such as users being able to evaluate the ideas of each other. It used to have these sorts of features; however, they were removed because almost no one was using them. The system is more of a brainstorming system, which is quite similar to an idea management system, although it usually lacks the support of discussing and rating of ideas. This may mean that the problems mentioned by Respondent 2 are not applicable on idea management system. Howbeit the authors mainly used quotes from Respondent 2 regarding problems with their previous evaluation features and analyzed why they may have experienced those particular problems, which should be applicable to an idea management system.
8. Conclusions
In this chapter, the answer to the research question of this thesis is presented, and what the research contribution it adds. Lastly, suggestions for further research are given.

In this section, the findings from the analysis of this thesis regarding what feature-related problems exist in current idea management systems are presented. Some of the suggestions found that may reduce the impact of problems within features in idea management systems will also be described.

In this thesis, the purpose was set out to discover feature-related problems within idea management systems of OIS. The method chosen to carry out a search for features and their problems was Grounded theory, which led to the discovery of five areas of problems.

Five feature-related problems were found:

- Problems with engagement
- Problems with duplicates
- Problems with evaluation models
- Problems with system complexity
- Problems with bias

A sub-purpose was to provide a list of features in current idea management system, which can be found in Appendix A.

The findings of this thesis show that Problems with engagement is best dealt with using features that delivers better feedback in order to give more motivation to the participants. Anonymous users are something that each of the Systems had implemented, ready for use. One interesting idea that came up during the interviews was to bring game mechanics into the feature design, to increase motivation of participants using game-like features, e.g. achievements that users could accomplish.

As for managing duplicates in an idea management system, it is recommended to implement a feature that suggests similar ideas during the idea submission phase. On the other hand, it is important that the algorithm finding the similar ideas is accurate, and is not only used on the title of the idea but also its description. However, unless ideas are reviewed manually before made public, there will always be some duplicates entering the system, considering in the end it comes down to what the idea submitter believes regarding the uniqueness of the idea.

During the interviews, the topic of which evaluation model was the most appropriate was often discussed. Each of the five systems had its own approach to evaluation with the exception of System B
currently without evaluation mechanics. The unique voting method in this research is the prediction market approach, used by System A, where users are given credits used for investing, like the stock market, in potential ideas. The benefit of this more elaborate approach is the participants are enforced to only vote for ideas they believe will succeed and be implemented. The problem with other voting features such as giving stars, thumbs up or other similar ways is the lack of commitment by the participants. They can distribute votes in any way they please, often on unlimited amounts of ideas, sometimes biased towards friends or coworkers ideas giving them support because of friendship, not because of the best benefit to the company.

Keeping the systems simple to their participants was also an important subject and the interviewees argued that one must be careful before adding new features into the system with the risk of making it too complex for the users. The idea submission processes seemed to matter the most with the same approach on all systems: idea title, description, and category. Some of the advanced features would be left out in order to keep systems simple for its users, perhaps too simple, e.g. leaving out key features such as evaluation in System B, due to lack of utilization by the contributors.

The last discovered problem was about bias during browsing and voting for ideas in idea management system. When participants are browsing for ideas of interest in the system there can be multiple ways of how the system displays the order of appearance among the available ideas. This problem was mentioned by only one respondent, but it could affect any of the systems. To prevent bias, managers should be careful of having features that displays the ratings of ideas before users have casted their vote, features that allow users to edit their casted vote unless an idea has been edited, or for instance features that show ideas in order of popularity.

Always displaying new ideas on the front page and the ratings of ideas before users have voted may not only cause bias, but may also increase the number of duplicates that enters an idea management system. Instead, it is recommended to hide the ratings of ideas towards users, which have not yet voted, on them, and to display ideas in more of a random fashion, that is a mix of new and old ideas.

8.2. Research contribution

In this section the scientific contribution, the contribution to businesses and organizations that use idea management systems, and the contribution that this thesis provides to the society is presented.

Before this study, there existed no extensive list regarding what features exist in idea management systems. In addition, there is limited research regarding specifically feature-related problems in idea management systems. Bailey and Horvitz (2010), highlighted some issues related to one idea management systems and provided recommendations to improve the systems. This thesis, with insights gathered from representatives of five different systems, each with their unique solution, provides further recommendations built upon the work of Bailey and Horvitz. This thesis has added to the body of knowledge in OIS research.

By knowing what types of feature-related problems exist and how to reduce the impact of these problems, it should give people that have an idea management system enough knowledge to improve
their ideation process, which may result in more good ideas, and in the end more profit. The list of features may also introduce features, which they have never heard of, that may improve their system.

People who are interested in obtaining an idea management system will acquire knowledge regarding what features are available, and the problems they may face in case they decide to implement one. However, considering they will also acquire knowledge how to avoid or reduce the impact of the existing problems, they have a good start in achieving a good ideation process when an idea management system is implemented.

A society may benefit from the knowledge they gain regarding idea management systems from this study. Since the utilization of idea management systems does not necessarily have to limit itself to businesses creating profitable innovations, it could be of use to non-profitable organizations or governmental agencies that for instance could bring in ideas or suggestions from the public on matters of improvement for the community.

8.3. Further research

In this section, suggestions for further research is described, in order to allow other researchers retrieve suggestions on where research is needed.

A possible solution to preventing duplicates that needs further research, which is out of the scope for this thesis, is to encourage users to submit their idea description as a comment to a very similar idea instead of submitting it as a new idea (Ford and Mohapatra, 2011). A suggestion for this particular solution would be that in case other users, including the idea creator believe a comment is extremely valuable to the original idea. Then the information of the comment could be merged with the idea and the creator of the comment may be added as a co-creator of the idea. This may add enough incentive for the users. However, research regarding this topic has not been found by the authors, which is why it may be suitable to study.

The authors believe it would be interesting if case studies were conducted, where the problems mentioned in this thesis are studied by comparing idea management systems which have implemented the suggested solutions against systems which have not, in order to validate the solutions.

Research that focuses on the problems regarding one of the other OIS, such as Innovation Marketplaces could be interesting. In order to see either if the results are similar, or if there are a new problems which are experienced by using innovation marketplaces.

Studying problems in idea management systems from other perspectives and not only from a functional perspective is also something that could be interesting for future research. An example of a problem which was not related to features which was found during this study, and was therefore decided to be outside the scope of this thesis, was the importance of having a transparent ideation process. That it should be open for all the idea creators to see what exactly is happening with their ideas, after they have been submitted. This requires further research, in order to find ways to improve the transparency of the ideation process of an idea management system.
References


Appendix A – Categories and Features

The features, their occurrences in the studied systems and a description are presented in the following section.

12 categories of features were found, with 66 sub-features within those categories.

Table 15: User recognition.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. User profile</td>
<td>100% (5 out of 5)</td>
</tr>
<tr>
<td>b. View the profile of another user</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>c. Badges</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>d. Leaderboard</td>
<td>60% (3 out of 5)</td>
</tr>
</tbody>
</table>

a. 100% of the systems had a user profile where, the users on the site maintains a personal profile to add details about themselves. Some control on what information is public to other users is sometimes available.

b. In 60% of the systems users could view the profile of another user, typically their ideas, comments, favorites, and recent activity

c. In 20% of the systems users on the site may receive badges which are displayed in the profiles of the users if certain requirements have been met.

d. 60% of the systems implemented a feature to display top contributors on the leaderboard.

Table 16: User communication.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Send a message</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>b. Share-idea to external networks</td>
<td>40% (2 out of 5)</td>
</tr>
</tbody>
</table>

a. 40% had a feature that enabled users to send private messages.

b. 40% of the systems were able to let users share ideas to external networks, such as LinkedIn, Facebook, Google+, Twitter, Blogs, e-mail, etc.
Table 17: Idea submission.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Write idea name/title</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>b. Description</td>
<td>100% (5 out of 5)</td>
</tr>
<tr>
<td>c. Category</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>d. Attachment</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>e. Tags</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>f. Preview before post</td>
<td>0% (0 out of 5)</td>
</tr>
</tbody>
</table>

a. 80% of the systems have a title name for their ideas that is typically shown in search or browse results.

b. 100% have a description field for the ideas.

c. 80% use some ability to assign ideas to categories.

d. 60% of the systems enable idea submitters to add an attachment to the idea submission.

e. 20% use tags to further organize ideas that the idea creator typically attach to the idea.

f. None of the surveyed systems implement functionality that enables previewing their idea submission before publishing.

Table 18: Manage content.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Report content as abuse</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>b. Search or suggests similar</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>c. Delete Idea</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>d. Edit Idea</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>e. Remove User from brainstorm</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. In 60% of the systems, System A, B, and E there is a feature where the users are able to report content as inappropriate. In the other two systems it is possible to report content as inappropriate by contacting the staff. System A allows the user to report a comment but not an idea. In System C, users can either report an idea or other brainstorm content as spam, and in System E users can report both ideas and comments.

b. In 20% there is a feature during idea submission where it automatically suggests other already existing ideas that could be potential duplicates to the idea creator in order to try minimize the amount of duplicates in the system.

c. 20% allows their idea creators to delete their own ideas.
d. In 20% of the systems the idea creator can usually edit their own ideas after they have been submitted.

e. 20% allows the creator or admin of a private brainstorm to remove another admin or user from the private brainstorm.

Table 19: Idea browsing.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Browse ideas</td>
<td>100% (5 out of 5)</td>
</tr>
<tr>
<td>b. Search ideas</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>c. Filter ideas depending on status</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>d. Tag cloud</td>
<td>0% (0 out of 5)</td>
</tr>
<tr>
<td>e. Browse Brainstorms</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>f. Search Brainstorms</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. In 100% of the systems it is possible to browse ideas. System A, C, D and E allows their users to view the most popular ideas and the newly created ideas. In System E this is not always available, it depends on what the customer wants, and the default view for the user is usually a mix of random ideas and newly created ideas. In System A and System D it is also possible for a user to view the most discussed/active ideas. System C also allows their users to sort ideas based on different campaigns and themes, while in System D, users can sort ideas based on what classification they have.
b. 80% allows their users to enter keywords in a search field in order to find ideas.
c. 20% have the ability to filter ideas depending on their status, ideas that are under evaluation, under upgrading, ideas that have been approved or archived, and ideas that are unread by the user.
d. In 20% of the systems users are able to browse brainstorms, and the users can sort them by the brainstorms which contain the most ideas, the most recent ideas and the brainstorms with most recent activity.
f. 20% allows their users to search for brainstorms by entering keywords into a search field.

Table 20: Voting.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vote on Idea</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>b. Clear vote</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>c. Vote on comment</td>
<td>40% (2 out of 5)</td>
</tr>
</tbody>
</table>

a. 80% of the systems have some sort of voting feature where users can express their opinion by voting on ideas. In System A credits are used to promote or demote an idea which in turns increases or decreases the value of the idea. A user can choose to invest all of their available credits in one single idea to influence it or spread their credits out on several; in addition to that a user can also offer to sell their investment.
In System C the users vote with 1 to 5 stars on an unlimited amount of ideas, in addition to that the users can also fill in a short survey answering questions regarding about the ideas suitability. System D has thumbs up or thumbs down for their ideas and like System C, questions are asked about the idea. In System D the users are asked to drag sliders ranking each parameter in accordance what they believe the idea fits and have to option to give comments to these evaluation parameters and attach files.

The solution of System E is not limited to one solution with several voting approaches to choose from which they described “because for different types of idea management needs, not every voting or ranking system is appropriate”.

b. In 40% of the systems users are usually allowed to clear/change their votes if an idea has been altered since their vote was submitted.

c. 40% have the functionality to vote on comments where users can express their opinions about other comments. In Exago the users vote on comments with 1 to 5 stars. System E usually uses light voting such as 1 to 3 stars, or like/dislike.

Table 21: Subscribe.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rss-feed</td>
<td>0% (0 out of 5)</td>
</tr>
<tr>
<td>Set idea as favorite</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>Subscribe</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>Subscribe to another user</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. In 0% of the systems that is none of them were the users able to follow idea updates outside the system website by using rss readers.

b. 40% allows the users to set an idea as their favorite which will allow them easier access to it in the future.

c. In 60% the Users can also subscribe to an idea or specific topics which will automatically send the users emails if anything new has occurred within the idea or topic.

d. 20% allows a user to follow another user which will send updates regarding the activity of the followed user to the user.

Table 22: Idea feedback.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Comment ideas</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>b. Comment idea with attachment</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>c. Comment another comment</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>d. Edit comment</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>e. Delete comment</td>
<td>0% (0 out of 5)</td>
</tr>
</tbody>
</table>
f. Viewer-submitted idea tags 0% (0 out of 5)

a. 80% of the systems implement the option to give feedback, as comments, on ideas.

b. 40% enable users to attach files to their comments in order to give detailed feedback to something that a simple textbox limits.

c. 40% have the ability to reply to a previous published comment and visually show the conversation between the users in a threaded format.

d. 40% enabled users to edit their published comments.

e. No systems allow users to remove their own comments from the systems.

f. No systems have the functionality for users to add their own written tags to an idea.

Table 23: Idea stats.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Idea rating</td>
<td>80% (4 out of 5)</td>
</tr>
<tr>
<td>b. View who promoted/demoted idea</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. Four out of five systems display idea ratings from participants votes. The idea ratings are typically shown as thumbs up/down, stars, or just numbers. One system had the ability to hide ratings before the participant had casted their vote.

b. 20% of the systems had a feature that revealed who had voted for the idea of the user.

Table 24: Miscellaneous.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Credits</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>b. Spend credits on rewards</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>c. Anonymous user</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>d. Related ideas</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. 20% of the systems have credits that are used to invest in ideas. This is similar to a stock market where the more credits invested in an idea further increases its value and vice versa.

b. 20% of the systems implement the functionality to spend earned credits bidding on rewards.

c. 60% of the systems have a feature which allows the users to be anonymous.
d. 20% of all the systems give the participants a suggestion of related ideas that can be copies or similarities useful for the viewers.

Table 25: Brainstorm creation.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Create Brainstorm</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>b. Question to be asked</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>c. Description</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>d. Add sample ideas</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>e. Upload attachments</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>f. Invite brainstormers</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. 20% allows users to create brainstorms, which can either be open or private which is invite-only, where users can submit their own ideas

b. In 20% a user can choose when creating a brainstorm, which question is to be asked to the other users which they should try to answer.

c. 20% let the user add a description with further details of the brainstorm.

d. In 20% the user can to add up to two idea samples that are supposed to give the participants a clue of what kinds of ideas you are after.

e. 20% allows the user to upload attachments such as a video or a picture when creating the brainstorm.

f. In 20% of the systems a user can invite other users to the brainstorm. If it is an open then any user can invite anyone to the brainstorm, if it is private then only the ones that are allowed to participate in the brainstorm can invite other users.
Table 26: Back-end & Administrator options.

<table>
<thead>
<tr>
<th>Features</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Idea template / Customizable fields for idea creation</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>b. Statistics for activity</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>c. Follow up ideas</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>d. Customize evaluation template</td>
<td>60% (3 out of 5)</td>
</tr>
<tr>
<td>e. Assign tasks</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>f. Create challenge</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>g. Comment summary</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>h. Idea stages/phases</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>i. Merge Idea</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>j. Split Idea</td>
<td>20% (1 out of 5)</td>
</tr>
<tr>
<td>k. Roles</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>l. Delete user content</td>
<td>100% (5 out of 5)</td>
</tr>
<tr>
<td>m. Idea submissions are reviewed</td>
<td>40% (2 out of 5)</td>
</tr>
<tr>
<td>n. Vote on comment</td>
<td>20% (1 out of 5)</td>
</tr>
</tbody>
</table>

a. 60% of the systems implement ways to configure the idea submissions template, where one company has up to 30 fields to customize for the administrator.

b. 40% enable administrators to export their users activity statistics to analyze. Typically this can be number of ideas, comments and logins made to track participation for management.

c. 40% of the systems have the ability to show individual progress and status for the current ideas for administrators and managers to follow up.

d. 60% enable administrators to customize templates for idea evaluation with their own tailored questions.

e. 20% of the systems implement a functionality that involves assigning tasks to specific users which can be to evaluate or read a specific idea.

f. 20% of the systems have a feature that allows administrators to create separate challenges that revolve around some specific topic to submit ideas into with a specific start and closing date.

g. 20% of the systems can have administrators create summaries from previous comments to show some of the important feedback that have been submitted previously and to carry over good comments into next stages of idea development.

h. 20% of the systems have divided the idea management into phases where idea managers are also responsible for moving ideas in and out of each phase of idea process.

i. 20% have a feature that enable administrators to merge ideas that are similar.
j. 20% of the systems can split ideas when there is one idea submission with enough information to contain two ideas.

k. 40% of the investigated systems have functionality implemented to let users assume different roles and responsibility to perform role-specific tasks. Typically there are regular users, administrators or moderators.

l. In 100% of the systems, administrators can delete user content such as ideas and comments.

m. In 40% of the systems idea submissions are reviewed and validated before they are posted to the website.

n. 20% allow their administrators to rate comments.