Open Innovation Software

On Aspects of Functionality and Creativity

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Abstract

This thesis presents how and if open innovation software (OIS) supports different types of creativity. The relevant theories and information on how an OIS is designed and, the relevant theories of creativity are used for making a model to test on different OIS.

The result shows that most OIS functionality supported the structuralist and situationalist school of creativity but it also shows that the inspirationalist school was poorly supported in the current functionality. With the result we discuss the implications of supporting all types of creativity to support the most of the users and in the end enable more innovations.

Summary in Swedish

Denna avhandling beskriver hur och om open innovation software (OIS) stödjer olika typer av kreativitet. Relevanta teorier och information om hur ett OIS var utformad och använder relevanta teorier om kreativitet för att kunna göra en modell att testa på olika OIS.

Resultatet visade att merparten av de testade OIS funktionalitet hjälpte den strukturalistiska och situationalistiska skolan för kreativitet, men resultatet indikerar också att inspirationalist skolan har dåligt stöd. Med resultaten diskuterar vi innebörden av att stödja alla typer av kreativitet för att få det mesta av användarna och i slutändan möjliggöra mer innovationer.
Acknowledgements

First of all I would like to thank Jenny Eriksson Lundström at Uppsala University. You gave excellent supervising and guidance that helped me a lot in the process. I would also like to thank all people that made this thesis possible. I would like to thank my classmates in our group for the good discussions and feedback you gave.

Keywords

Open Innovation (OI), Open Innovation Software (OIS), Functionality, Creativity
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1 Introduction

Innovation can be seen as a successful way to commercially implement new ideas through scientific, technological, organizational, financial, and business activities that lead to a new or improved product or service (Chesbrough, 2003). To meet today’s constant change in the world it’s very important for companies to handle innovation in a central way to maintain and advance their businesses (ibid). Open innovation is a way to handle this new knowledge landscape and create new business opportunities by being open to external sources of ideas and external paths to the market (Chesbrough, 2003; Chesbrough, Vanhaverbeke, & West, 2006).

Innovation uses technology to improve speed and efficiency in new ways (Dodgson, Gann, & Salter, 2008). They call this technology ‘innovation technology’ as it is a way to bring together users and scientific researchers in decisions about new products and services. That doesn’t mean that this technology supports open innovation practices and therefore Hrastinski, Kviselius, Ozan & Edenius (2010) defines a new term called open innovation software (OIS) that is concentrated to the open innovation area. In their analysis they indentified the basic kinds of OIS, idea management software, problem solving software, innovation marketplace and innovation analysis software. Sternberg (1999) summarizes a lot of theories about creativity and comes up with conclusion that it is the ability to produce a product that is novel and useful to both the individual and the social group. Creativity is a big part of innovation but how does these OIS support the different approaches of creativity?

1.1 Problem background

Open innovation means that valuable ideas can come from both inside and outside the firm and that you can reach the market from inside or outside the company (Chesbrough, Vanhaverbeke, & West, 2006). OIS technology is one of the key parts that enable the support of open innovation (Hrastinski, Kviselius, Ozan, & Edenius, 2010). Many researcher have come to the conclusion that creativity is to create something useful and novel (Sternberg, 1999). Shneiderman (2007) summarizes a lot of work in the field of creativity and came up with three intersecting schools that sort the different origins of creativity and how it can be stimulated. Creativity is the very heart of innovation and that it has been found to be a precursor of an organizations survival and effectiveness (Hrastinski et al., 2010) Creativity is important for innovation so how does today’s OIS support these different schools of creativity?

1.2 Aim

Explore different OIS and see how and if they support the three schools of creativity?
1.3 Delimitations

The following delimitations will be acknowledged:

- Only choose OIS according to Hrastinski, Kviselius, Ozan and Edenius (2010) classification.
- Only OIS that can be tested online by us.
- Focus on functionality that is integrated in the OIS.
- For our analysis we will use only theories based on the creativity schools by Shneiderman (2007).

1.4 Disposition

In the following chapter we are going to discuss the methodology we going to apply on this thesis. In the third chapter we review previous literature about open innovation and closed innovation then in chapter 4 we review the literature about creativity. In chapter 5 we investigate the OIS functionality in three categories: Idea management software, Problem solving software and Innovation marketplace to see how and if it supports the structuralist, inspirationalist and situationalist school of creativity. In chapter 6 we analyze our findings from the OIS. Finally we conclude this thesis.
2 Methodology

In this chapter we present the how we will approach this study. This chapter is based on Oates (2006).

2.1 Positivist research

Every research has some underlying philosophical paradigm but what is it? You can say that it’s how we view the nature of our world and how we can acquire knowledge about it.

The oldest and most recognized paradigm is positivism. It’s called the scientific method because that’s the approach to research in the natural sciences. It is 400 to 500 years old and is the most accepted method for research.

It is based on two basic assumptions according to Oates:

- Our world is ordered and regular, not random.
- We can investigate it objectively

The aim with the scientific method and positivism is to find the universal laws, patterns and regularities and prove or disapprove it with a hypothesis. These basic assumptions and aim fits our goal with this thesis. First we will base our view of universal laws, patterns and regularities on theories of creativity and open innovation software. Second we will investigate a selection of OIS to see how they support creativity. Third we will look at the result from each OIS to investigate if there is any pattern of interest. Last we will come to a conclusion on how the OIS supported creativity.

This technique is called reductionism where you breaking down complex thing into smaller parts that are more easily studied.

The positivist paradigm shared world view according to Oates is as follows:

*The world exists independently of humans:* the world can be studied, captured and measured.

*Measurement and modeling:* Discover this world by doing observations and measurements and produce models of how it works.

*Objectivity:* Be an impartial observer.

*Hypothesis testing:* Based on empirical testing of theories and hypotheses.

*Quantitative data analysis:* Mathematics is often used to for modeling and proofs and statistical analysis.

*Universal laws:* Look for generalizations.
2.2 Case study as research strategy

As described in the introduction we’re going to conduct a study of a selection of OIS to see how they support the schools of creativity. Oates describes a strategy called case study which seem to fit our properties to this project. The characteristics Oates describes is:

*Focus on depth rather than breadth*: We are going to focus on the details about OIS functionality and how they support creativity fits our approach.

*Natural setting*: This characteristic also fits our approach as we going to examine each case as they are and as they may be used right now. Our purpose is to disturb the setting as little as possible.

*Holistic study*: Oates describes this as that the researcher focuses on the complexity of relationships and processes. We are going to focus on relationship between OIS functionality and creativity.

*Multiple sources and methods*: Our data sources will be previous literature and observations of OIS. The data will mostly be qualitative and the result will be analyzed for patterns.

The definition of a case study according to Yin (2003):

*A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are clearly evident.*

This definition and the characteristics of a case study suit our preferences of what research we are going to apply and for that reason we use this strategy.

2.2.1 Planning a case study

The three basic types of case studies according to Yin (2003) are exploratory, descriptive and explanatory. The one that we’re going to conduct in our research is an explanatory. It’s described in (Oates, 2006):

*An explanatory goes further than a descriptive study in trying to explain why events happened as they did or particular outcomes occurred. The case study analysis seeks to identify the multiple, often inter-linked, factors that had an effect, or compares what was found in the case to theories from the literature in to see whether on theory matches the case better than others.*

In our case study about OIS in how and if they support the three creativity schools we will use a multiple case study in which we will investigate the phenomenon of OIS and creativity from several software’s. Each case is analyzed based on what happens in the present time and is conducted under a short period.
Our intention with the case studies is to find data that will enable some generalization. It’s called generalization because it’s supposed to give a broader conclusion that is broader than the case itself. There are four different types of generalizations and the one we going to apply is the *rich insight* because we want to give new important information on how OIS supports the existing theory of the creativity schools.

### 2.3 Judging the quality

There are four criteria that judge the quality of a positivist research (ibid) and which were going to attain to. They are as follows: Objectivity, reliability, internal validity and external validity.

*Objectivity:* Be free of biases and distortions to the research.

*Reliability:* Have natural research instruments that are accurate and reliable.

*Internal validity:* Research the right things or collect the right data from the right source.

*External validity:* Have findings that are generalizable.
3 Open Innovation

Innovation is an important issue for business in order to sustain their competitive advantage and they must innovate to survive (Chesbrough, 2006). The research of innovation developed and a new concept of innovation evolved. This new concept of innovation is called the open innovation paradigm (ibid).

*Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.* (Chesbrough, Vanhaverbeke, & West, 2006)

The open innovation paradigm can be explained as a research project can start from either external or internal technology base and new technology can be implemented at any order in the process. Projects can also reach the market in more ways than only the traditional closed innovation process. This model to approach innovation is open because those projects can get ideas from many more directions and that projects can reach the market in more ways (Chesbrough et al. 2006). Figure 1 visualizes this paradigm.

![Figure 1 An Open Innovation paradigm (Source: Chesbrough et al. 2006)](image)

The general principles for approaching open innovation are according to Chesbrough (2003):

- Not all the smart people work for us. We need to work with smart people inside and outside our company.
• External (R&D) can create significant value; internal research and development is needed to claim some portion of that value.
• We don’t have to originate the research to profit from it.
• Building a better business model is better than getting to market first.
• If we make the best use of internal and external ideas, we will win.
• We should profit from others’ use of our intellectual property (IP), and we should buy others IP whenever it advances our own business model.

Technology supports this new approach of innovation and Hrastinski, Kviselius, Ozan, & Edenius (2010) classified software that supports the open innovation paradigm. They call it OIS and that area we going to explore in the following chapter.

3.1 Open innovation software (OIS)

As the organizations evolve and start to use open innovation processes they need software to support the relation between internal and external ideas. The technology to support this process is often based on a web interface and called open innovation software (ibid). Hrastinski, Kviselius, Ozan, & Edenius (2010) classified 51 systems that support open innovation processes.

In their research they were able to identify 43 features from 51 systems and divided them into seven main characteristics. The functionalities found by (Hrastinski, Kviselius, Ozan, & Edenius, 2010) are as follows: idea submission, problem submission, problem solving and analysis, evaluation, collaboration, expert directory and marketplace.

The first functionality they discovered were idea submission, a simple way to let employees and customers to submit their ideas to the organization.

The second functionality is problem submission were organizations can upload their problem and ask for help. Then individuals are allowed to understand the problem and come with solutions.

The third were problem solving and analysis. The functionality has focus on letting users solve problems and advance ideas. Some of the techniques found to help this process where the know method theory of inventive problem solving (TRIZ) or mind mapping.

The fourth functionality was evaluation. The functionality lets users or business rate the quality of ideas and solutions. With help of a vote function and comment users can help organization to understand what ideas or solutions are most possible to be good. Another way can be that only the organization evaluate and not the users.

The fifth functionality was collaboration. Collaboration lets users share their ideas and solutions and communicate with each other by help of a voting function or a discussion board. This functionality is widely used.
The sixth functionality they discovered is an *expert directory* in some systems. The functionality in that kind of system is based on that you have certain experts in different areas that speed up the problem solving process. Reward and recognition from the community is something that keeps the experts active.

The seventh and last characteristic that is described is the *marketplace*. It can be described as a way to connect solutions seekers with innovators in either an open way or a confidential way. The open marketplace is often used by organizations that are non-profit or by academic institution and the confidential marketplace is used by organizations that value secrecy.

Hrastinski, Kviselius, Ozan & Edenius (2010) discovered correlations between the characteristics and divide them it into four basic kinds of OIS (See table 1).

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea management software</td>
<td>Lets users suggest, evaluate and discuss ideas openly or within predefined categories.</td>
</tr>
<tr>
<td>Problem solving software</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 incentive.</td>
</tr>
<tr>
<td>Innovation analysis software</td>
<td>Provides sophisticated tools for evaluating and analyzing the quality and potential of ideas and solutions.</td>
</tr>
</tbody>
</table>

Table 1 Four types of open innovation software (Source: Hrastinski et al. 2010)

OIS is the technology that enables organizations to use open innovation practices and Hrastinski, Kviselius, Ozan & Edenius (2010) state that creativity is a big part of innovation. In the next chapter we going to explore the research of creativity to understand how OIS functionality and creativity are connected.
4 Creativity

Functionality in OIS that stimulates creative solutions and ideas is something that should be considered to improve the process of innovation. To understand what creativity really is and how it works we have to explore that phenomenon.

4.1 50 years of creativity

In the Handbook of Creativity (Sternberg, 1999) Richard E. Mayer summarizes the chapters and the findings of creativity research for the last 50 years. It contains a lot of different views which can be seen as confusing but he manages to summarize the research and give some directions about creativity while he also emphasized the need of further study.

Mayer sums up several authors’ definitions about creativity and found that most of them support originality and usefulness. What they mean by their definition is that creativity is the ability to produce a product that is novel and useful to both the individual and the social group. From this basic definition Mayer concludes that there is much diversity in the underlying reasons for creativity. Mayer explains five different dimensions of creativity based on the findings:

First view is whether creativity is a property of people, products or cognitive processes. Mayer’s (Sternberg, 1999) considerations are that creative people are those who create new and useful products and the creative processes happen when these products are created by creative people.

The second view that Mayer found is whether creativity is a personal or social phenomenon. In this there exist two perspectives. In the individual view, creativity means that you produce something novel and useful with respect to the person doing the creating. Or in the social view, the creativity means that you produce something novel and useful to the social or cultural domain.

Mayer’s third view from the findings is whether creativity is common or rare. The common view means that every human is capable of being creative and they study the cognitive processes that normal people use when solving a problem that needs creativity. Some researchers mean that creativity is rare and it only exists in a few individuals and instead focus on the characteristics and what basic conditions are specific for the creativity.

The fourth view Mayer describe is whether creativity is domain-general or domain-specific. With general they mean that creativity is like a skill or characteristic and that it can be used in many different situations. According to the domain-specific view is that there are different creativity abilities that are used in various domains like painting or scientific discovery.

The fifth view Mayer describe based on the findings is whether creativity is quantitative or qualitative. The quantitative view means that creativity has different factors in individuals and differs in amount between them. The qualitative view means that creativity always comes in unique ways to the person in the creative moment.
With these different views you can see that there is a lot of diversity behind the origins of creativity but all the different views agree that it occurs when someone creates an original and useful product. These views explain how the users can be creative but doesn’t explain the tools or technology to support it. To understand how creativity can be supported by functionality we going investigate Shneidermans (2007) paper that present tools to support creativity.

4.2 The schools of creativity

The area of creativity is relatively large and (Shneiderman, 2007) summarize these dimensions even further and points out that there are three major intersecting schools that sort out a large wide of literature about creativity.

First Shneiderman explains the school of structuralists that believe that everybody can be creative as long as they follow a certain method. By following several stages you know what has to be done to reach the goal. The stages can be described such as preparation, incubation, illumination and verification. Self-help books, organizational creativity consultants and systematic discovery methods are examples of generic methods of this school.

Second Shneiderman explains the inspirationalist school that on the other hand argue that you should breakaway from familiar structures to find creative solutions through help of meditation, dreaming and playful exploration. Examples of tools to support this kind of activity is sketching, concept mapping and visualization to see the big picture fast, find relationships and explore possibilities.

Third Shneiderman explains is the situationalist school that views creativity as a part of social activities. They try to understand how reward and recognition supports creativity and also how competition versus collaboration stimulates creativity.

These views and schools state the diversity of creativity has and Shneiderman argue that when designing a creativity support tool you have to consider these three schools to create a tool that stimulates creativity to all kind of individuals. For example a tool supports the structuralist view you have a progress bar that show what has been done and what are still needed. Inspirationalist view you need tools that support sketching, image libraries and so on. In the situationalist view you need to consider the social part of creativity so that it supports collaboration in different ways.

4.3 Principles

Shneiderman (2007) concludes some basic principles of what is needed to design a proper creativity tool that helps discovery and innovation.

First principle it’s that the tool should support exploratory search. With support of exploratory search Shneiderman (2007) argue that to be the successful with discovery and innovation you
have access to previous and related work. With improved search mechanisms like ranking, clustering and partitioning with options to able to tag and mark, also be able to collaborate your result with others and keep history of what been done to keep track.

The second principle Shneiderman (2007) presents is that you should enable collaboration. He means that collaboration is an important process that often is the key part of innovation and discovery. In the early stages have safe communications were you can ventilate problem definitions and goals without being ripped-off or rejected. Document who said what and ideas that in the future could emerge to newer ideas. In middle stages you support trust, accurate records of what have been done and that you can safe exchange idea refinements and knowledge. In last stages it should provide the right test panel and media partners to validate the work.

Third principle Shneiderman (2007) means that a creativity support tool should provide rich history-keeping. To have a systematic approach to innovation and discovery seems to be beneficial rather than just doing it. With a rich history both if the individuals where a free-thinker or structured there is always good to be able to go back and see what have been done and what result it had and in this way you could try different ways.

The last principle Shneiderman (2007) discuss is that the tool should be built with low threshold, high ceilings and wide walls. With that he tries to say that you should make the creativity support tool to suit all levels of expertise users. Not too advanced for new users but also support functionality that experts need.

4.3 Enhance creativity

Nickerson in (Sternberg, 1999) discusses whether creativity can be enhanced and if so, how it can be done. Nickerson shows that there is evidence that proves that creativity can be enhanced and give twelve suggestions how it can be done.

- Establishing purpose and intention
- Building basic skills
- Encouraging acquisition of domain-specific knowledge
- Stimulating and rewarding curiosity and exploration
- Building motivation and especially internal motivation
- Encouraging confidence and a willingness to take risks
- Focusing on mastery and self-competition
- Promoting supportable beliefs about creativity
- Providing opportunities for choice and discovery
- Developing self-management (metacognitive) skills
- Teaching techniques and strategies for facilitating creative performance
- Providing balance
Nickerson says that these all directions not support creative thinking to the same amount, but to support the different ways creativity shows itself, these instructions will be involved to some extent.

Now we know what open innovation is and that open innovation software enables it for the organizations and how creativity can be supported. In the following chapter we will choose a selection of OIS and develop a model to test how and if they support the schools of creativity.
5 OIS and creativity

Here we make a case on each website, and then we connect the OIS functionality to the schools of creativity.

5.1 Open innovation software to analyze

Each selected system that are going to be analyzed are chosen to match Hrastinski, Kviselius, Ozan & Edenius (2010) classification in how an OIS should be and what type they belong to (see table 1). In each group every system is powered by a different source engine. Group 4 will not be analyzed because it’s more a stand-alone software that focuses on the quality and potential of ideas and solutions that’s already been submitted.

<table>
<thead>
<tr>
<th>Type</th>
<th>System to analyze</th>
</tr>
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<tbody>
<tr>
<td>Group 1</td>
<td></td>
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<tr>
<td>Group 2</td>
<td></td>
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<tr>
<td>Group 3</td>
<td></td>
</tr>
<tr>
<td>Innovation analysis software</td>
<td></td>
</tr>
<tr>
<td>Group 4</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 OIS systems to analyze.

5.1.1 OIS model

The model for analysis that will be used on each OIS:

The OIS name
A brief description and a picture of the actual OIS.
Functionality
Here will tested functionality be listed.

The structuralist view of creativity
Here we will discuss and connect the functionality to the structuralist school of creativity.

The inspirationalist view of creativity
Here we will discuss and connect the functionality to the inspirationalist school of creativity.

The situationalist view of creativity
Here we will discuss and connect the functionality to the situationalist school of creativity.

Analysis

5.2 Idea management software
An idea management system lets users suggest, evaluate and discuss ideas openly or within predefined categories (see table 1).

5.2.1 My Starbucks Idea
My Starbucks Idea is created to collect the user’s ideas, both big and small and eventually put them into work. As they on their My Starbucks Idea webpage: “Together, we will shape the future of Starbucks.”
Functionality

- Got an idea: If you are a registered member you can submit your ideas with help of a two text field. First write your idea title and the system searches for similar ideas, and then a description to your idea and you can choose what kind of category it belongs to.
  - What ideas are chosen: Your idea can be chosen either if it’s on the popular ideas list or by a Starbucks Idea Partner (A Starbucks employee with expertise level in some area).
  - If your idea is chosen: You will not be compensated but you may get credit on the site.

- View ideas: Here you choose from four different categories which ideas you want to watch.
  - Popular ideas: A ranking system that uses an algorithm that is based on how many points, number of comments and recentness the ideas have.
  - Recent ideas: The most recent ideas first.
  - Top all-time: A ranking system that only takes the top ideas based on points.
  - Comments: The ideas with the most comments are highest rated.

- Ideas in action: Here you can watch the ideas that have been selected for further development and watch their status. There are four different statuses: Under review, reviewed, coming soon and launched.
- Voting: Once a registered member you can vote on an idea you like or dislike. A vote gives either ten points up or down and you can only do it once per idea.
- Commenting: As a registered member you can also comment each idea with your own opinion.

*The structuralist school of creativity*

Yes, you can submit your ideas and through some stages. First you can prepare the idea before you submit and then the other users can interact with your idea. When users vote and comment you get verification if the idea is good or bad.

*The inspirationalist school of creativity*

Partly, you don’t get any chance to playful exploration. The function you can use is a textbox where you can write text or make lists. You can however search and read others ideas to get in a creative mind-set.

*The situationalist school of creativity*

Yes, support for collaboration through commenting and voting on other users ideas. You can get recognition by other user by being chosen to the ideas in action part.

*Analysis*

Two of three schools are supported by My Starbucks Idea. You can submit your idea through some systematic steps. By being clear and structured on how the users submit and go through with their ideas they reach the creative users that need an ordered path to be creative. The situationalist view that means that creative work is social is also supported by being able to communicate with other users through votes and comments to give both feedback and credit for an idea. That kind of functionality on My Starbucks Idea will stimulate the users that need the social stimulus to be creative. The school that isn’t supported to its full potential is the inspirationalist view. The tool that is supported to is very basic and doesn’t give much to explore and play around with. Instead some tools like having their menu online and being able to combine or edit some of the coffee drinks in a free and playful way would give support the users that need that kind of stimuli to make those creative ideas.

*5.2.2 Adobe Labs Ideas*

Adobe Labs Ideas is a place where users can submit, vote and comment ideas that concern Adobe technologies. They want the users to help Adobe to improve their technologies after your needs.
Figure 3 Adobe Labs Ideas, 2010-04-27

**Functionality**

- Post idea: To suggest a new idea you first choose the technology you want to improve. Title and a description and what category it belongs to are required but you also have the possibilities to upload an attachment and list tags to your submission.
- View ideas: Here you have three categories to choose between.
  - My favorites: Here you can watch those ideas you have selected.
  - Recent ideas: Here you see the most recent idea on top.
  - Most popular ideas: The most popular ideas on top.
- Functions in view ideas:
  - Vote: You have options to promote or demote an idea and also see how many votes an idea has.
  - Favorite: Add it to your favorites and
  - Tweet this: Add the idea to your Twitter.
- Status: See the actual status on the idea: Pending, under review, adopted, currently in product and not adopted.
- Subscribe: You can subscribe on a topic or category to always know when it’s updated.
- Comment: You have the ability to respond to a user’s idea with text and with the option to attach a file.
- My network: Add other users to your “network”.

The structuralist school of creativity

Yes, you have structured way to post ideas and respond to others ideas. You can prepare your idea and preview it before you post it. It’s structured to help the user to know with fields that are required.

The inspirationalist school of creativity

Partly, you don’t have any functionality to support the inspirationalist school. You are able to submit an attachment to your idea or comment but have restricted upload size. It requires that you have the proper software on your computer and doesn’t assure that the other users can take part of your attachment. You can search and read others ideas to get in a creative mind-set.

The situationalist school of creativity

Yes, you have a lot of functionality that supports the social part. Commenting, voting and also the possibility to message a user in Adobe Labs Idea promotes collaboration. The possibility to add the idea to your Twitter account for recognition or make other users interested in the idea. You can also add users to your network with friends or colleagues.

Analysis

The Adobe Labs Idea supports two of three schools defined by Shneiderman (2007). The support for the social view of creativity is very good. You have the ability to collaborate with other users in many different ways. Twitter, comments, messaging and voting all support the users that need the social context in their creativity. Adobe Labs Idea lacks the functionality to support the inspirationalist school fully with tools like being able to playful with the ideas or the technologies. The structuralist views that encourage systematic tools are partly supported. You well defined sections were you submit, comment voting and other functions are structured easy and helps the people that need this kind of method to be creative.

5.2.3 Justin.tv Feature Suggestions
Justin.tv is a service that allows users to stream live video and share it around the world. The feature suggestions section is their official feedback forum that lets users suggest or recommend ideas to Justin.tv.

![Figure 4 Justin.tv Feature Suggestions, 2010-04-28](image)

**Functionality**

- **Votes:** You only have ten votes to start with. You need these votes to suggest or when to vote on an idea. On each idea or suggestion you can choose to use one to three votes depending on how much you like it. You are only able to get these votes back when an idea is completed or deleted or you change your vote on an earlier idea.

- **Suggest idea:** At the top you can start to write your idea while the system live search for matching ideas. If it finds ideas that match then you can vote on that idea or you can choose to create a new idea.
  - **New idea:** A registered user can then suggest a new idea. First it needs a title, then you can choose to write a description and at last you choose how many votes you like to spend on your idea.

- **View ideas:** You can search for an idea or you can choose from the pre-defined categories. When you first se an idea you see how many votes and comments that idea has so you choose directly to vote on that idea or you can click on it and enter the ideas page. Here you can see
all the comments and supporters that the idea has. You can also see how many average votes the idea has.

- Comment: A text field where you post your comment to the idea.
- Share: You can choose to share the idea on your Twitter and Facebook.
- Status: You can see the status from the employees on what is happening with that idea. Under review, planned, started and completed.

*The structuralist school of creativity*

Yes, you have some structure in their ways to suggest idea and comment. You know what have to be implemented and what field that needs to be done. Basic input when you respond to an idea and when you suggest an idea and the systematic tool to take you where you need to go.

*The inspirationalist school of creativity*

Partly, support for the inspirationalist school of creativity. Only text is supported for being able to comment and suggest an idea. You can read others ideas to come into a creative mind-set.

*The situationalist school of creativity*

Yes, the situationalist school got a lot of support. Tools like commenting and voting on ideas promotes social activities between the users. You also have the ability to display your or an idea you like on your Twitter and Facebook account for even further recognition. The voting system also upholds ideas to be more unique because a user only can give a vote one to three points. It gives the user that made the idea rewarded with getting high points but also get many votes.

*Analysis*

Justin.tv Feature Suggestions supports two of three creativity schools. Being able to suggest and evaluate ideas more openly. It’s supporting systematic tools for suggest an idea but also searching but could be improved in ways to search for ideas more general with of categories or keyword to make clearer for the user. The support for the creative user that wants the stimuli of being able to playful come up with ideas lacks that opportunity. The social tools are well developed with the ability to evaluate the ideas between the users and being able to be recognized by other users when your idea has been deployed on Justin.tv. You also have the ability to easy promote your or others ideas that you feel for.

**5.3 Problem solving software**

A problem solving software provides opportunities for defining a problem and then being able to suggest, evaluate and discussing solutions (see table 1).

**5.3.1 Dell IdeaStorm Storm Sessions**
Dell IdeaStorm is idea management software and Storm Sessions is another part that lets Dell present a specific topic or problem where the users can give solutions. While the session is active you can post, vote and comment ideas. When the time is up Dell closes the session and review the feedback and they share what will happen to your idea.

Figure 5 Dell IdeaStorm Storm Sessions, 2010-05-04

**Functionality**

- Sessions: First of all you can see if there are any active storm sessions, then you can choose which sessions you like to join. Before you join you can see how many ideas that have responded to each session, if it’s active and how long until the session end. If a storm session has ended you can only read the previous solutions to their issue.
  
  o Join this session: When you join a session you can read the matter and the ideas submitted. You can choose to post your own idea to the problem and also comment and vote on the others ideas.
- Post your idea: Need a title and editorial summary. Here you have some options to edit your text, insert image and link. You also have the choice to choose to publish your idea directly to Facebook.
- Comment: When commenting an idea you have almost the same options as when you posting.
- Vote: You can vote on an idea and give 10 points up or down.

The structuralist school of creativity

Yes, there is a very orderly way to implement a suggestion. You can preview before you submit and you will also be updated when you write your description if there are any similar ideas. You get verification form status and comments on what is happening to your idea.

The inspirationalist school of creativity

Partly, you don’t have the ability to share in quickly concept way within the system. You are able to attach images and link within the suggestion or comment so you can visualize your concept but then you must have software to edit. You can search others solutions and ideas to come to a creative mind-set.

The situationalist school of creativity

Yes, you have support of collaboration and recognition to those who need the social context in their creative moment. Collaboration are supported through being able to vote and comment on other ideas and through joining these storm sessions to come up with a good solution or idea.

Analysis

Dell IdeaStorm Storm Session supports two of three creativity schools. Structure and social stimuli for creativity is supported but lacks tools to be playful. You have the ability to upload picture and so on but not directly play around with tools like sketching or mind maps.

5.3.2 Ubuntu Brainstorm

Ubuntu brainstorm is a place where users can suggest an idea or a solution to an existing idea regarding Ubuntu. Then the users have the option to promote or demote an idea so if it’s a popular subject it can be implemented in Ubuntu.
Functionality

- **View ideas:** When you login you enter the popular ideas category which is the area where all approved ideas land. Here you can vote and submit solutions to existing ideas. The list is first the ideas and then you can see the solutions submitted and the according votes towards it.
  - **Vote:** You can vote on a solution with three options: promote, demote or you vote blank. You can see how many votes and a bar that shows graphic over the votes.
  - **Propose and comment a solution:** If you want to propose a solution to the subject you can do that by enter the thread. Here you can see the solutions and the comments around the topic. Propose a solution needs a title and a description then you can submit it’s nearly the same with comment.
  - **Blueprint:** You have the option to upload a blueprint. A blueprint is a document that describes the feature and how to implement it. You can refer to an earlier blueprint found in the Ubuntu blueprint page or you can make your own.
  - **Submit your idea:** First you have to create an idea rationale. Describe the problem and why you are proposing it. Select category, related project and tag the idea. Then you can submit your solution to that problem, with title and description. You can also attach an Ubuntuforums.org thread or submit a blueprint. After you submitted the idea goes to the idea sandbox where the Ubuntu developers will decide if it gets approved.
• Ideas in development: Here you can see which problems and solutions that are selected for further development their comments about it.
• Implemented ideas: Here you can see which ideas that have been implemented.

The structuralist school of creativity
Yes, you have structured ways to submit your idea. It’s based on three steps that take you through the process before you can submit. When to propose a solution to a problem you simply press propose your solution and you get the text field.

The inspirationalist school of creativity
Partly, you don’t have any tool for playful exploration. You can attach blueprints and links to a forum but then you must have those programs on your computer. You can search others solutions and ideas to come to a creative mind-set.

The situationalist school of creativity
Yes, you have the tools for discussing the ideas with comments and votes. Recognition is able by being selected to ideas in development. It can be with a good problem or with a good solution.

Summary
Ubuntu brainstorm supports two of three schools of creativity. They have the structured ways of submitting and also some support of the social part of creativity. The standard commenting and voting could maybe be wider supported with being to link to your Facebook account or Twitter to spread the word out. They have the classic way of submitting but it’s hard to implement pictures and other visual parts to the idea or problem. With better support of the visual and playful exploration you could support the inspirationalist more.

5.3.3 Connect + Develop, P&G’s Needs
Procter & Gamble (P&G) is a big multinational corporation that manufactures a lot of consumer goods. Brands like Gillette, Oral-B and Wella is part of P&G. The Connect + Develop are their version of open innovation. The section P&G’s Needs is a place where users can submit a solution to their needs.
Figure 7 Connect + Develop, P&G’s Needs, 2010-05-06

**Functionality**

- **Browse P&G’s needs**: When you enter the section you get a long list with needs. You can search for a term, title and description. You can sort the ideas after title, created, description and innovation categories.
  - **Need detail**: In this section you find the title, types, categories, description, file and when created.
  - **In the file section** you can find a document with the specifications of the need.
- **Submit your innovation**: If you feel you have an innovation to submit you have to fill in a formulary. Title, category, description and the option to attach files. There also a part that is about the intellectual property status of the innovation.

*The structuralist school of creativity*
Yes, there is a structure for what is needed to submit an innovation and where to go if you need further information. The needs are also structured so you can sort them in how you want them.

_The inspirationalist school of creativity_

No, there aren’t any tools to playful exploration more than being able to download a document and submit a text and attach a document.

_The situationalist school of creativity_

No, there isn’t any support for collaboration between users, the only collaboration will then be if your innovation is accepted and they offer a partnership. That’s also the reward if you have a good innovation, a partnership that could generate money.

_Analysis_

P&G’s Needs supports one of three schools of creativity. They have a very simple system. They give you the option to submit your innovation with text or an attachment but the support of functionality for collaboration and playful tools are missing. If they want to stimulate the creativity they should develop support for the social minds but also the playful minds.

5.4 Innovation Marketplace

Innovation Marketplaces is where organizations submit their problems to a special marketplace for innovators. Then the users can submit a solution be rewarded and recognized in different ways (see table 1).

5.4.1 InnoCentive

InnoCentive is an open innovation marketplace where organizations can post their challenges and offer financial awards to the registered users that have the best solution.
Functionality

- Challenges: There are four kinds of challenges that solvers can attend to.
  - Ideation: A wide question to get new ideas, example brainstorming or market survey.
  - Theoretical: It has detailed solution requirements that the users must fulfill.
  - RTP (Reduction to Practice): Has the same high level of detail as the Theoretical but it also requires the solver to submit original data or a physical sample.
  - eRFP: Allow organizations to submit requests for a partner, supplier or expertise to solve a business challenge.

- Disciplines: You can choose your area of interest or expertise with help of filters.

- View challenge: In the overview of the challenges you can read the title, description, tags, when it’s posted, the deadline, how much the award is and how many solvers.

- Project room: When agree to join a challenge you get your own secure and confidential project room. Here you get the details for the challenge, you can submit your proposal, ask questions to the InnoCentive team.
  - Messages: Here you can write text to InnoCentive team.
Submit solution: First you download a solution template and follow it. Then you can attach files that go with your solution.

Winning solvers: Here you can watch the most recent winning solvers.

The structuralist school of creativity

Yes, you have structured ways to find what area you want to assign to. When you want to submit a solution you get your project room where you can submit question and solutions. In the description you get information on what is required. You also have a certain template that you have to follow before you submit.

The inspirationalist school of creativity

No, you don’t have any tools for playful exploration. You read the description and what I needed but you can attach files with the solution but that requires that you have the proper software on your computer.

The situationalist school of creativity

Partly, you have not much support of collaboration between the users. You have your own project room where you can ask confidential questions to the InnoCentive team. There is a function that let you solve challenges in teams but then the organization must allow it. Reward is that you can get from $5000 to $1,000,000 for you solution and be recognized by the other users as a winning solution.

Analysis

The InnoCentive supports one of three schools of creativity. They are one of the first open innovation marketplaces where they connect organizations with users that want to solve their challenges. It is structured easy to find what challenges there are and what are needed to submit a solution. It hasn’t any easy tools to use for supporting the situationalist view of creativity. They have launched a new function that allow teams to collaborate on solving a challenge but the most of the challenges where only supported to be solved by one user. The reward is higher valued than the social part of creativity.

5.4.2 Idea Bounty

Idea Bounty is website where users and clients can sign up. The clients upload a brief and a reward that goes to the best idea the user submit.
Figure 9 Idea Bounty, 2010-05-11

**Functionality**

- Latest bounty: Here you can see the latest brief with information about it, how much the award is and deadline.
- Post idea: Here you can add description and title on your idea in text fields. You also have the possibility to attach both video files, other documents and add a url to a website that explains your idea. Before you submit you can preview your idea.
- Winners: Here you can see the latest Idea Bounty winners.

*The structuralist school of creativity*

Yes, you have structured ways in submit an idea with fields that are required and optional. The briefs are divided in easy steps to make it structured for the user. You can easily get a fast overview over the brief and when the deadlines are.

*The inspirationalist school of creativity*

No, you have the option to upload video files and other documents to the idea but beside from that you are only given text fields to submit.
The situationalist school of creativity

Partly, you don’t get any tools for collaboration and social interaction between the users. You can share the brief to your friends with help of different websites they support and you are able to get 10% of the bounty. Rather than that kind of collaboration is more intended for a single user. Reward and recognition is incentive for ideas.

Analysis

Idea Bounty supports one of three schools of creativity. They have structured ways to submit and solve briefs with easy forms and descriptions in what are needed. The lack of collaboration between the users doesn’t give a lot of support for the situationalists that want that social part of creativity. The inspirationalist has some support of being able to submit video files and other documents but you don’t have any other tools for easy playful exploration.

5.4.3 NineSigma

NineSigma is a company that connects their clients with companies, researchers and individuals to solve their problems.

![NineSigma](image)

Figure 10 NineSigma, 2010-05-11

**Functionality**

- Requests: Here you can see all requests that are available. You can sort the requests by different factors.
• Propose a solution: First you can see their request more detailed. Then you have to make a proposal document after a template on your computer. After that you can submit your response online. There you can upload the filled proposal and other relevant documents.

• Evaluation: Only NineSigma and the company will see the non-confidential proposal you submit. All proposals will be reviewed and you will be updated with actual status. If it’s a successful proposal you can awarded with a contract.

*The structuralist school of creativity*

Yes, you have structured way to find a challenge that suits you and also structured ways to submit a proposal. There are many different steps that need to be done do be able to submit a complete proposal.

*The inspirationalist school of creativity*

No, you don’t have any functionality to support playful exploration. In the request paper it contains text, pictures and maybe some addresses to relevant information but rather than that you can’t explore. In the submit part you have a proposal paper to fill out and then you can attach files that you think it’s relevant.

*The situationalist school of creativity*

Partly, you don’t have any tools share idea or discuss with other participant that would stimulate the social side of creativity. You can share the request on your social media website but not discuss and vote on proposals. You can also e-mail a question about the request to NineSigma. As reward for your proposal you can be awarded with a contract with the client.

*Analysis*

NineSigma supports one of three schools of creativity. They have an easy way to find the requests and the functionality to submit a proposal. The steps of what is needed are easy to understand. Tools for the being playful and explore the area you must have your own computer because it doesn’t support any integrated functionality for the inspirationalists. If you are a person that needs that social part of creativity then you don’t have much functionality for collaboration. You can collaborate if you are a company that responds to that request. You can share a request on Facebook and on other social media to spread the word.
6 Analysis

This chapter will present our analysis of our findings from the OIS in their support of the three different school of creativity.

6.1 OIS result matrix

The result from the cases shows us that structuralist and situationalist school of creativity is supported by most of the selected OIS. It also shows that the inspirationalist school of creativity is poorly supported. In the following chapter we will analyze our findings in each school.

<table>
<thead>
<tr>
<th>Type</th>
<th>OIS</th>
<th>Structuralist</th>
<th>Inspirationalist</th>
<th>Situationalist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea management</td>
<td>Starbucks, My Starbucks Idea</td>
<td>Yes</td>
<td>Partly</td>
<td>Yes</td>
</tr>
<tr>
<td>software</td>
<td>Adobe, Adobe Labs Ideas</td>
<td>Yes</td>
<td>Partly</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Justin.tv, Feature Suggestions</td>
<td>Yes</td>
<td>Partly</td>
<td>Yes</td>
</tr>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving</td>
<td>DELL, IdeaStorm, Storm Sessions</td>
<td>Yes</td>
<td>Partly</td>
<td>Yes</td>
</tr>
<tr>
<td>software</td>
<td>Ubuntu brainstorm</td>
<td>Yes</td>
<td>Partly</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Connect + Develop, P&amp;G’s Needs</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td>InnoCentive</td>
<td>Yes</td>
<td>No</td>
<td>Partly</td>
</tr>
<tr>
<td>marketplace</td>
<td>Idea Bounty</td>
<td>Yes</td>
<td>No</td>
<td>Partly</td>
</tr>
<tr>
<td></td>
<td>NineSigma</td>
<td>Yes</td>
<td>No</td>
<td>Partly</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 Result matrix

6.2 Structuralist

Every tested system had support for the structuralist school of creativity. You have ordered ways to submit and respond to others ideas and problems. The structuralist school believes that people can be creative as long as they have some systematic approach.

When you submit an idea most of the systems had the same structure. First you have to be a registered user and then you are able to submit ideas or solutions. In group 1 title and description are the primary input fields. In group 2 the fields increase and you are often allowed to upload files and other documents with your solution/idea. In group 3 you got the same functionality as in group 2 but here it’s often a template to follow and a detailed specification of needs. The OIS are structured in the same way as in their respectively group. The stages to post an idea/solution can be connected to Shneiderman (2007) structuralist school and the stages he describes to be a part
of the systematic approach. Preparation of the idea/solution so that you can preview or the required fields that has to be filled before you can submit. After you submit you have incubation. Some ideas/solutions comes directly up or like in Ubuntu brainstorm the problem has to first be verified before people can vote and comment. Illumination comes after it has been submitted and sent forward then it will be seen by either the users of group 1 and group 2 and in group 3 it often the company or organization that see it. You get Verification from the users who vote and comment if like or dislike your idea/solution or in the marketplace were the organization responds to your solution.

Shneidermans (2007) suggestions that to support the structuralist school you need to have this structured steps. You could say that the most OIS had several steps, progress indicator and reminders of what needed to be able to submit. Group 1 and group 2 had support to the “provide rich history-keeping” principle that Shneiderman (2007) discuss should be in a creativity support tool. That includes that all the old and completed ideas/problems is available to look at. By that you have the structure to go back and look at ideas/problems and see how they solved or implemented it and by that way you earn time.

By having this systematic approach that the structuralists school of creativity need, you following one of Nickerson’s (Sternberg, 1999) suggestions to enhance creativity by having the technique and strategy to facilitate creative performance. This motivates the users by knowing that they can be creative by following the structure. Motivation is also one of Nickerson’s twelve suggestions that you should build motivation and especially internal motivation to enhance creativity.

By having a systematic process in their OIS they support the people that need that stimuli and the organization will benefit of their creativity.

6.3 Inspirationalist

Here you can see the pattern in table 3 that most of the OIS miss or partly support the inspirationalist school of creativity. The inspirationalist school argue that creativity comes when you breakaway from familiar structures with help of playful exploration. None of the OIS supports tools like sketching, concept-mapping or visualization tools. Be supporting this kind of functionality Shneiderman (2007) argue that the user can quickly explore possibilities, see unexpected relationships and being able to visualize to get the big picture.

In some of the OIS you are able to upload an attachment to your idea/solution. As stated in our delimitations we only focus on functionality that is integrated and supported by the OIS. So if you have software on your computer that allow you to maybe sketch a solution and upload it as a attachment requires that all the other users have the same software and makes it less easy to use.

OIS in group 1 and group 2 that partly supported the inspirationalist school had the functionality to exploratory search. By having the functionality to view earlier relevant work the inspirationalists come into a creative mind-set. Like in My Starbucks Idea you have the options to
search ideas through different categories. The top all-time or the most popular ideas for the moment you find the proper ideas directly and stimulate the inspirationalists. This functionality is one of the principles Shneiderman (2007) recommend to assist the discovery and innovation process.

By not supporting the inspirationalist school to the fully you miss a whole group of users that could make that breakthrough idea/solution if only they had the tools to do that. This is also a point in Nickerson (Sternberg, 1999) suggestion to enhance the creativity that you should stimulate and reward curiosity and exploration.

**6.4 Situationalist**

The situationalist school of creativity means that creative work is social. They try to understand what motivates them through recognition and reward or competition versus collaboration. The majority of group 1 and group 2 supported the situationalist school and group 3 lacked full support.

One function that was found in almost every OIS in group 1 and group 2 was the vote and comment on an idea/solution. Shneiderman (2007) talks about the importance of collaboration vs. competition and that functionality give the user that possibility. By voting the user can collaborate which ideas/solutions they like or dislike by voting it up or down. But it also gives the users who want the competition edge by being the most liked idea/solution. The comment functionality gives the users the possibility to discuss their ideas/solutions and give each other tips on how they can improve it.

The functionality to be the top idea in the OIS also supports one of Nickerson’s (Sternberg, 1999) suggestions to enhance creativity. He suggests that you should focus on mastery and self-competition and the user that wants the recognition strives to have the top idea/solution and next time come with even a better idea/solution.

Many of the OIS had their ideas that were in use saved so other users can watch and see who made that idea/solution. This functionality is also important by situationalist argues Shneiderman (2007) because it gives the users that want recognition that support. By being a user that has a lot of ideas/solutions that has been taken to use motivates them to continue to keep get that recognition from the others users.

Some of the OIS like Justin.tv has the functionality to share your or someone else idea/solution directly to your Facebook and Twitter account. This helps for recognition if the user wants other users to see his good idea/solution or if they want other users to help improve the idea/solution. The functionality that allows collaboration is also one of the principles that Shneiderman (2007) suggest should be in a creativity support tool.
The group 3 that only partly supported the situationalist school misses the collaboration part of creativity. Here it’s a more detailed and request that you submit to organization that wants a solution to their problem. There isn’t much room for collaboration between the users. It’s more of competition to be selected as a winning solution and the reward that the organization pays out is their motivation. The competition and reward is supported by the situationalist school of creativity because Shneiderman (2007) argue that competition and reward can also work as an incentive.

One of Nickerson’s (Sternberg, 1999) suggestions to enhance creativity is to encourage acquisition of domain-specific knowledge. The marketplace can be a place where the experts can come and solve ideas/problems in their domain and earn reward or recognition and that encourage them to learn more.

The marketplaces besides the lack of collaboration have the ability to encouraging acquisition of domain-specific knowledge because the user can be an expert in their domain

6.5 Reflections
What have we accomplished?

To start we had to connect the OIS with the open innovation paradigm to first understand that open innovation is a new way to innovate. With one of the most recognized researchers in area of open innovation Chesbrough (2003) were able to form our understanding. The paradigm argue that knowledge isn’t just inside the organization but also outside and that you should use take advantage of this. On that way you can reach new paths to the market, accelerate the innovation and find new ways to the customers.

With the theory and information about the open innovation paradigm we started to investigate the technology that can be used to enable this process. Hrastinski et al. (2010) was the researchers that defined the term OIS. With their classification and characteristics we were able to understand how the OIS supported the open innovation paradigm. With the standard types of OIS classified by Hrastinski et al. (2010) we were able to know what software to find to each category to our search on how the creativity schools are supported. In each group of the OIS we decided to investigate we had two preferences beside that it match Hrastinski et al. (2010) classification of how each group should be. The first preferences were that the OIS had to be able to be tested by us online and the second preference was that in each group it had to be a different OIS provider. After that we had three OIS in each group and we cut out the innovation analysis software because then the idea/solution is already done and we focus on the front end of open innovation.

With the knowledge and theories that OIS is the technology that enables the open innovation paradigm and that innovation includes a big part of creativity in its process we had to investigate the theories and research in the area of creativity. One book that gave a lot of information was the Handbook of Creativity (Sternberg, 1999) that included the research for the last 50 years in the
area of creativity. The mayor finding was that creativity had a lot of different origins but they all agreed that creativity is the ability to produce a product that is novel and useful. But all the research and diversity made it hard to find the proper preferences to connect with OIS functionality.

Then we found the work by Shneiderman (2007) and his paper of creativity support tools. His theories sorted out a lot earlier researches into three intersecting schools. The schools were much more connectable to the OIS. Now we were able to make a model to use on each OIS and what theories to apply.

The patterns we could see in our research were that the structuralist school of creativity was supported by all the tested OIS. They all had a systematic approach that validates with Shneiderman (2007) suggestions of what should be included like progress bar and reminders of what need to be done. Also the situationalist school was supported by almost every OIS. The possibility to the social part of creativity with tools like being able to comment and vote on each other’s ideas promotes collaboration. In the principles Shneiderman (2007) means that collaboration often is one of the key processes that lead to discovery and innovation. If you have that possibility for the situationalists you are able to get the most creativity from them.

We were also available to see that the OIS in group 3 only supported the situationalist school partly. That’s because they lacked the possibility to vote and comment on other solutions instead they focused on the reward as an incentive for the user.

They school that all didn’t support or just partly supported was the inspirationalist school. With the inspirationalist school Shneiderman (2007) argue that creativity occur when you breakaway from familiar structures and playful explore the possibilities. This was something that couldn’t be found in any of the OIS. As our delimitation was to explore the functionality that was integrated in the OIS and in some OIS you could upload a file but that requires also that the other user have the same software and makes it harder than it should to use it share the idea/solution. Functionality to sketch an idea or concept-map products or just have an image library that the inspirationalists could play around with would encourage creative solutions.

The ones in group 1 and group 2 that partly supported the inspirationalist school were because they had the functionality to see the ranking of the ideas or the ideas that had been chosen. By that the user can read previous work and come into that creative mind-set.

As you can see by the pattern in table 3 that two off three schools are supported you miss a whole category of users that could have made that innovation possible. As two of the general principle of open innovation is that not all the smart people work for us and if they use the internal and external ideas on the best way the organization will win (Chesbrough, 2003). And that creativity is a key part of innovation (Hrastinski et al., 2010) you have to be able to support the different creativity users get stimulated by to get all the smart people’s ideas and by getting those ideas the organization will win.
To go back to chapter 2.3 on judging the quality of positivist research how have we met the four criteria: *Objectivity, Reliability, Internal Validity and External Validity*?

First we have been objective in our thesis by used the same criteria on each OIS. Second the thesis is reliable because we use a well know strategy called case study. It gives us depth in how the OIS supports the creativity but it can also answer if it supports the school of creativity. As we focus on to understand the complexity of the relationship of how an OIS can support creativity the case study gives us that possibility. The case study strategy is often not associated with the positivist paradigm but Oates (2006) argues that like in our case you can use it to confirm or refute theories in the same way as positivist research does. Third we have internal validity because we have used the classification by Hrastinski et al. (2010) to have the right OIS to each group. We have primary used the theories of the three intersecting schools of creativity by Shneiderman (2007) to secure the right data in how to support creativity. Last we have external validity in one hand because we have selected the OIS so that in every group they are built on a different software base. In the other hand we can’t give a definitive answer that this is generalizable on all OIS but would 400 OIS give us another pattern?
7 Conclusion

Our aim with this thesis was to test the functionality in different OIS and see how and if they support the three schools of creativity. With help of theory to first understand open innovation paradigm, open innovation software and the creativity and created a case model that we tested on several OIS. In this chapter we are going to present our conclusion.

To answer our questions if and how the investigated OIS supported the three schools of creativity: Structuralist, Inspirationalist and Situationalist.

The structuralist school of creativity was supported by group 1, group and group 3 (see table 3). The creativity was supported by the functionality to have systematic tools to be creative. It had the method described in Shneiderman’s (2007) school and also his design principle that a creative support tool should have rich-history keeping. They also supported two of Nickerson’s (Sternberg, 1999) suggestions to enhance creativity (see chapter 6.2).

The inspirationalist school of creativity was only partly supported by group 1 and group 2 and group 3 didn’t support at all. They all lacked the functionality that Shneiderman (2007) argue that the inspirationalist school need, the functionality to playfully explore and breakaway from familiar structures. Those who partly supported had one of Shneiderman’s (2007) principles and one of Nickerson’s suggestions to enhance creativity (see chapter 6.3).

The situationalist school of creativity is supported by group 1, group 2 and partly in group 3. Those who fully supported the creativity had one of Shneiderman’s (2007) principles to allow collaboration. Those who partly supported didn’t have the functionality to collaborate but instead they supported the competition and reward functionality that Shneiderman (2007) argue is needed by the situationalist. Two of Nickerson’s (Sternberg, 1999) suggestions to enhance creativity were also supported (see chapter 6.4).

Two out of three schools were supported and how they were supported or not are described in detail in chapter 6.

7.1 Further work

As a recommendation to further work on the area of supporting creativity in OIS would be to build a prototype that supports all of these elements of creativity especially the inspirationalist school. Because in today’s OIS you miss a whole group of users that could made that special innovation. And it should be build with low threshhold, high ceilings and wide walls by the design principle Shneiderman (2007) suggest should be in creativity support tool to support all the users.
8 Bibliography

8.1 Published material


8.2 Electronic sources


