CHALMERS

Is Project Management Support Useful?

The case of software as a service (SaaS) tools in small marketing firms

Master of Science Thesis in the Master Degree Programme Management and Economics of Innovation

EVELINA A KARLSSON

Department of Technology Management and Economics
Division of Innovation Engineering and Management
CHALMERS UNIVERSITY OF TECHNOLOGY
Göteborg, Sweden, 2012
Report No. E 2012:034

MASTER'S THESIS E 2012:034

Is Project Management Support Useful?

The case of software as a service (SaaS) in small marketing firms

EVELINA A KARLSSON

Tutor, Chalmers: Magnus Holmén

Department of Technology Management and Economics
Division of Innovation Engineering and Management
CHALMERS UNIVERSITY OF TECHNOLOGY
Göteborg, Sweden 2012

Is Project Management Support Useful?
The case of software as a service (SaaS) in small marketing firms

Evelina A Karlsson

Master's Thesis E 2012:034

Department of Technology Management and Economics
Division of Innovation Engineering and Management
Chalmers University of Technology
SE-412 96 Göteborg, Sweden
Telephone: + 46 (0)31-772 1000

Chalmers Reproservice
Göteborg, Sweden 2012

Abstract

Many companies carry out their work in the form of projects, being able to perform these well may have a significant impact on a company's success; hence, project management becomes very important. To support practitioners, several project management bodies of knowledge have been created and there is also a wide range of project management software available on the market. The traditional way of employing software is through purchasing and installing the software on a computer or internal IT system; however, with the development of Internet, software is nowadays also available in the form of a service, namely Software as a Service (SaaS). This way of acquiring software does not require installation, but instead connection to the Internet. There are methods describing what features and how to evaluate software in general and in relation to project management but these cover mainly traditional software whilst evaluations and studies of project management SaaS are sparse. This thesis is focused on covering this gap through identifying what project management features to be supported by a tool together with setting requirements on software available as a service from the perspective of users in small marketing firms. The study aims at understanding whether and during what circumstances project management tools available as SaaS are useful for small marketing enterprises.

Through performing a case study in a small online marketing firm the project processes and project management tool usage has been studied as well as the users' wants and needs regarding software features. To broaden the thesis a multiple case study was performed to identify feature wants and needs amongst users in other firms, both current users of SaaS and non-users. Finally, a feature evaluation framework was generated and applied to a number of project management SaaS tools in order to evaluate these.

The main challenge found within the project management in the small marketing firm was the coordination of multiple projects. The complexity of each project cannot be considered high but being able to coordinate work and stakeholders in several projects simultaneously, managing multi-tasking and a shared resource pool accordingly set high requirements on the project manager and project members. The use of a project management SaaS tool was intensive and users believed it to ease communication and project work efficiency. Tool users in the small media firms were found to prefer collaboration features over planning and tracking. They were also found to be rather risk prone, as they did not consider data security an issue when it came to SaaS. Other firms, not within the marketing sector, showed the opposite characteristics.

Finally, the investigation of the project management SaaS showed that these tools provide a broad range of features; some supported all project related features set up in the feature evaluation framework, whilst others were focused mainly on collaboration or mainly on planning. The tradeoff of using these tools comes with data security and availability promises as these were found to be very low. Moreover, did the tool providers create a data lock-in, ability to switch tools was made difficult. However, the tools seem to be useful for online marketing firms as most of their needs could be satisfied. The feature evaluation framework can also be considered useful when evaluating project management SaaS tools, though it might need to be adjusted to particular firm needs when used. Either way, it is suitable to use as a checklist when setting up requirements so that no important features are forgotten or left out due to unawareness of the evaluator.

Key words: *Online marketing firms, project management software, software as a service, SaaS, software requirements, project management software features*

Contents

Acknowledgements

First of all I would like to thank the staff and owners of the company where this thesis was carried out. I was given the possibility to conduct several interviews, observe the work and I received great insights in the online marketing sector.

Secondly I would like to thank my Chalmers supervisor, Magnus Holmén for all the support given throughout the thesis, from the beginning until the end.

Finally I would like to express my gratitude to my friends for supporting me and giving me the strength to finalize this thesis. A special thanks to Anne Elerud-Tryde and Miguel Gómez Gómez for reviewing and giving feedback on my work.

Göteborg, June 2012
Evelina Karlsson

1 Introduction

This chapter describes the background of the thesis and gives a brief introduction to project management theory and Software as a Service (SaaS). Thereafter the problem and case description are presented which will lead to the purpose and the research questions. Finally, the research study outline, delimitations and the report structure is presented.

1.1 Background

Many companies carry out their work in the form of projects. To many organizations projects are fundamental to the way they operate, for example in the businesses of software development, construction, engineering and consulting (Conchúir, 2011). Being able to perform projects well may have a significant impact on a company's success; hence, project management becomes important.

To support project management practitioners, several standards and methods have been created, such as the PMBOK Guide, PRINCE2 and Scrum (Maylor, 2010). Furthermore, project managers can take help from using software which support managing projects. Project management software appeared on the market already in the 1960´s (Davis & Martin, 1985) and was in the beginning rather limited. With the development of IT, a broad range of project management tools supporting different types of projects in different sectors are now available. The traditional way of employing software has been through purchasing and installing the software on a company's computer or common IT system. However, in late 1990s, along with the development of Internet, software became available in the form of a service, namely Software as a Service (SaaS) (Finch, 2006). This way of acquiring software does not require installation, but instead connection to the Internet. Today there are tools available as SaaS for all parts of the enterprise; ERP (enterprise resource planning), accounting, CRM (customer relationship management), project management and more. So far, the popularity in using SaaS is mainly amongst small and medium sized firms (Nema, 2010) due to the easiness of employing the software; an IT department is not needed nor is running the software on private servers.

This thesis will focus on the project management software available as services, or SaaS. In literature it has been found that traditional project management software is criticized for lacking in fitness between the tools and the way companies work today. Romano et. al. (2002) believe that project management today concerns more than planning and scheduling; collaboration, processes and project work are key in successful project management. Jansson (2009) proposes web-based, or SaaS, project management tools as a solution since these are considered to support the global environment companies live in today, permitting increased collaboration. Furthermore, it has been identified that there are methods describing how to evaluate software features in general and in relation to project management (Jadhav & Sonar, 2011; Davis & Martin, 1985). These cover mainly traditional software and project management tools which support large, complex projects related to engineering and conventional project management theory. Evaluations and studies of web-based project portals are sparse compared to evaluations of individual-oriented desktop tools (Cabot & Wilson, 2009).

Since project management SaaS tools have not been studied to a large extent, knowledge in this area is lacking. Therefore, identifying what project management features to be supported by a tool together with setting requirements on software available as a service becomes an interesting subject for this thesis.

1.2 The company Online Konsultor

In order to investigate the identified knowledge gap, a case study will take place at a small online marketing company, in this thesis called "Online Konsultor", which is a pseudonym since the company preferred to stay anonymous. Online Konsultor is a small firm located in Madrid, Spain,

and was founded in 2007. The company is dedicated to marketing consulting performing digital marketing projects. The company has experience with project management tools available as SaaS since two years and the users of this tool have identified deficiencies in its fulfillment of their needs. The company is looking to change tools but is unsure of how to make the choice of a new tool; there are many factors to consider. Being able to evaluate these factors and setting up suitable requirements is something Online Konsultor found themselves incapable of doing due to lacks in competence and available resources. The resources needed to be able to evaluate and select a SaaS tool to adopt is especially difficult for small companies since time and money commonly are the largest constraints (Baard & Watts, 2005).

1.3 Purpose and research questions

A gap in the literature of knowledge about project management SaaS tools as well as what features are important for today's project work was found. The company, Online Konsultor, needed help in defining what features and requirements to be fulfilled by a project management SaaS tool, both in terms of project management features and requirements on SaaS tools. Considering these aspects, the purpose of this thesis is to identify wants and needs in small marketing firms regarding project management SaaS tools and to investigate whether these tools are useful for the tool users in these firms.

The thesis is guided by the following research questions:

1) How are projects coordinated at Online Konsultor, a small European online marketing firm, and how are project management tools used during their project processes?

2) From the user perspective; what project management tool features and what SaaS tool characteristics are wanted and needed?

a) What are the needs and wants present amongst the marketing firm SaaS tool users?

b) To what extent and in what ways do the tool-using marketing firms' wants and needs differ from the non-tool users and from tool-users in other business sectors?

3) To what extent and under what circumstances do the existing project management SaaS tools support the work in marketing projects and the users' wants and needs deriving from the previous questions?

The investigation will take the perspective of project participants, both the project manager and project members, in the small marketing enterprise which is mainly performing services and work in close collaboration with customers.

1.4 Research study outline

In order to investigate the identified research questions, three different empirical studies will be conducted; a case study, a multiple case study and a tool evaluation. The overall research process is shown in the following figure.

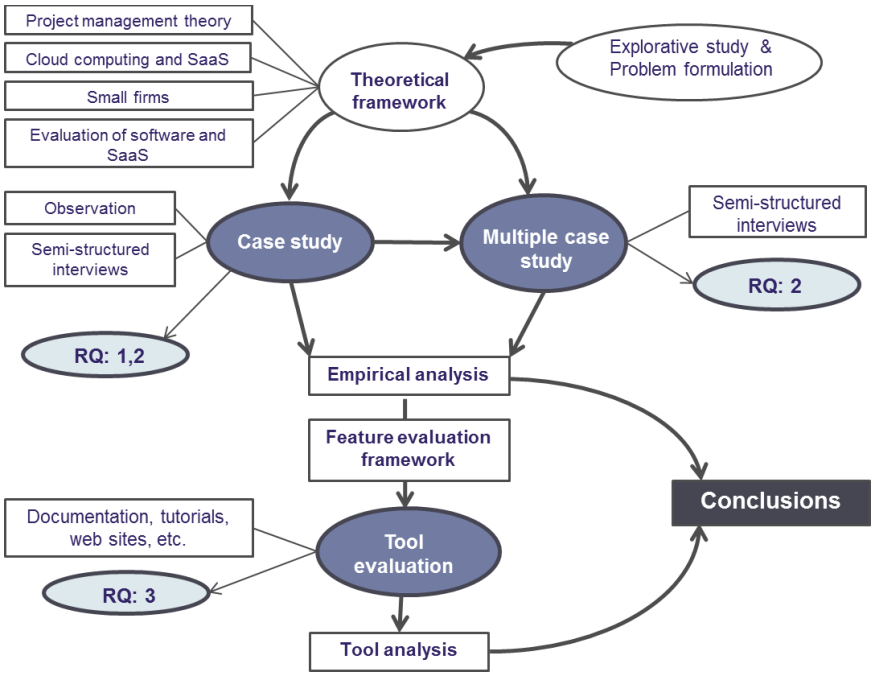

Figure 1: Overview of the research study flow (for full description see chapter 3. Methods)

Firstly, the research will seek to find out what online marketing projects look like in practice, how they are coordinated and how project participants use the tools during projects (aiming to answer RQ1.). The case study consists in studying the project processes and coordination at Online Konsultor. It will also involve investigating what feature wants and needs are present amongst the users of the project management SaaS tools at Online Konsultor, "users" considers both the project manager and the project participants (aiming to answer RQ 2.a.).

Secondly, the research includes a multiple case study which will be performed through semi-structured interviews with four groups of interviewees with the purpose of investigating their wants and needs when it comes to project management SaaS tools;

- Media/web firms using SaaS,
- Media/web firms not using SaaS and,
- Non-media firms using SaaS.
- Project management SaaS tool providers

This study was performed firstly in order to understand whether the user wants and needs found at Online Konsultor were the same, or different, in other media/web firms (aiming to answer RQ 2.a.). Secondly, to investigate whether and how these user wants and needs were different from the next two groups'; media/web firms not using SaaS and other firms, non-media, which used SaaS (aiming to answer RQ2.b.). Finally project management SaaS vendors were interviewed in order understand their point of view of their own customers' wants and needs. The multiple case study was performed in order to cover potential features which might be important in project management SaaS tools but which had not yet been recognized at Online Konsultor but in other firms.

Thirdly, based on the analysis of the case study and the multiple case study, a feature evaluation framework was developed and the available project management SaaS tools were evaluated. The evaluation aimed at creating an understanding for what features these tools actually support. Furthermore, to be able to answer to what extent and under what circumstances the existing SaaS tools support the project management tool users' needs and wants (aiming to answer RQ3.).

1.5 Delimitations

There are constantly new project management SaaS tools entering the market and there are possibly more tools that could be taken into account than the ones included in this investigation. No tools appearing after June 2011 were included in the evaluation. In total 20 tools were chosen, after applying a number of filters eleven (11) were evaluated, this process will be further described in the methods section.

1.6 Structure of the report

In order to give the reader a clear understanding of the report, a description of the structure is provided.

The following chapter contains the literature study (2), where relevant literature is reviewed, such as; project management theory, the nature of SaaS, software evaluation methods and characteristics of the small enterprise. The third chapter covers the research methods (3) used, describing how the study was conducted and its research design. Also, the quality of the study will be discussed in this section.

The forth chapter presents the empirical analysis of the case study (4) including project processes and project coordination challenges at Online Konsultor. This chapter is followed by the tool feature analysis (5) based on the interview findings regarding tool feature needs and wants resulting in a list of features. These features are evaluated in a number of tools, which findings are presented and analyzed in chapter six (6). Thereafter a discussion of the project management SaaS is done in chapter seven (7). Finally, the findings are wrapped ending with drawing conclusions (8) and proposing future research (9).

2 Literature review

In this chapter the theoretical framework is outlined. Relevant articles and books have been reviewed in order to find out what is known and what is not known in the research area. The areas covered are; project management theories and critics to these, cloud computing and SaaS, and, project management and the small enterprise. Finally, project management software and methods for evaluating these are presented.

2.1 Project management theories

There are several methods and standards proposing how to manage projects. To name a few; scrum, rapid application development, extreme programming, lean development, last planner, Prince2 and PMBOK Guide. Some of them originate from construction sector and others from software development. Those originating from traditional engineering are normally linear in their design and focus on planning and control whilst those for software engineering are characterized by iterative processes. In this section, the PMBOK, Scrum and web project management will be presented. The PMBOK was published by the PMI (Project Management Institute) in the 1990s and is a widely recognized body of knowledge belonging to the second generation project management (Maylor, 2010). Scrum originates from the software engineering sector and is characterized by an iterative and agile approach (Cervone, 2010), belonging to the third generation of project management methods (Maylor, 2010). Web project management is presented by Shelford and Remilliard (2003) and is relevant to focus since many of the companies included in this research work with online media development.

2.1.1 Definition of projects

According to Kerzner (2009) the view of project management has changed over the years, going from believing that project management would create more overhead costs to viewing it as accomplishing more work in less time and with fewer resources. There has been a growth in using projects to organize and manage work in recent decades. Project management has become more important than ever as organizations become less hierarchical and leaner (Liberatore & Pollack-Johnson, 2003).

In organizations different kinds of operations and projects are performed to achieve a set of company objectives. Projects and operations normally differ in that operations are ongoing and produce repetitive products or services whilst projects are executed in environments which are supported by operations work. Because of this, there is generally a significant amount of interaction between the operations departments and the project team as they work together to achieve project goals (PMI, 2008).

The definition of a project varies but the following is suggested by Conchuir (2011).

- A project delivers a result, often a product or a service.
- There are limited amounts of time and money to do the project.
- A project usually involves a number of people.
- A project happens only once and is unique

Even though the project is unique, it does not mean that the way of doing projects have to be unique. Project managers should learn from others as reinventing the wheel and making mistakes is expensive. The way projects are managed is much the same for any type of project (Conchúir, 2011).

Maylor (2010) provides a slightly different classification of projects as can be seen in the following figure, where a project does not need to be unique in every aspect to be classified as a

project. The "first-timers" are projects which are unique in its kind whilst the "As…But…" are projects which contain some similarity to previous work but still include some novelties. Finally, the "painting by numbers" are projects which have a high degree of similarity in both process and outcome.

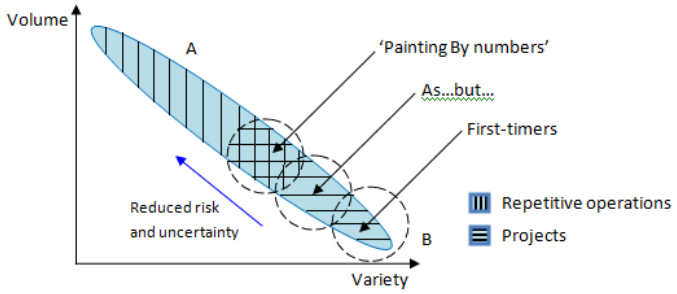

Figure 2: Project classification considering volume and variety (Maylor, 2010)

Depending on type of project there are different levels of risk and uncertainty involved – the "first-timers" include a high degree of risk whilst the "painting by numbers" are considered low risk projects.

The PMI (2008) states that in order for a project to be successful, the project team must:

- Select appropriate processes required to meet the project objectives
- Use a defined approach that can be adopted to meet requirements
- Comply with requirements to meet stakeholder needs and expectations
- Balance the competing demands of scope, time, cost, quality, resources, and risk to produce the specified product, service, or result (PMI, 2008)

Figure 3: Overview of factors that make project management successful (Kerzner, 2009).

Kerzner (2009) believes it is important to select a project management standard since it can influence processes, documentation and training in the company. Every company has to make its decision on what method to adopt, it has to depend on the suitableness to the company's commercial sector, branch and also what is available in their language.

2.1.2 PMBOK – Project management body of knowledge

The project management institute PMI was established in the US in 1969 and provides a standard for project management, called the PMBOK Guide, as previously mentioned.

The PMBOK is rather a guide than a methodology according to PMI (2008) in the sense that a methodology tells exactly what to do whilst a guide gives suggestions of what to do. The PMBOK

Guide is based on 42 processes which draw on global experience from different sectors resulting in a generic and general user guide for all types of projects and in different branches.

The scope of the PMBOK Guide are the project management processes, which are the processes that help to create an effective flow during the projects existence (PMI, 2008). The five process groups are:

1. Initiating – Defining the scope and finding out limits and requirements
2. Planning – Who does what and when
3. Execution – Actually doing the project
4. Monitoring & Controlling - Checking that everything is done and completed
5. Closing – Making sure everything is finished (Conchúir, 2011).

The figure below shows the typical project process, though the PMI (2008) recognizes that the process can be overlapping with different sub phases, or perhaps divided into several processes that follow each other sequentially depending on the industry or organizational practices.

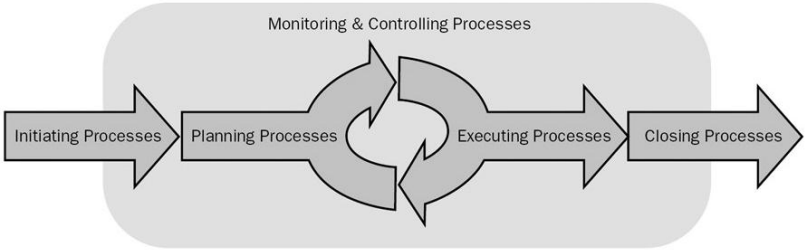

Figure 4: The project process, starting with initial process, planning, execution and closing processes (PMI, 2008).

The typical life cycle of the project suggested by the PMI (2008) indicating cost and staffing level along the project is the following:

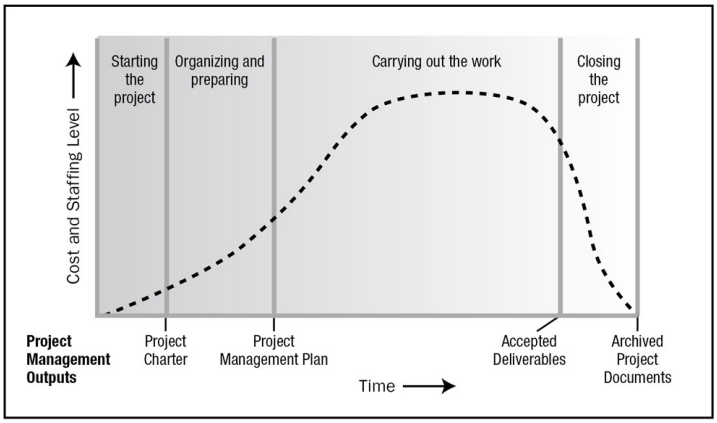

Figure 5: Life cycle of the project showing the typical staffing and cost level of the project, the highest level is during the execution of the project (PMI, 2008).

The PMBOK Guide identifies a number of knowledge areas which are important in project management:

- Integration management
- Scope management
- Time management
- Cost management
- Quality management
- Human resource management

- Communications management
- Risk management
- Procurement management

How the processes and knowledge areas interact is shown in the matrix below:

	Project Management Process Groups				
Knowledge Areas	**Initiating Process Group**	**Planning Process Group**	**Executing Process Group**	**Monitoring & Controlling Process Group**	**Closing Process Group**
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Execution	4.4 Monitor and Control Project Work 4.5 Perform Integrated	4.6 Close Project or Phase
5. Project Scope Management		5.1 Collect Requirements 5.2 Define Scope 5.3 Create WBS		5.4 Verify Scope 5.5 Control Scope	
6. Project Time Management		6.1 Define Activities 6.2 Sequence Activities 6.3 Estimate Activity Resources 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Estimate Costs 7.2 Determine Budget		7.3 Control Costs	
8. Project Quality Management		8.1 Plan Quality	8.2 Perform Quality Assurance	8.3 Perform Quality Control	
9. Project Human Resource Management		9.1 Develop Human Resource Plan	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
10. Project Communications Management	10.1 Identify Stakeholders	10.2 Plan Communications	10.3 Distribute Information 10.4 Manage Stakeholder Expectations	10.5 Report Performance	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses		11.6 Monitor and Control Risks	
12. Project Procurement Management		12.1 Plan Procurements	12.2 Conduct Procurements	12.3 Administer Procurements	12.4 Close Procurements

Figure 6: Matrix showing how the project management processes and knowledge areas interact (PMI, 2008)

As described in the PMBOK Guide the initial scope is defined and initial financial resources are committed during the initiating processes. The internal and external stakeholders who will interact and influence the overall outcome of the project are also identified. Involving the customers and other stakeholders during initiation generally improves the probability of shared ownership, deliverables acceptance and the stakeholder satisfaction (PMI, 2008). The project manager is assigned to the project in the initiating phase, or even before. Finally the project charter should be developed, which is the document that formally authorizes the project containing the requirements that satisfy the stakeholders' needs.

The next process in the PMBOK Guide is the planning process which includes establishing the total scope of the effort, defining and refining the objectives and developing the course of action required to attain those objectives. The project management plan is created, though it is acknowledged that along the project the plan might be updated or changed. The PMI (2008) suggest the project team to encourage involvement from all stakeholders when planning the project and developing the project management plan. Included in the planning is also the creation of a work breakdown structure, collecting project requirements and sequencing activities. Further on in the planning process, estimating resources, developing a schedule,

estimating costs, determining budget and planning procurement is done. Risks should also be identified but the possibility to identify risk depends very much on the type of project.

The executing processes, as proposed in the PMBOK Guide, involve coordinating people and resources as well as integrating and performing the activities according to the project plan. During the execution, results might require planning updates or changes.

Monitoring and controlling takes place along the large part of the project. Monitoring should be done of the ongoing project activities against the project management plan to measure the project performance. Changes have to be controlled and it is recommended to prepare preventive actions in anticipation of possible problems. The control is done to monitor the "health" of the project (PMI, 2008).

Finally, at the project closure, it is important to obtain acceptance by the customer or sponsor and to conduct a post-project or phase-end review. Furthermore the PMBOK recommends to document lessons learned and apply appropriate updates to organizational process assets, archive all relevant project documents in the Project Management Information System to be used as historical data (PMI, 2008).

2.1.3 Scrum – an agile project management approach

Scrum is an agile project management method which originated from the information system area. The reason for its development comes from disadvantages of applying traditional project management methods in software engineering (Cervone, 2010). Cervone (2010) means that applying traditional project management to software development is unsuitable due to its unpredictable nature and a non-repeatable process, instead short iterative processes with clearly defined deliverables as suggested by Scrum fit better. The agile project management is rooted in the four principles:

(1) Individuals and interactions over processes and tools.
(2) Working software over comprehensive documentation.
(3) Customer collaboration over contract negotiation.
(4) Responding to change over following a plan.

Cervone (2010) means that in Scrum direct communications is preferred before making large amounts of documentation in order for the project team to be able to adapt quickly to the unpredictable and rapidly changing requirements which development projects are experiencing.

The Scrum method is described to be based on roles, processes and artifacts. The team normally has a Scrum Master (corresponding to the project manager) and the team is self-organizing and consists of 5-10 people working on the project. The Scrum process has five major activities:

1) the kick-off
2) the sprint planning meeting
3) the sprint
4) the daily Scrum meeting
5) the sprint review meeting

The kick-off meeting (1) is the first step of the project and is supposed to set the overall project requirements and goals. The sprint planning meeting (2) is normally held together with product owner and team and is the start of each sprint (3). The sprint is iterative and during its planning meeting the team defines the project requirements, in Scrum terms called the product backlog, as well as the goals and outcomes of the particular sprint (Cervone, 2010). Thereafter the sprint begins and no requirements can be changed until the next sprint. The daily scrum meeting (4) is

held daily with the purpose of tracking the progress of the team and to identify where extra effort is needed. The sprint review (5) is held at the end of each sprint where the functionalities created are shown to the product owner.

The artifacts of Scrum are, according to Cervone (2010), the product backlog, the sprint backlog and the burn down charts. The product backlog is the requirements of the project, whilst the sprint backlog is a subset of these to be developed during the sprint. The burn down charts are used to track the progress of the project (Cervone, 2010).

2.1.4 Web project management

According to Shelford and Remillard (2003) the project management of web development is in some aspects very similar to the project management in other industries. The basic tasks for the project manager are the same, such as; creating time lines, managing deliverables, facilitating meetings, managing the team and providing a single point of contact for everyone involved in the project. The differences lie in the dynamic surroundings of the project in web development (Shelford & Remillard, 2003). The challenges arise due to the following factors:

- Changes in web development technology; there is a change roughly every 6 month
- Increase or decrease in project budget which will affect the scope
- Competition in market place; customers will require the same functionalities as offered by competitors
- The business model changes

Communication is very important in web development, especially making sure changes of product requirements are communicated. Shelford and Remillard (2003) believe it is best practice to have a communication plan and a document management system where documents can be shared with all team members. Since scope, expectations and specifications will most likely change throughout the project the authors recommend to control changes through an issue log or a change request tool. The issue log can for example be a document that should be available for everyone and it works well as a meeting agenda, project plan checker and performance reviewer (Shelford & Remillard, 2003).

When it comes to project management models, Shelford and Remillard (2003) are convinced that the standard linear project models, where all requirements are stated in the beginning, are very limited in its functionality in web projects. Instead iterative processes are needed and agile project management approaches are recommended. However, as in conventional project management, some planning should be done. When creating a schedule for a web project, the authors emphasize in the importance of keeping the plan flexible since it quickly becomes obsolete as client issues change orders (Shelford & Remillard, 2003).

2.2 Critics to traditional project management methods

The theories presented in the PMBOK Guide, described in previous section, are widely criticized. Koskela and Howell (2002) mean that the underlying theory of project management is obsolete and that a more powerful foundation is needed. The main objection is that planning, execution and control are not used in practice as suggested by the PMBOK Guide.

Koskela and Howell (2002) in accordance with Cervone (2010) state that the Scrum method used in software engineering has emerged due to failure of conventional project management methods. The same goes for another method called the last planner, which was developed in the area of construction, deriving from the lean philosophy.

According to Koskela and Howell (2002), project theory rests on production theory where all processes are viewed as production: input – transformation – output, assuming that tasks are independent and discrete with low uncertainty. The authors mean it is incorrect to believe that a project can be realized in an optimal manner and that all work can be captured in a top-down decomposition. Koskela and Howell (2002) suggest including operations flow and valuing generation in the concept of project theory, hence; time, variability and the customer would be considered.

Furthermore, Koskela and Howell (2002) criticize the PMBOK Guide for proposing a centralized management and control of the projects and for focusing heavily on the planning processes, the concept referred to is *management-as-planning*. According to Koskela and Howell (2002) the executing process is very vaguely described and reminds of the *dispatching model* in manufacturing where work can start only after given authorization. The controlling process is divided into performance control and change control, which the authors believe corresponds to a *thermostat model* where performance is measured and compared to a defined standard of control. Koskela and Howell (2002) suggest the following changes;

- Management-as-planning should be extended to management-as-organizing because it would give the idea that human activity is inherently situated, planning should focus on structuring the environment to contribute to purposeful acting.
- The dispatching model proposes one-way communication, but it should be two-way.
- The thermostat model, measuring performance against a standard, should be changed to focusing on finding the root cause of problems; only then performance can be improved.

Other authors criticize the fact that there is very much written in the area of what should be done in traditional project management but that there is little research done on the actuality of project management (Cicmil, et al., 2006). It is argued that too little is known on the actuality of project-based working and that there are knowledge gaps of how to effectively manage complex undertakings.

Cicmil et al. (2006) criticizes the mainstream research of projects and project management for its heavy reliance on the functionalist and instrumental view of projects and organizations. Within that view the function of project management is taken to be the accomplishment of some finite piece of work in a specified period of time, within a certain budget, and to agreed specification. Cicmil et al. (2006) believe that if projects instead would be seen as complex social settings, characterized by tensions between unpredictability, control and collaborative interaction, other understandings could be achieved.

Pollack (2007) agrees in that traditional project management is rooted in the hard paradigm, where traditional project management tends to emphasize efficient, expert-led delivery, control against predetermined goals. Pollack (2007) also points out that the soft paradigm's influence on project management is small but growing. In the project management of the soft paradigm there is more focus on learning, participation and typically demonstrates an interest in underlying social process.

Finally, research performed on the usage of project management tools and techniques shows that the project managers use a very small number of these (White & Fortune, 2002). The research tells that project managers use off the shelf software tools and the most widely used planning technique is the Gantt chart. The authors also reports that many managers find the tools and methods they have employed lacking in usability, project management software was the most reported on with respect to limitations (White & Fortune, 2002). The most important factors to the projects outcome were; clear goals, support from senior management and adequate funds and resources whilst factors such as planning and control systems, having the support of a project champion and risk management were not considered important.

2.3 Cloud computing and SaaS

In this chapter cloud computing and software as a service (SaaS) are introduced ending with factors to consider before choosing to implement SaaS.

2.3.1 Cloud computing description

Cloud computing normally refers to two things; the applications delivered as services over the Internet, and the hardware and systems software in the data centers that provide these applications. The application services are called Software as a Service (**SaaS**) and the data center hardware and software is called a **Cloud** (Armburst, et al., 2010). As depicted in figure 8, the cloud services are provided over the internet and accessed through IP enabled devices such as computers and smart phones.

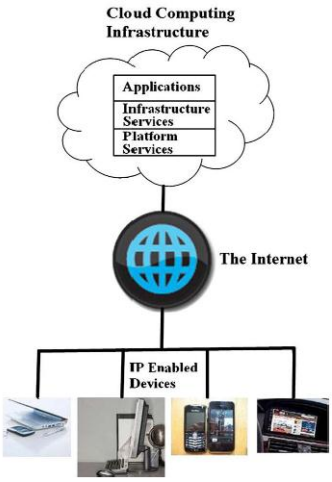

Figure 8: Illustration of cloud computing (Marston, et al., 2010)

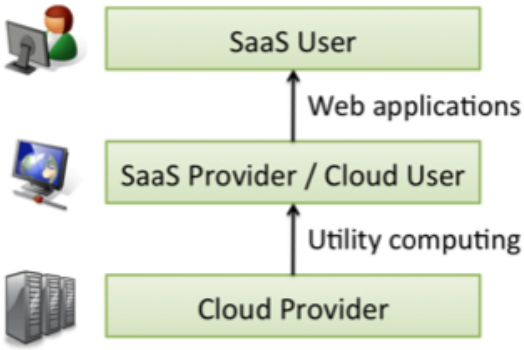

Figure 7: Overview of the relation between the concepts; SaaS user and provider, and, the Cloud user and provider (Armburst, et al., 2010).

To describe figure 7, starting from the bottom; someone provides hardware and system software, known as the cloud. In order for someone to use the cloud, they have to buy this service as utility computing. The cloud user might also be a provider of SaaS which is sold to the SaaS users through web applications.

The National institute of Standards and technology in the U.S. defines cloud computing as follows: "*Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction*" (Mell & Grance, 2011).

According to Mell and Grace (2011), the five essential characteristics of cloud computing are:

1. On-demand self-service - no human interaction with provider is needed
2. Broad network access – services are available over networks and accessed via standard mechanisms (e.g. mobile phones, laptops)
3. Resource pooling - the provider's computing resources are pooled to serve multiple consumers using a multi-tenant model
4. Rapid elasticity - capabilities can be rapidly provisioned and scaled as needed.
5. Measured service - resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service

From the hardware point of view cloud computing has eliminated the need for hardware users to plan far ahead for provisioning of hardware since resources are available on demand. It has also eliminated the upfront cost and commitment. Finally, it has created the possibility for short-

term usage, one can start small and increase hardware resources when needed (Armburst, et al., 2010). There are three service models within cloud computing as shown in the table below:

Table 1: SaaS, PaaS and IaaS (Narayan, 2009; Mell & Grance, 2011).

SaaS (Software as a Service)	The consumer is given ability to use applications running on a cloud infrastructure available through the web. The consumer does not control the underlying infrastructure or platforms nor the individual application capabilities. Examples of SaaS include enterprise-level applications such as Salesforce, Netsuite or Google Apps to personal applications such as Gmail, TurboTax Online, Facebook, or Twitter.
PaaS (Platform as a Service)	PaaS lets the consumer deploy its applications onto the cloud infrastructure using tools provided by the PaaS provider. PaaS includes Operating systems and Application Server Stack such as .Net framework, VS.Net, SQL Server and so on. The user cannot manage the underlying infrastructure but has control over the deployed applications. Providers of PaaS are Microsoft's Azure & Google's AppEngine.
IaaS (Infrastructure as a Service)	IaaS is all about hardware, data storage, networking and bandwidth i.e. Server, Routers and Switches. The IaaS provider gives the consumer resources such as processing, storage and the user can deploy and run software – operative systems and applications. The user cannot control the underlying infrastructure, but the operating systems and applications. Amazon & Rackspace are examples of IaaS providers.

2.3.2 Obstacles and advantages of Cloud computing

A number of obstacles can be identified when it comes to adopting cloud services, such as; availability, data lock-in, data confidentiality and data security. Though there are also several advantages, such as; low employment cost, immediate access, lowers IT barriers to innovation and scalability.

Armburst et al. (2010) recognizes that availability of the services is an issue that worries many organizations since lack of availability would mean lack of service. To overcome this obstacle, using multiple cloud computing providers can be a solution to avoid single point of failure. The authors are also concerned about data lock-ins. Since APIs (application programming interface) are not standardized for cloud computing it might be difficult to extract data and programs which are based on one cloud and transfer it to another (Armburst, et al., 2010). This also applies to migration back to an in-house IT environment (Enisa, 2009). If the cloud provider would get out of business this problem could have substantial negative effects on the cloud user (Armburst, et al., 2010).

Companies can be reluctant to using cloud computing services due to issues with data confidentiality (Armburst, et al., 2010). Current cloud offerings are essentially public networks, which means the service is provided by a cloud provider to the general public (Mell & Grance, 2011), and are therefore exposed to more attacks. Also, intellectual property might even be at risk, not only due to hacking, but to contractual clauses (Enisa, 2009). A way to check this is to carefully study the service level agreements (SLA).

Regarding data security and future growth of cloud computing, the authors have differing opinions. Subashini & Kavitha (2011) acknowledges that security is one of the major issues in cloud computing which is the reducing factor in its growth; complications with data privacy and data protection are currently present on the market. On the other hand, Armburst et al. (2010) believe that there are not any fundamental obstacles for making cloud computing as safe as in house IT environments.

Finally, Marston et al. (2010) argue that today's environment with the ability to access information independently of device and location represents a major shift in computing and they mean that cloud computing is here to stay. The authors point out the advantages which cloud computing has brought, and they are several. Cloud computing;

- Lowers the cost of entry for smaller firms that want to benefit from compute-intensive business analytics, something which only has been available for large corporations
- Can provide immediate access to hardware resources, with no upfront capital investments for users, hence, IT can be treated as an operational cost instead of investment cost
- Lowers the IT barriers to innovation, which can be seen through the vast amount of online applications available (such as Facebook and Youtube).
- Makes it easier for companies to scale their services

2.3.3 SaaS – Software as a service

The term SaaS dates back to the 1990s (Finch, 2006) and is commonly known as web services. General technologies of the Internet and virtualization have made SaaS technically possible (Cusumano, 2010). In SaaS, the subscriber rents the access to an application, which is normally executed on a cloud provider's server. The subscriber gets the right to use specific applications on demand and the service also includes application data management, such as back-up and data sharing between subscribers.

The subscriber's browser provides the application interface, to protect the application data that is exchanged between the subscriber's browser and the cloud provider over the network, cryptography is required (Badger, et al., 2011). The SaaS provider's main responsibility is to provide software that is solid and functioning. In SaaS, the application runs on the cloud which eliminates the need for installing and running software on the actual computer or on private servers. This greatly simplifies the maintenance and the costs related to it (Marston, et al., 2010). SaaS users can access the applications any time anywhere, share data and collaborate more easily and keep their data stored in the cloud. Cloud computing allows for scaling on demand without having to build or provision new data centers, which means that SaaS suppliers can scale as their customers need more resources (Armburst, et al., 2010).

Since no infrastructure is needed to be purchased or maintained, SaaS drives a new implementation methodology where software releases can be smaller and more frequent with the ability of incorporating user feedback early in the development stages of implementation (Hai & Sakoda, 2009). According to Cucumano (2010), SaaS together with cloud computing are becoming the new platform for enterprise and personal computing. The author believes that they are now in level with or overtaking the traditional desktop applications.

2.3.4 SaaS adoption – advantages and disadvantages

Since this thesis focuses on adopting and using SaaS, this section will be dedicated to discussing the advantages and disadvantages that come with using SaaS.

Cost of SaaS

The cost model for the SaaS application is normally on demand where the user pays per month or per user and month (Finch, 2006). One of the reasons for adopting SaaS is the low up-front cost and that no complex installation is needed. Neither need subscribers maintain the platform, such as hardware renewal, software upgrades nor security patches. Furthermore, license costs can be reduced since there is no need to buy a license per computer, one license can be used on several computers but at different times (Badger, et al., 2011).

Whilst the up-front cost is rather low there are disadvantages in terms of cumulative rental and uncertain enhancement expenses (Lee, et al., 2009). In the long term the cost might not be favorable compared to on-premise software. Cost considerations such as total cost of ownership and comparing it to in-house IT should be taken into account in the adoption process (Nema, 2010; Lashar, 2008).

Personalization and integration

According to Lu and Sun (2009), SaaS solutions lack in personalization possibilities since these applications normally are based on industry best practices. This might create difficulties in adapting work flows and specific needs of an organization to the software or vice versa. The authors recommend looking at the vendor's ability to handle configuration and customization of the SaaS.

The SaaS approach to integration leverages a set of APIs published by the SaaS solution provider. The complexities arise due to vendor specific APIs, for back office integrations companies will find many new challenges when trying to integrate SaaS but still many of the traditional challenges are encountered (Hai & Sakoda, 2009). Though, integration as a service is beginning to simplify integrations and SaaS providers focus more on pre-built integrations. In the case a company has many customized applications and data stored in proprietary databases they would have trouble switching to a SaaS quickly (Cusumano, 2010).

Data lock-in with SaaS

As recognized previously by Hai and Sakoda (2009), the APIs of the vendors are not standardized and even though the SaaS provider normally supply APIs they do not offer readymade data export routines, which means that the customer will have to develop a program to extract the data and write it to file ready for import to another tool. The structure of business records normally varies, hence a customer record at one SaaS provider may have different fields than at another provider, even though there are common underlying file formats for the export and import of data, e.g., XML (Enisa, 2009). This creates a data lock-in effect. If the customer also has integrated programs with the SaaS tools these would have to be re-written to take into account the new provider's APIs which increases switching difficulties.

Furthermore, some SaaS firms offer companies to develop new applications and integrate these with web services from other vendors. The SaaS specific application programming interfaces (APIs) encourage application developers to tailor their applications making it difficult to change platform (Cusumano, 2010).

Availability and SLAs

Availability was discussed in relation to cloud computing previously, when it comes to SaaS there are two main sources of availability risks; if the supplier company goes out of business and DDoS attacks. DDoS stands for Distributed Denial of Service, where criminals threaten to cut off incomes of SaaS providers by making their service unavailable (Armburst, et al., 2010).

Furthermore, adopting SaaS requires a stable network service, even though Internet is better than ever before it still cannot be comparable to the intranet or local area network (Lu & Sun, 2009), an instable network connection will have a direct effect on the quality of service.

What can be ensured beforehand is that the SaaS provider delivers a strong service level agreement (SLA). Badger et al. (2011) recommends to study the following;

Promises to the subscribers:

- The availability promise and calculation should carefully be studied
- Remedies for failure to perform - Compensations should occur if they fail in supporting their promises

- Data preservation – whether the subscriber data is preserved if the contract is terminated (typically data is preserved for 30 days).

Limitations (promises not made to the subscriber):

- Providers normally do not take responsibilities for results of natural disasters or for a connectivity problem between the provider and the subscriber.
- Providers reserve the right to change the SLA
- Security, sometimes the provider states that they are not liable for the security, such as a functioning error caused by malicious activity.

Apart from the above, it is important that subscribers carefully assess whether the SLA specifies compliance with appropriate laws and regulations governing the subscriber data. Subscribers should carefully examine the SLA for any disclaimers relating to security or critical processing, and should also search for any comment on whether the provider recommends independent backup of data stored in their cloud (Badger, et al., 2011).

Data security

In the SaaS model, the subscribers will store their data in an offsite server instead of their own data center which means someone else is in control of it. Data is accessed via Internet frequently and inevitably, there will be risks of data loss, disclosure, distortion or other security risks in the process of data storage and transmission (Badger, et al., 2011).

Furthermore, there are browser based risks. By relying on a browser for software application interfaces the risk is that if a subscriber visits a malicious web site and the browser becomes contaminated, subsequent access to a SaaS application might compromise the subscriber's data (Armburst, et al., 2010). The SaaS system should protect the subscriber's device so as to control the exposure to attacks.

To assess these risks the data protection of the SaaS provider should be analyzed: its data protection mechanisms, data location configuration and database organization, transaction processing technologies (Badger, et al., 2011). Furthermore encryption is required to be strong using a robust algorithm with keys of required strength to be used for web sessions whenever the subscribed SaaS application requires the confidentiality of application interaction and data transfers. When it comes to data deletion, the subscriber should require that cloud providers offer a mechanism for reliably deleting data on a subscriber's request (Badger, et al., 2011).

Furthermore it is recommended to choose a SaaS partner with state-of-the-art backup, recovery and redundancy and to select a partner with an open and transparent system status website (Nema, 2010).

Data confidentiality and legal issues

One concern related to data confidentiality is that many nations have laws requiring SaaS providers to keep customer data and copyrighted material within national boundaries (Enisa, 2009). Enterprises within the governmental, financial or healthcare sector might be under data security regulations which ban storing confidential information outside of the country. Hence, if the SaaS application provider's data center is located abroad it cannot be used. There can also be similar organizational policies prohibiting data from being replicated on servers located outside of the company walls (Hai & Sakoda, 2009). Some businesses may not like the ability of a country to get access to their data via the court system; for example, a European customer might be concerned about using SaaS in the United States given their particular laws. Enisa (2009) also points out that customer data may be held in multiple jurisdictions, data centers might be located in countries where the legal framework and enforcement is unpredictable.

It needs to be assessed whether the SaaS provider will meet the confidentiality compliance, integrity and availability needs of the organization that will be using the subscribed SaaS application (Nema, 2010).

Vendor selection
Nema (2010) stresses the importance of selecting the right vendor; one should evaluate the technical capabilities both for the company's current situation and future. If your own company changes, it is important to consider whether the SaaS possibly can be adapted. The vendor should be able to suggest a pragmatic approach and incorporate industry-wide best practices. There are many start-ups on the market offering SaaS solutions, being able to judge the vendor's financial situation is essential as longevity of the SaaS vendor is crucial to the company's success.

Apart from the assessing the SaaS vendor Nema (2010) recommends to check the hosting firm of the SaaS provider. As a SaaS user, one might be affected by the underlying layers; the infrastructure and platforms. Many times the SaaS user is not even aware of who is providing the underlying resources, therefore it is important to look this up to check whether it has the right certifications. Lastly, it is recommended to work with a partner that will deliver ongoing maintenance, service and upgrades (Nema, 2010).

2.4 The small service firm
The nature of a small business is characterized by close contact with customers, personal service and provision of a more customized approach to their customers. Typical for small businesses is also the flexibility to provide ideas to new services and therefore contribute to innovation and competition. Moreover, small firms normally lack financial stability and costly mistakes cannot be afforded. Most of the small business firms fail within 3-5 years of existence, due to managerial incompetence, inadequate planning and poor financial control (Baard & Watts, 2005).

The companies operating in the service sector are typically within one of the following areas; wholesale and retail trade, transport and storage, communication and information services, finance and insurance, property and business services, or education and health. Their value is intangible rather than physical (Baard & Watts, 2005).

According to Scott and Bruce (1987) the small enterprises' development passes through five stages which are normally accompanied by crisis. The first stage is the start-up phase where focus is on profitability and as it grows there will be a higher demand on formalization and record keeping. In the second phase the main task is survival. It can be characterized by overtrading and an uncontrolled growth where more control is needed. There may be increased complexity in coordination due to customer base expansion. The third phase is the growth phase, where the business is still profitable and more time is spent on coordination. Expansion and maturity are the fourth and fifth phase where the organization will be exposed to more competition and administrative functions and also the requirement of the managers changes; going from entrepreneurial to more managerial (Scott & Bruce, 1987).

2.4.1 Project management and SaaS in small firms
When it comes to organizing around projects in small enterprises, one of the issues which arise is where to place the project manager in the organization. In large companies there might be assigned project managers full time but in small companies the project manager normally has to wear multiple hats, perhaps both working as project manager and line manager. A problem that might arise is that the project manager dedicates resources or time corresponding to his or her preferences (Kerzner, 2009).

Kerzner (2009) defines projects in small companies as follows:

- Total duration is usually three to twelve months
- Continuous communication between team members
- Manual rather than computerized cost control may be acceptable
- Project managers work closely with functional personnel and managers on a daily basis, so time-consuming detail reporting is not necessary
- The work breakdown structure is not on a high level

Typical for small companies is also that the project manager handles multiple projects which can create priority problems; the low priority projects might never be managed. Furthermore, resources are more limited in a small company compared to a large one and therefore interpersonal skills become very important in order to being able to motivate the few resources there are (Kerzner, 2009).

As mentioned previously in this thesis, SaaS is particularly interesting for small and medium sized enterprises (SME) since it gives them the access to achieve the same possibilities as the large enterprise but to a lower cost (Nema, 2010). For SMEs cloud computing is particularly attractive in the current global economic crisis, due to its flexible cost structure and scalability.

Though availability and service reliability is however of concern for any company when it comes to cloud computing (Sultan, 2011). For large companies loss of service as a result of cloud glitches could be disastrous if it impacts their customers and results in substantial loss of sale opportunities and customer dissatisfaction. However, for SMEs on the other hand it is a question of tradeoff. The loss of service for a few hours for many SMEs may not be catastrophic (Sultan, 2011).

2.5 Project management software

The definition of project management software varies widely. One definition found on a project management glossary webpage was: "Project management software is a class of computer applications specifically designed to aid with planning and controlling resources, costs and schedules of a project." (Strategies, 2007).

Another web article states that project management software is any solution that allows an individual or a team to track a project from its start to finish, providing scheduling of resources, budget management, time management, task assignments, quality management and documentation. The goal of the project management software is to increase efficiency and track the progress (projectmanagementsoftware.com, 2011).

Kerzner (2009) points out that while project management software can be of great help in the difficult task of tracking and controlling projects it cannot be a substitute to project leadership. Project management software can be a terrific aid to the project manager in tracking the many interrelated variables and tasks that evolve during the project. Typical capabilities are; project data summary of expenditures, timing, and activity, data management and reporting capabilities, customized and standard reporting formats, early-warning systems, resource planning and analysis, cost analysis, variance analysis an multiple calendars.

2.5.1 Project management traditional software vs. SaaS

The critics towards traditional software is that it concerns only single projects in single locations and project inputs and outputs (Romano, et al., 2002). Since the world is globalizing the authors mean that the project management playground is changing, teams are dispersed across organizational and national boundaries. Romano et al. (2002) state project management nowadays to concern not only planning and scheduling, but also process and project work and therefore traditional project management software is no longer enough.

Romano et al. (2002) are convinced that collaboration in projects will become essential for success. In their paper the authors name the highest grade of collaboration in project management software "the concerted level". At the concerted level, software allows for a high degree of collaboration, for instance, the possibility for coauthors to write in the same document. The authors state that concerted project management is not available in project management software at the time of writing (2002) and they address the main issue: lack of collaboration tools.

Web-based project management tools are by Jansson (2009) referred to as social project management, or project management 2.0. It is an evolution of project management practices that are built on the Web 2.0 technologies. Whilst the more traditional project management is based on the project manager's control, the new generation of collaborative software enables everyone in the project to contribute to the project work. The project can to some extent be led and developed by the whole team which is given full access to all information (Jansson, 2009).

For an enterprise to be successful it needs to innovate, and to be innovative a company needs to be able to efficiently combine a broad range of knowledge from different domains, to achieve this, collaboration is key according to Jansson (2009). The author means that by employing web-based project management, a higher innovativeness can be achieved compared to using traditional project management rules where less collaboration is encouraged.

A comparison of the focus of the traditional and web-based project management can be seen in the table below.

Table 2: Comparison between traditional and web-based project management (Jansson, 2009).

Traditional project management	Project management 2.0
Centralization of control	Decentralization of control
Top-down planning	Bottom-up planning
Strictly controlled environment	Collaborative environment
Pre-defined structure and tasks	Emergent structures, tasking
Limited access to the plan	Unlimited access to the plan
Local access to information, strict user restrictions	Universal access to information, few restrictions
Limited communication with team, separate tools	Enhanced communication within team e.g. shared project e-mails, chats
Separate projects	Holistic approach, resource pools
Often complex tools	Easy to use tools
Rigidity of tools	Flexibility of tools

Few investigations and evaluations of project management SaaS were found during the literature review, though there was one investigation on web-based software project portals performed by Cabot and Wilson (2009). The researchers distinguish project management tools from groupware by the following core features:

- Task management (such as to-do lists, bug tracking and work-flow management)
- Document repository (preferably with version control)
- Conversational tools (such as e-mail, chat, wikis)
- Search function (with which everything related to one subject can be retrieved)

The investigation of the tools were found to supply, apart from the core features, role-based access and hosting multiple projects. The main differences between the tools were their target

market, some were aimed for development teams, other for smaller organizations. Moreover, Cabot and Wilson (2009) discovered that none of the project portals made it easy for users to export their projects for backup or use elsewhere. The contents and history of version control repositories could be relocated using third-party tools, but the tickets, wiki pages, and other content stored in portals could at best be exported as XML for parsing and interpretation. The high cost of switching means that customers are effectively locked in once they select a portal (Cabot & Wilson, 2009).

2.5.2 Proposed project management features

First a notion on the definition of features, requirements and non-functional and functional requirements has to be made.

The authors Liu and Mei (2003) define a feature as; a feature is a higher-level abstraction of a set of relevant detailed software requirements, which is perceivable by users. Moreover, the definitions used by Shrivathsan (2009) are the following:

- "A *feature* is a set of related requirements that allows the user to satisfy a business objective or need"
- "A *requirement* is a ability that a product must possess or something a product must do in order to ultimately satisfy a customer need"

Then there are functional and nonfunctional characteristics, Chung and Leite (2009) states that a system's utility is determined by both of these. Functionality of a system is not useful if the non-functional characteristics are not in place. Nonfunctional characteristics set the constraints to the system and are for example usability, flexibility, performance, user-friendliness, security, testability, privacy and reliability. Functional requirements describe the behaviors (functions or services) of the system that support user goals, tasks or activities. The functional requirements define the functionality and the tasks the system must be able to perform and are for example; technical specifications, data manipulation or simply what the system can do.

As mentioned previously, Romano et.al (2002) discuss the lack of collaboration software and how the highest level of collaboration is the concerted one. The authors propose a number of modules that should be included in collaborative project management software, these modules are described in table 3 below.

Table 3: Project management collaboration software modules (Romano, et al., 2002)

Modules:	Description:
1. Project Specification Overview	Stores project specification: name, goal, sponsors, customers, leaders, duration, involving locations and collaboration policies.
2. Accounting and Cost Management	Tracking costs as the project progresses
3. Administration and Security	Allows administrators to set up new project, new users and to manage them
4. Content Management	Provides central knowledge and data repository for the project. Storage of all types of files – documents, meeting notes.
5. Resource Management	Manages project resources such as people, equipment, and services
6. Process Management	Manages work flow, process templates, project phases, tasks, task schedules, and delegation of tasks to project members.
7. Collaboration	Facilitates the collaborations between project members within and across project sites. Provides communication, e.g. e-mail exchange, group calendars, group writing and online group meeting.
8. Data Visualization	Allows users to view project status, cost and resources in an intuitive way

9. Graphical User Interface	Provides the user interface to interact with the system.
10. Database	Stores all data for the system

Kerzner (2009) mentions what project management software normally offers;

- Project data summary: expenditure, timing, and activity
- Project management and business graphics capabilities
- Data management and reporting capabilities
- Critical path analysis
- Customized and standard reporting formats
- Multi-project tracking
- Risk and Impact analysis
- Early-warning systems
- Graphical presentation of cost, time, and activity data
- Resource planning and analysis
- Cost analysis, variance analysis
- Multiple calendars
- Resource leveling
- Project calendars

According to Jadhav and Sonar (2011) a lot of literature lack in providing criteria that can be used for evaluation of any software package, therefore they propose a number of criteria groups as shown below in figure 9.

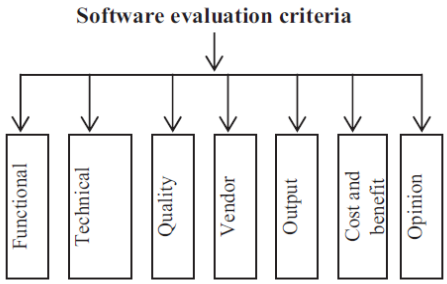

Figure 9: Software evaluation criteria (Jadhav & Sonar, 2011).

Jadhav and Sonar (2011) explains that the only specific criteria is the functional one, where the capabilities depending on the type of package are found, e.g. CRM, ERP, Project management related criteria. The other criteria: technological, quality, vendor, cost and benefit and opinion are generic and the details for each one of them can be found in appendix 2: Software evaluation criteria. These criteria has been used as a source of reference when setting up the feature framework in this thesis and are therefore important.

2.6 Evaluating project management software

Reliable and qualitative software is a growing demand, to meet this, firms are offering a variety of software packages which are customizable to meet different organizations' needs. Jadhav and Sonar (2011) stress the importance of selecting appropriate software since the opposite could adversely affect business processes and functioning. In this subchapter two processes for evaluating and selecting software will be presented.

Evaluation process of project management software

One of the earlier project management software evaluations was presented in 1985 (Davis & Martin, 1985). According to Davis and Martin (1985) it is important to evaluate not only the technical features but also what the program can do and whether it is easy to learn and use.

Furthermore, a software choice is very situational and the authors propose to start the software selection by looking at the users' situation, not at the software itself. It is useful to ask yourself the following questions:

- What are the characteristics of your project and who will be using the software?
- Do you really need to monitor the costs, resource planning and scheduling?

The steps of the proposed evaluation process are:

1. Review program documentation and instruction manual
2. Study and experiment with tutorial exercises
3. Enter data for a number of predefined activities in the different project management software, including times, costs and resources.
4. Enter the actual progress data for a portion of the projects activities in order to evaluate the program's updating and progress monitoring features.

By entering the same predefined activities, the differences in speed, ease of use and general functionality will be highlighted. Furthermore, the programs' accuracy and calculation performance could be checked and compared. Davis and Martin (1985) discovered themselves that not one package (of the evaluated ones) was better than the other on every dimension, they tended to be strong in one dimension but lack in another.

Evaluation process of software in general

Jadhav and Sonar (2011) presents a process for evaluation of software packages, not specific to project management software, but to software in general. It follows a six step process:

1. *Requirement definition*: Identify functional and non-functional requirements of the software; these must be accurate, complete and detailed.

2. *Preliminary investigation of available software packages*: Investigating major functionalities and features, helpful resources might be vendors web sites and third party's reports. Deliverable: list of packages to evaluate

3. *Short listing packages:* the candidates found in the second step that do not provide essential functionalities and features are eliminated in this phase. Criteria related to vendor or price can also be used for eliminating candidates. Deliverable of this phase is list of candidate software packages to be considered for detailed evaluation.

4. *Establishing criteria for evaluation:* The criteria that is to be used in the evaluation is identified and arranged in a hierarchical tree structure. Every branch ends into a well-defined and measureable basic attribute.

5. *Evaluating software packages* Metrics are defined and weights are assigned to each basic attribute in the criteria hierarchy. Rating is done against each basic criterion in hierarchy for each software package considered for detailed evaluation. Aggregate score is then calculated for each software package.

6. *Selecting software package:* The final phase is to rank the available alternatives in descending order of the score and select the best software. Aggregate scores gives us only an idea about which one is better over the other; however, decision of selecting best software package, as in other selection, is always human dependable.

3 Methods

This section will firstly describe the research orientation and strategy together with the overall process. Thereafter the choice of research design and methods will be presented and described. Finally the quality of the research is discussed with consideration taken to the research design and methods used.

3.1 Research orientation and strategy

The orientation of the thesis is mainly practical, it is meant to help managers in smaller marketing enterprises in evaluating project management tools available as SaaS. It also aims at understanding the needs of these enterprises and whether current project management SaaS tools meet these needs. Moreover, project management software developers could make use of the findings from this thesis in order to develop software that better meet the customers' wants and needs.

The research strategy when conducting a thesis is normally defined as either *qualitative or quantitative*. The fundamental differences are that the quantitative researchers use measurements to test theories, using a deductive approach while the qualitative research normally is connected to the inductive approach where theory generation is emphasized (Bryman & Bell, 2007). The model of the qualitative research can be seen below; it begins with the selection of a significant subject and, through the collection and interpretation of empirical information, ends with the creation of a new theory based on the encountered facts.

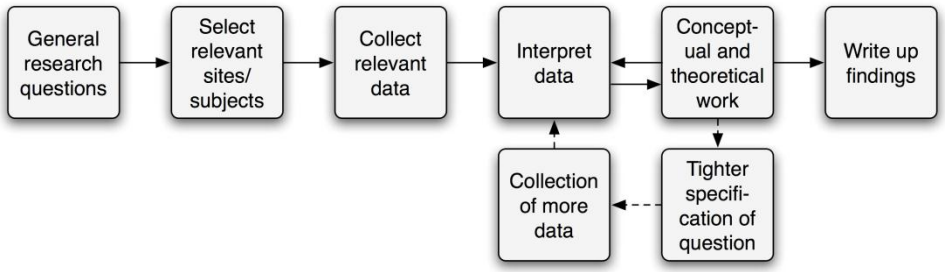

Figure 10: The main steps of qualitative research (Bryman & Bell, 2007)

The first part of this thesis investigated an area which was relatively unknown, project work in a small marketing firm and project management tool needs and wants in these firms, hence it aimed at creating theory rather than testing it. Therefore the first part of the study can be considered to have a qualitative approach. Furthermore, the first part of the study was characterized by an iterative approach which started out with the case study at Online Konsultor, where the firm's project processes, coordination issues and project management tool usage was studied. The project members' feature wants and needs were also investigated. Thereafter, the investigation was broadened with a multiple case study in order to understand whether the problems encountered at Online Konsultor could be found in other companies or if the feature needs and wants differed; both firms which were similar to Online Konsultor and firms in other sectors were interviewed, trying to identify patterns. Throughout the process the research questions have been more specified as analysis of findings have been ongoing.

The second part of the study on the other hand aimed at testing and evaluating a number of project management SaaS tools, which can be considered to have a less inductive and rather a deductive approach. The findings from the first part of the study were used to create a feature evaluation framework which was then tested through evaluating the project management SaaS tools.

The overall research process can be viewed in figure 11 below. The research started out with Online Konsultor expressing the problems the company was experiencing with their current project management tool *Basecamp.* This was then followed by an explorative pre-study including;

- An initial literature review of project management theories, SaaS tools and evaluation models
- Initial on-site observation of the usage of the current tool
- Informal interviews to understand the problem better

Thereafter the problem formulation could be done as a gap in literature had been identified; knowledge about how and what to evaluate in project management SaaS tools considering small marketing firms. Hence, the initial problem, Online Konsultor's dissatisfaction with their current tool, moved towards a more general problem; Project management SaaS tool fulfillment of feature wants and needs of the small marketing firms. Then the research questions were formulated.

Before the empirical studies took place, literature was reviewed in more detail and the theoretical framework was created. There were three empirical studies conducted;

- A case study at Online Konsultor including observations and semi-structured interviews
- A multiple case study with four groups of interviewees conducted through semi-structured interviews
- A tool evaluation investigating a number of project management SaaS tools

The case study and the multiple case study used the qualitative approach when conducting the research and there was a sequential relationship between these studies. The case study was performed first and the multiple case study afterwards. The findings from the case study provided input to the interview questions asked in the multiple case study. After having performed the case study, research question one could be answered. The case study together with the multiple case study provided the possibility to answer research question two.

Through performing an empirical analysis of the case study and multiple case study, a set of features were put together into a feature evaluation framework which was used to perform the tool evaluation, which provided input to research question three. Finally, by comparing and analyzing the findings from the empirical analysis and the tool evaluation analysis, conclusions could be drawn.

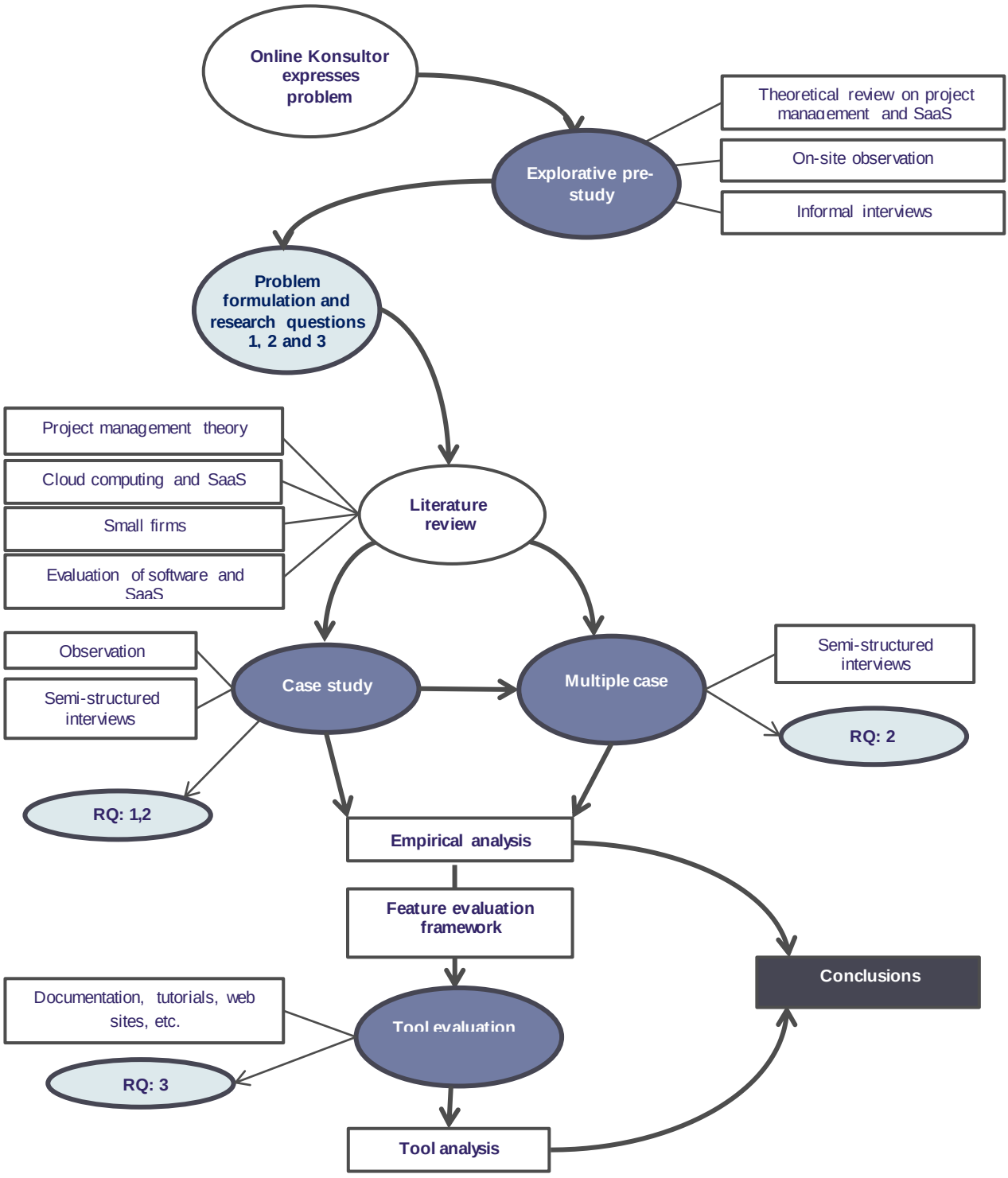

Figure 11: Work flow and methods

3.2 Research design

The research design guides the structure of the research; the methods and also the analysis of the data (Bryman & Bell, 2007). The choice of research design is important since it will affect the research evaluation criteria; reliability, replication and validity. This research has employed the case study design and multiple case study design.

The *case study design* included studying one small online marketing company, in this thesis called Online Konsultor, in a detailed way with the intention of understanding the project processes and project work as well as uncovering project coordination challenges in this company. This was followed investigating the needs and wants regarding project management SaaS tool features, performing interviews with staff at Online Konsultor. The case study is a research strategy which entails studying one single entity intensively with the aim of understanding the dynamics present in the case (Eisenhardt, 1989). Since the aim of the study was to understand the social aspects as well as the interaction of actors entailed in coordinating projects, the case study was considered suitable.

Multiple case studies are becoming increasingly popular in business research and are undertaken with the purpose of comparing the cases included in the study (Bryman & Bell, 2007). The multiple case study allows the researcher to compare and contrast findings deriving from each case. Since the researcher wanted to investigate whether other companies experienced the same or different wants and needs as Online Konsultor regarding project management SaaS tool features, this design was applied in the second study.

Within the frame of the case study and the multiple case study a feature evaluation framework was developed after the empirical analysis of these. The feature framework was tested on a number of project management SaaS tools and the results analyzed in order to be able to answer research question three, to what extent and under what circumstances the current SaaS tools support wants and needs deriving from the previous studies.

3.3 Research methods

As mentioned in the previous chapter, the research strategy sets the research structure but also influences the research methods. In case studies, data collection methods typically used are; archives, interviews, questionnaires and observations (Eisenhardt, 1989). The following research methods will be presented; literature study, observation, semi-structured interviews and documentation. In this section the methods are presented and their use motivated. In the next section where the studies are described, the procedure of the research will be explained in more detail.

3.3.1 Literature study

The literature study provides the basis on which the research questions are justified (Bryman & Bell, 2007) and allows the researcher to analyze data in an informed way. Through studying literature the researcher finds out what is already known in the area of the research and it also increases credibility of the study as being able to draw on other's work to support an argument or conclusion is important. The areas of literature included were;

- Project management theories and critics to these
- The concept of Cloud computing and Software as a Service
- The characteristics of the small firms and their project management
- Project management software
- Software evaluation processes

Apart from identifying existing knowledge in the areas stated above, the literature study helped in identifying what was not known. The topic of this study has not been dealt with in great detail; evaluating project management tools available as SaaS, nor the needs of the small marketing firm, which increases the value of the conducted research.

The literature study has been very important when analyzing the findings in this investigation. It has also increased the understanding for the difficulties regarding SaaS and difficulties related to the evaluation and selection of software.

3.3.2 Observation

Observation was used during the case study of Online Konsultor. The observation employed can be considered to have been non-participant observation where the observer observes but does not participate in what is going on in the social setting (Bryman & Bell, 2007). Observation is suitable when studying social interactions. The aim of the observation in this research was to understand the interactions between the project stakeholders; project managers, project members and clients at Online Konsultor and also to identify how they used their project management SaaS tool during their work in projects.

Furthermore, the observation can be considered unstructured since no observation schedules were used. This method was chosen since the researcher had the possibility to perform the thesis onsite and was therefore able to observe the ongoing work in the company. The reason for not choosing structured observation was because the researcher was not looking for particular behavior but rather to map the process of projects, occurred behavior and interactions between stakeholders along the process; hence, a coding schedule as used in structured observation was not suitable.

3.3.3 Semi-structured interviews

Interviews are probably the most widely used method in qualitative research (Bryman & Bell, 2007). The two main types of qualitative interviewing is unstructured and semi-structured interviewing. In qualitative research, the researcher wants answers which are rich on descriptions and has detailed answers whilst in the quantitative, the interview guides are designed to generate answers that can be coded and processed rapidly. Semi-structured interviews are relevant to use when there is an interest in the interviewee's point of view in a particular area. The researcher normally prepares a number of questions on different topics that he/she wants to cover but flexibility is given to adjust the questions during the interview and also to add new questions (Bryman & Bell, 2007).

The semi-structured interview was used when exploring the project management SaaS feature needs and wants, first in the case study at Online Konsultor, and then during the second data collection as well. There were in total four different semi-structured interview guides set up.

The semi-structured interviews in the multiple case study were conducted via telephone. An advantage of this is that it lowers the influence which the interviewer's characteristics can have on the interviewee. Though, a disadvantage is that the interviewer cannot engage in observation (Bryman & Bell, 2007). Either way, the reason for choosing phone interviews was due to distance between the location of the interviewees and the researcher.

3.3.4 Documentation

The project management SaaS tools were evaluated through reading documents, or in this case written information on web sites. This type of data is a type of secondary data and normally requires high interpretative skills (Bryman & Bell, 2007). Important to consider when taking on the use of documents are; the authenticity, credibility, representativeness and meaning. One risk in applying this research method is that the documents produced by companies might bring issues related to credibility and representativeness since a company may try to make their product look as good as possible on paper. A tool might provide a particular feature, but it is not

until it is tested one can be sure the feature works in a satisfying way. Hence, the optimal and safest way to evaluate the tools would of course have been to try all of them out. Due to time and resource constraints this was not possible.

However, the purpose of the investigation of the tools was not the rate the performance of different features; it was rather meant to check whether the tools supplied particular features. Hence, the risk of credibility lacks can be considered to have been lowered.

3.4 The studies

In this section the three studies which have been performed will be outlined; the case study at Online Konsultor, the multiple case study with other companies and the project management SaaS tool investigation.

3.4.1 Study 1 at Online Konsultor:

There were mainly three methods used during data collection in the first study; unstructured non-participant observation during three months, process mapping of four projects involving three consultants per mapping session, and nine semi-structured interviews.

In order to investigate the project coordination at Online Konsultor, the researcher employed observation while working and performing the thesis in the company, in total three months were spent observing the work in company, though full time observation was not applied. The researcher was a participant of the group but not of the projects. As the researcher was a part of the company she could actively observe the way the staff worked in projects, how projects were coordinated and what challenges were encountered along the processes. Furthermore, when studying something in its natural environment the interaction between the different project stakeholders and their behavior could be observed. The goal of the observation was to understand the social interactions, the project process at Online Konsultor and to understand how the company used project management tools during projects. The findings from the observation were recorded by taking notes which then could be organized and analyzed.

Apart from observation, the project processes were identified through mapping the typical project steps of some of Online Konsultor's projects. This was done together with three consultants per mapping session using post-its to create a flow of activities which occurred during some of their typical projects. Estimation of the time each activity required was also recorded. Four project workflows were defined; online reputation management, search engine marketing, search engine optimization and display management. The aim of this exercise was to clearly understand all activities which take place during the projects since all might not be visible through sole observation. Using post-its as a tool made it easy to change steps and reorganize the flow. The researcher used several sources of information, three consultants, in order to make sure no steps were excluded or forgotten.

There were also semi-structured interviews performed at Online Konsultor, where nine people with different positions were interviewed; Project manager, web developer, programmer, CEO and five marketing consultants. The guide can be found in appendix 3. Staff in different positions was chosen to get the perspective of all tool users in the organization involved in the projects. The interviews were performed face-to-face and lasted around 45 minutes each.

3.4.2 Study 2: Multiple case study including other companies

The aim of the second study was to investigate project management software feature needs and wants present amongst the users in other firms. Both firms which were active in the same sector as Online Konsultor and firms from different sectors were interviewed, including both current users and non-users of project management SaaS. Furthermore project management SaaS tool providers were interviewed in order to understand what features they believed were important

to their own customers. The following chart shows the different interview objects which participated in the second study:

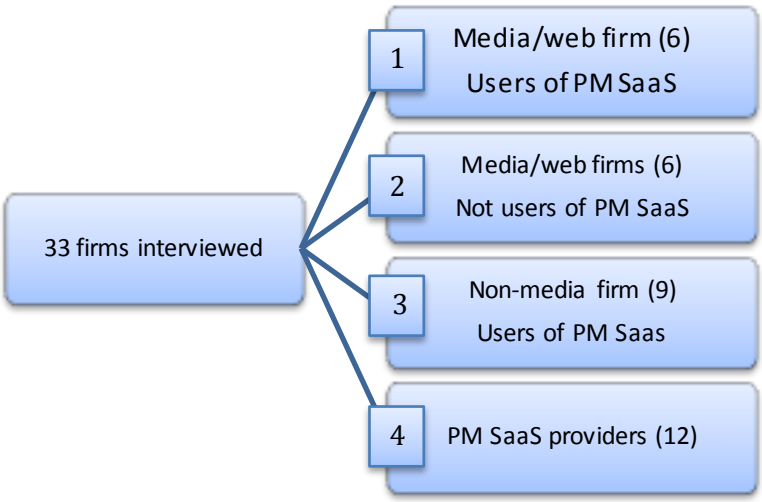

Figure 12: Overview of interview participant groups in study 2

In total there were 33 firms interviewed and these could be divided into four groups. All interviews were conducted over the telephone lasting from 25 to 60 minutes each. The interviewees can be found in appendix 4, 5 and 6 where the firm name, position of the interviewee and date of the interview are stated. Though, it has to be noted that all companies are not listed as some preferred not to appear in the published edition of this thesis; these companies have been given the names Firm A, Firm B and so on.

1) the first group of interviewees were tool users in other **small media and web companies**, where project management tools available as SaaS were already adopted. The interview guide can be found in appendix 4. These interviews were conducted to understand whether the needs and wants encountered amongst the users at Online Konsultor were common amongst other similar companies and to detect what differences there were (if any). Within this group of interviewees six companies were interviewed, one interviewee in each company, the interviewees were project managers or project members.

2) the second group of firms were also **media and web firms but which had not yet employed project management SaaS tools**. There were in total six companies interviewed, one interviewee in each company and the interviewees were project managers or project members. The interview guide which was used can be seen in appendix 5.

3) the third group of interviewees included companies which were active in **other sectors than media and web**, but which used project management SaaS tools. These were collected in order to provide insights about features which were considered important for these users, as these might be different from the media/web firms. The questions asked in these interviews were the same as the first group and can be viewed in appendix 4. In total there were nine companies interviewed, one interviewee per company and consisting both of project managers and project participants.

4) The forth group of interviews was performed with **SaaS providers** supplying project management tools. These were interviewed in order to understand the needs and wants they believed their users have and to cover potentially important features which might not have been recognized previously. The questions asked in these interviews can be viewed in appendix 6. In

total there were twelve companies interviewed. The interviewees were mainly sales staff but also people working in help support.

Sampling respondents to the multiple case study

There are three broad approaches used for qualitative sampling; convenience sampling, judgment sampling and theoretical sampling (Marshall, 1996). The sample methods used to select participants in the semi-structured interviews with small media and web firms, both users and non-users of SaaS and the non-media firms (interview groups 1, 2 and 3) were sampled through convenience and judgment. Finding the companies was done through searching for marketing or media companies online but also through checking customer references available on project management tool providers' web pages. Furthermore, Swedish companies were chosen more often chosen over foreign ones in order to facilitate the ability to reach the interviewees and also to lower costs due to resource shortages. Hence the decision of who would participate was dependent on information available on the web in terms of search engine hits and contact details (convenience) and also on a personal judgment regarding the companies' relevance (judgment).

In the first group of interviewees all used a project management SaaS tool and were categorized as media/web firms. There were four companies working with online marketing and web development, one company working with solely web development and one editorial media firm. The second group of interviewees did not use project management SaaS tools but were also categorized as media/web firms. There were three companies working with online marketing, one with web development and two firms with market research and more traditional marketing campaigns.

In the third group the firms were categorized as non-media firms and all used project management SaaS. These firms were all service organizations apart from one. There were one Management and IT consulting firm, three IT development firms, two university institutions, one governmental institution, one online search engine company and finally one innovation and R&D department. The sampling of the SaaS provider firms (interview group 4) were also done through convenience and judgment. The companies were found through an online search engine and the ones which stated to supply a project management tool through SaaS. Around 20 companies were contacted and 12 were successfully interviewed. These interviewed firms derived from different countries, both Sweden, the US, Ireland and India.

Data analysis in qualitative research

Qualitative data analysis is known to be rather complex since the researcher easily ends up with rich data through field notes and interviews (Bryman & Bell, 2007). Analytical induction and grounded theory are qualitative data analysis methods. These are normally considered to be iterative processes since analysis starts already after the first data has been collected and serves as input in the coming data collection. The analysis from the first steps shapes the next steps in the data collection (Bryman & Bell, 2007).

In this study, the researcher intended using this approach, starting out with the case study at Online Konsultor where the data collected was analyzed and later used as input in the multiple case study. Furthermore, throughout the interview data collection the information revealed in one interview was several times used as input to form new questions in the next interview in order to explore new themes that came up throughout the data collection.

To facilitate the analysis of data collected from semi-structured interviews the data was coded. The coding focused on grouping the data after different themes, putting all relevant data regarding one concept together in a word editor in order to obtain different perceptions and seeking for patterns. This method seemed to be the most appropriate since topics were mixed

up in the transcripts, the interviewees reflections did not correspond exactly to the questions asked.

Feature evaluation framework creation
During the empirical analysis of the first and the second study, the findings were interpreted and contrasted. Each group of interviewees in the multiple case study were contrasted both between each other but also with the case study at Online Konsultor and with literature in order to be able to extract a number of features which were not only wanted and needed by the firms but also suggested by literature. This analysis resulted in the feature evaluation framework which can be seen in appendix 7. The procedure of extracting features was performed by grouping features according to the analysis. Overall features were assigned sub-features in order to be able to measure the overall features. For example, *Centralized communication* was considered an overall feature whilst *messaging* and *document sharing* were considered sub-features of the overall feature *centralized communication*.

3.4.3 Study 3: Tool evaluation

The evaluation of the tools was performed through assessing the feature list resulting from the empirical analysis of study 1 and 2. The assessment was performed going through documentation available on the tool providers' web pages. The evaluation process used was influenced both by the processes suggested by Jadhav and Sonar (2011) as well as Davis and Martin (1985).

As proposed by Davis and Martin (1985) the software selection should start by looking at the users' situation, not at the software itself. The same initial step is suggested by Jadhav and Sonar (2011) where the authors recommend identifying functional and non-functional requirements of the software. This step was fulfilled through study 1 and 2.

The second step was to perform an investigation of available SaaS tools with the aim producing a list of tools to evaluate, corresponding to the second step of Jadhav and Sonar's (2011) evaluation process. This was basically done through Internet searches. The keywords used were "Project management tools" + online/SaaS/as a web service/tool evaluation. Through these searches, tools were found both directly from the search engine hits but also through pages where project management SaaS had been listed. There were in total around 200 tools found.

The selection of tools to evaluate was done through a funnel as illustrated below.

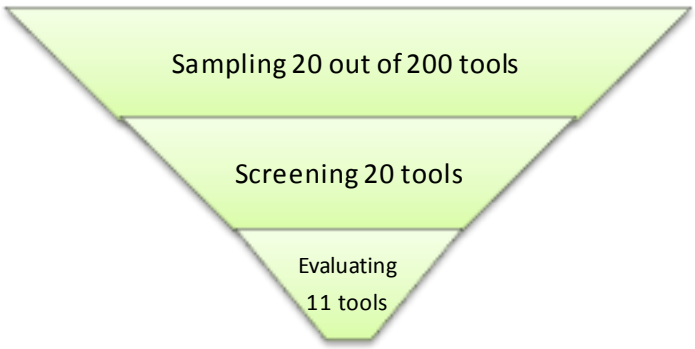

Figure 13: Illustration of tool evaluation funnel

The evaluation started with sampling 20 tools randomly from a list where the 200 encountered tools had been listed. Then a screening, or shortlisting, of the 20 tools was performed, corresponding to step 3 in Jadhav and Sonar's (2011) framework. The short listing applied a number of filter criteria, as follows:

- ✓ The tools had to be available as SaaS, desktop software was excluded
- ✓ The tools had to be promoted as project management tools, only "collaborative software" or "groupware" were not included
- ✓ SaaS provided as free of charge were excluded since this type of business model is less established and the researcher believed it would bring more risks in terms of vendor stability
- ✓ SaaS tools which did not dispose their pricing were excluded since the researcher believed it was important to be able to record prices
- ✓ The tools had to be easily triable, not requiring contacting the supplier in order to increase flexibility if one would like to try out the tool
- ✓ The websites of the tools had to provide enough information in order to be evaluated, enough means being able to fill out more than 70% of the feature list evaluation.
- ✓ Since messaging was very important to the marketing firms, a message function was required as well

Of the 20 tools which were screened, 11 passed to the next level of evaluation.

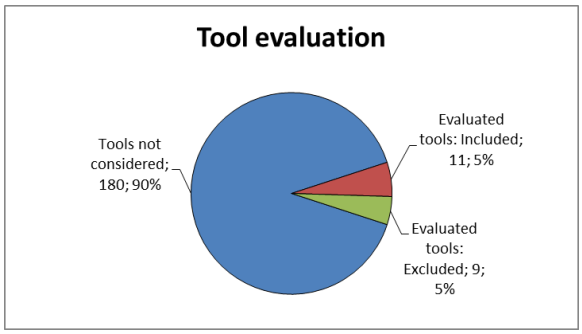

Figure 14: Tool investigation overview, 11 tools were investigated

The tools that were screened were the following:

Table 4: Tools considered during investigation and whether they were included or not

No.	Tool Name	Included/Excluded	Website	Date of evaluation
1	Basecamp	Included	www.basecamphq.com	2st of April 2012
2	Celoxis	Included	www.celoxis.com	2st of April 2012
3	Projectplace	Included	www.projectplace.se	3rd of April 2012
4	Projectturf	Included	www.projectturf.com	2st of April 2012
5	Proworkflow	Included	www.proworkflow.com	2st of April 2012
6	Same-page e-studio	Included	www.same-page.com	2st of April 2012
7	Teamwork live	Included	www.teamworklive.com	3rd of April 2012
8	Teamwork PM	Included	www.teamworkpm.net	2st of April 2012
9	Visionproject	Included	www.visionproject.se	3rd of April 2012
10	Zoho projects	Included	http://www.zoho.com/projects	2st of April 2012
11	Clarizen	Included	www.clarizen.com	3rd of April 2012
12	Daptiv	Excluded - No price nor triable on request	www.daptiv.com	3rd of April 2012
13	Tenrox	Excluded - lacking information	www.tenrox.com	3rd of April 2012
14	AtTask	Excluded - No price available, triable on request	www.attask.com	2st of April 2012
15	24sevenoffice	Excluded - no messaging	24sevenoffice.com	2st of April 2012
16	1st manager	Excluded - no messaging	www.1stmanager.com	3rd of April 2012
17	Teambox	Excluded - Free of charge	www.teambox.com	3rd of April 2012
18	Meltwater drive	Excluded - No price disposal, not triable	www.meltwaterdrive.com	2st of April 2012
19	Qtask	Excluded - lacking information	www.qtask.com	3rd of April 2012
20	Todoyu	Excluded - no messaging	www.todoyu.com	2st of April 2012

After the screening it was time to investigate the remaining tools (11 of them) applying the feature framework. The features were evaluated through reading documents, or in this case, written information on the tool web sites. For the evaluation of each feature a simple scale was used; *Yes, No, N/A,* or Yes, Partly, No, N/A or simply *text or numbers* as can be seen in the feature list in appendix 7.

"Yes" meant simply that the feature was provided and "No" the opposite. N/A was used when a feature was not found, but the researcher could not be sure the feature was not provided. "Partly" was only used in a few cases, for instance, when evaluating the features: *Resource management (e.g. allocation, estimation, tracking)* and *Cost management (e.g. budgeting and tracking).* When given the value "Partly", it meant that the tool provided some support for the feature, but not all listed within the parenthesis.

During the tool evaluation, a number of features were excluded, for example financial stability of the provider due to difficulties in acquiring financial statements of the companies, many were based abroad. As recognized by Bryman and Bell (2007), sometimes it is necessary to use indicators in order to provide a measure of a concept. One feature which was identified to be important was ease-of-use, which is a concept that can only be measured through a number of indicators since it is a variable characteristic that does not have a direct measure. In this case, the only indicator which was used was whether the provider promoted their tools to be easy to use. This can be considered a rather weak indicator and it is clear that trials would have to be performed in order to make sure to get a good measure of it.

The next step in the evaluation process according to Davis and Martin (1985) would have been to actually perform trials of the tools and rate the performance. The same was found in the case of Jadhav and Sonar (2011), suggesting criteria weights to be applied and using evaluation methods such as AHP (analytical hierarchy process) or similar to be able to finally make the selection of tools. In this investigation the purpose was not to choose the best tool but to investigate the tools considering what type of features they provided, hence, these steps were excluded in the evaluation process.

After having evaluated the tools, the results were first presented by feature and secondly by grouping and categorizing the tools, how this categorization was performed is described in appendix 8.

3.4.4 Managing language barriers during research

The data was collected in several languages; Spanish, English and Swedish which could bring a certain difficulty to the interpretation of interview answers. The case study at Online Konsultor was conducted in both Spanish and English, the multiple case study in Swedish and English and the tool evaluation in English. The researcher is fluent in all three languages which is a necessary attribute to begin with, though the difficulty might come with the particular nomenclature used in each language; project management terminology and names of software features. When it comes to feature names, these have been translated from English to Swedish and Spanish respectively taking help from dictionaries and project management SaaS tools' web pages which were sometimes provided in several languages. Hence, the vocabulary used in these tools could be checked upon and used during interviews. Moreover, during the interviews, the participants were asked to explain what each feature meant to them, that way each feature would be explained and not only given a name in order to make sure the researcher had understood the wants and needs correctly.

3.5 Quality of the research

The commonly used criteria to evaluate social research studies are construct validity, internal validity, external validity, and reliability. When it comes to qualitative research it has been

recommended to apply a different set of criteria: trustworthiness and authenticity (Guba and Lincoln 1994, cited in Bryman and Bell, 2007). Trustworthiness consists of four concepts; credibility, transferability, dependability and confirmability, these four will all be included in the research evaluation. Authenticity, on the other hand, is a criterion which concerns political impact of the research and is therefore not relevant for this study. Ecological validity on the other hand is normally considered to be relevant in case studies and will be discussed at the end of this section.

3.5.1 Credibility

Credibility parallels the internal validity measure in quantitative research. In qualitative research the establishment of the credibility of findings means ensuring that research has been carried out in accordance with good research practices. In order to increase credibility, the findings should be submitted to the participants of the research for confirmation, a so called respondent validation. Furthermore, it is recommended to use triangulation to increase credibility, either by using more than one source of data or more than one method for data collection. High credibility confirms the integrity of conclusions at the internal level.

Riege (2003) proposes some procedures to ensure internal validity for case studies and some of them have been chosen to intensify the criterion of credibility in this study. The researcher tried to self-monitor herself during the interviews, trying to explore and clarify the respondent's answers when these were not coherent with the purpose of the asked questions. Furthermore cross-case analysis, looking for patterns have been performed in the research and finally triangulation of data sources and methods were used to a large extent.

In the first study of Online Konsultor, the observations performed in the company were complemented by project process mapping together with the consultants in order to make sure the project processes had been understood correctly by the researcher. Furthermore, the feature wants and needs were conducted through interviews with different employees within Online Konsultor. The results from the interviews were confirmed through summarizing the features that had been found and showing these to the participants.

In the second study, there was no confirmation of the findings but the researcher used triangulation through several sources of data – several companies within the same sector were interviewed in order to collect information. Furthermore, the cases were objects to cross-case analysis trying to find patterns within and between the different cases in order to increase credibility. Finally, the project management SaaS tools were evaluated following the same feature list using web sites as principal source of data. Several tools were evaluated and cross-case analyzed which can also be considered to have increased credibility. Though, it would have been better to perform trials of the tools in addition to the web sites.

3.5.2 Transferability

Transferability is analogue to external validity in quantitative research. The test of transferability is achieved when the research shows similar or different findings of a phenomenon amongst similar or different respondents (Riege, 2003). Transferability is enabled by thick descriptions and details of a context (Lincoln and Guba 1994, cited in Bryman and Bell, 2007). According to Yin (2009) qualitative research has been traditionally criticized for providing low generalizability but the author believes this confusion to come from the nature of the generalization. While quantitative research intends to expand the findings by statistical generalization, case study reaches it analytically and the investigator makes an effort to generalize a particular set of findings to some broader theory.

In order to increase the transferability of this study, the context, results and analysis of these have been provided with thick descriptions. Especially, this is true for the case study at Online Konsultor. The multiple case study included more objects of study but with a lower intensity of

the description of the cases. In multiple case studies Riege (2003) proposes to use replication logic when selecting different kinds firms. The firms which were chosen for this study were grouped according to this replication logic (media/web firms, users and not users of SaaS, other service firms and SaaS providers) which improved the analytical generalization of findings.

The results of the study might be valid for more organizations than just Online Konsultor within the small online marketing firm sector since it has been shown that several companies face the same wants and needs regarding project management tools available as SaaS. Moreover, the features which were identified in the feature evaluation framework are thoroughly described and might be transferable to other contexts, where companies might have the same needs and wants.

Finally, the considering the tool evaluation, the conclusions which can be drawn from this study cannot be generalized to a large extent for several reasons. There were only 11 tools included and these tools were selected by applying a number of filters or attributes which had to be fulfilled in order for the tools to be included in the evaluation. Hence, these cannot be considered a representative sample. However, how the filtering was performed is clearly stated so to some extent these tools can represent a small part of available project management SaaS tools but far from all. Moreover, the findings have been compared with the findings of previous authors, though, only to a small extent since very little research was found in the area of project management SaaS tools.

3.5.3 Dependability

Dependability parallels reliability in quantitative research, where the research study's processes and methods are judged on the base of whether they can be repeated with the same results being produced (Bryman & Bell, 2007). In order to ensure the dependability criteria the researcher should ensure that complete records are kept of all phases of the research, such as the problem definition, selection of participants, interview transcripts and data analysis. To ensure dependability the procedures should be audited by the peers (Lincoln and Guba 1994, cited in Bryman and Bell, 2007). Since this is a rather demanding, it has not been applied in this research, besides, it is commonly understood that this kind of research is rather personal to the investigator and that there is no guarantee that his/her peers would not come with radically different conclusions (Mays, 1995).

To increase dependability in this research it has been spelt out how the participants were chosen, both the interview participants and the tools. The transcripts of the interviews are maintained and the description of data and analysis is rather extensive. Furthermore, each interviewee's company type and date of interview are stated and the interview guides are provided. However, the results of the interviewees may change as the environment around them changes, hence, dependability after all cannot be considered to be high. The evaluation of the tools was performed through following a feature list of predefined characteristics which gives a certain stability to the process. Furthermore, how the categorization of the tools was done has been described in appendix 8 which increases dependability.

3.5.4 Confirmability

Confirmability concerns objectivity of the research and is closely related to construct validity (Riege, 2003). To meet the criterion it has to be ensured that the researcher has acted with good faith and that the researchers' own values has not intruded in the research (Bryman & Bell, 2007). Though, it is recognized that complete objectivity is impossible in business research. However, to increase confirmability the general methods and procedures should be explicitly described in detail, this thesis provides a rather extensive description of the procedure of all the steps which can be considered to have increased confirmability.

Construct validity is whether the measure that is formulated to measure a concept, really reflects that concept (Bryman & Bell, 2007). Using several sources of evidence, the case study and multiple case study can be considered to have given a good base for the identification of project management tool features. Though one thing that should be questioned is whether the identified features in the framework actually provided the possibility to categorize the tools correctly. The overall features, such as centralized communication, consist of several sub-features with the intention of measuring the principal feature. Construct validity could be negatively affected depending on the how the sub-features have been selected and used, whether these represent the overall feature. Anyhow, triangulation has been used in order to identify different features that are important to consider when evaluating the overall suitableness of the tools and this strengthens the construct validity.

3.5.5 Ecological validity

Ecological validity concerns whether the findings are applicable to people's everyday life. The results of this study are meant for practical appliance and could be very useful for people working in small marketing companies in need of project management software. They could take use of the findings of the evaluated tools or make use of the framework of features which was developed. Furthermore the companies providing the tools could use the results in their development of tools in order to create a better fit for their customers. Hence, the ecological validity can be considered rather high.

3.5.6 Summary of the research quality

In the following table the research quality criteria is summarized for each study and given a grade – low, medium or high.

Table 5: Summary of research quality per study

Research quality Summary	Case study Online Konsultor	Multiple Case study	Tool evaluation
Credibility	Participants reviewed data from interviews and process mapping – credibility high	Triangulation of several objects trying to find patterns – credibility medium	Several tools were cross- case analyzed, only source web sites – credibility low
Transferability	Thick descriptions were used – medium transferability	Replication logic when picking cases. Feature framework might be transferable to other firms in service sector – medium transferability	11 tools were included and selected using a filter criteria – medium transferability
Dependability	Interview transcripts are maintained and interview guides are provided – dependability low	Selection of participants described and interview guides provided – dependability low	Tool selection, evaluation framework and grouping procedure described – dependability high
Confirmability	The methods used are described, though the researchers interpretation of the case might have affected results – confirmability low	To create the feature evaluation framework several sources of evidence was used – confirmability medium	How the tools were grouped has been spelled out – confirmability medium
Ecological validity	The results describe the environment of Online Konsultor – ecological validity medium	The evaluation framework provides high ecological validity	The evaluation results can be very useful for software developers and potential PM SaaS adopters – ecological validity high

4 Study 1: Project management at Online Konsultor

In this chapter the findings from the case study are presented through an empirical analysis. It aims at contextualizing the project processes and coordination at Online Konsultor. First an introduction to the company's organization is given, then project coordination challenges are analyzed and the project processes are presented through describing two types of projects. Finally, the role of the project manager is discussed. The following figure shows the areas that will be covered in the empirical analysis.

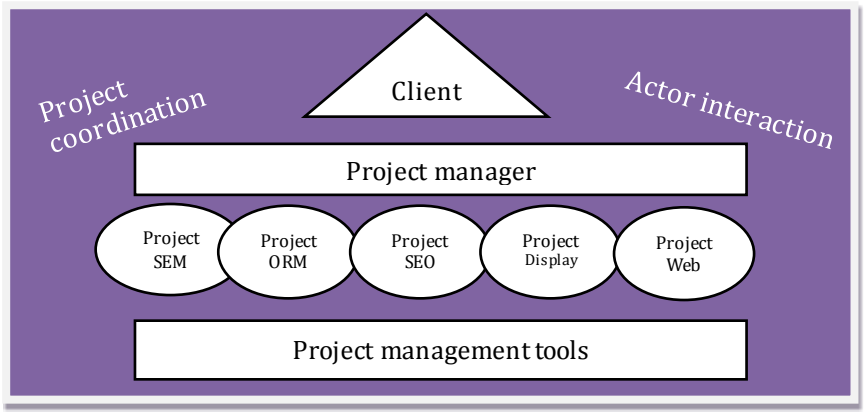

Figure 15: An illustration of the areas that will be covered in the empirical analysis of Online Konsultor case study

4.1 Online Konsultor's organization

Online Konsultor is a small online marketing firm based in Madrid (Spain). The company performs mainly digital marketing projects for their customers such as search engine marketing and optimization, online reputation management, web development and more with the objective of increasing their clients' visibility online.

At the time of investigation the company had fifteen employees, organized as can be seen in the organizational chart below. The *owners* were the main responsible for the sales as well as managing the company. The *project manager*, led most of the projects, though the owners were also taking on this role in some cases. The project manager was also responsible for coordinating the marketing consultants. There were two people within the administrative department, one *operations analyst* and one *accountant*. Then there was a *programmer* and one *web designer* and finally eight *marketing consultants*.

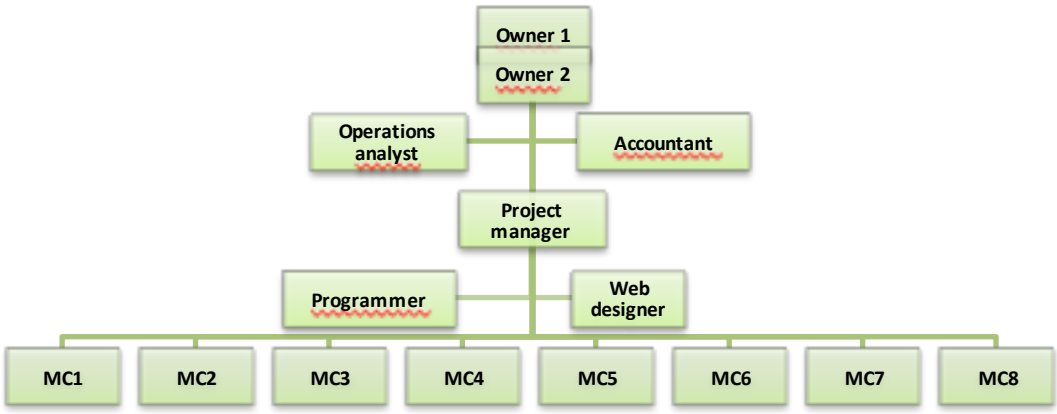

Figure 16: Organizational chart of Online Konsultor (MC = marketing consultant)

Online Konsultor runs rather small projects, ranging from a few weeks length to around 6 months. Within each project there were normally between 2-5 internal staff cooperating with the clients' staff. The staff was normally involved in several projects at the same time, especially the web designer and the programmer since their competence were required in almost all projects. To manage their projects, Online Konsultor used a supporting tool called *Basecamp* (http://basecamphq.com/) which is an online tool available as SaaS. Basecamp has features such as centralized messaging, sharing of documents, task set-up and assignation; it has a global calendar and a dashboard which helps keeping everyone up-to-date of the ongoing work. This tool is used by all the project participants but also by most of the clients, which are given access when a project is initiated.

4.2 Project process and coordination

As was seen in the literature review there are several standards and theories on how to best manage projects, e.g. the PMBOK Guide and Scrum. At Online Konsultor, none of these were explicitly followed, only methods such as planning, time tracking and performance management were utilized. According to the research performed by White and Fortune (2002) it is common that project managers use a very small number of project management methods and techniques, hence the case of Online Konsultor is not unique.

However, the process of the projects performed at Online Konsultor, as can be seen in the following figure is not very different from the typical project process presented by the PMI (2008).

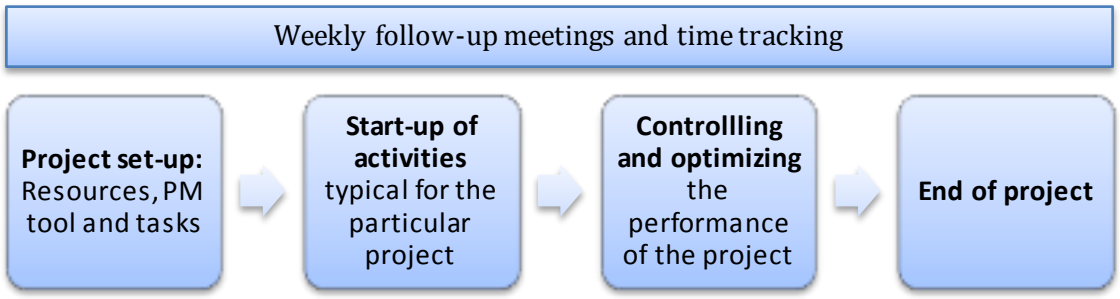

Figure 17: Overview of a typical project process at Online Konsultor

The "Project set-up" at Online Konsultor corresponds to the initiating and partly the planning process presented in the PMBOK Guide (as can be seen in figure 4). The "Start-up of activities" corresponds both to the planning process and the executing process, "controlling and optimizing" corresponds to the executing and monitoring processes as presented by PMI (2008). The "weekly follow-up meetings and time tracking" are also included in the controlling and monitoring processes. Finally, the "End of project" simply corresponds to the closing process.

Regarding the intensity of cost for Online Konsultor, it is directly related to the intensity of human resources required. When comparing with the graph represented in PMBOK Guide (PMI, 2008) the cost is more intense in the beginning of the project than in the latter part of it. In most of Online Konsultor's projects, the set-up of the marketing campaigns and the research required is very resource intense. Once the adverts are launched the intensity of work decreases. This is of course in the case when the campaigns are running according to plan, if problems were to occur along the way the resource costs might increase.

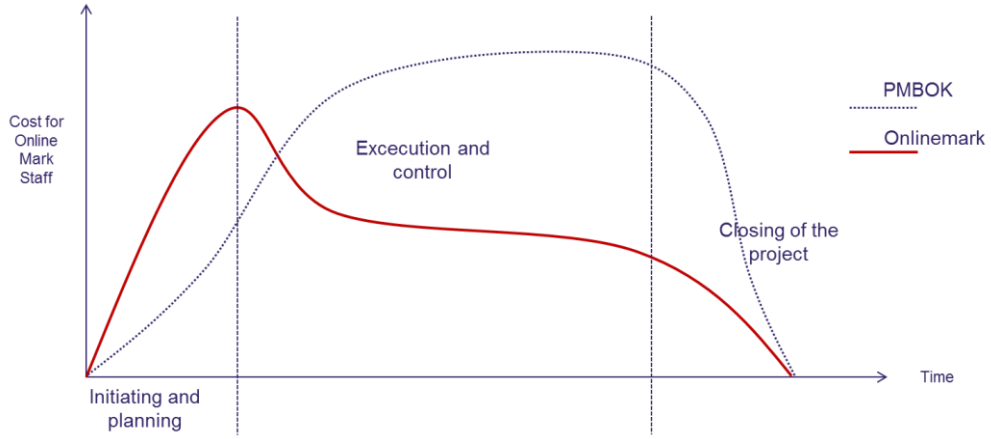

Figure 18: Project cost in the perspective of Online Konsultor throughout the projects

For the customer on the other hand, the cost looks as in the following graph. The consulting fee is fixed throughout the project with a potential bonus at the end which is applied if the performance of the project exceeds expectations. The advertising cost is variable depending on the spending of each month.

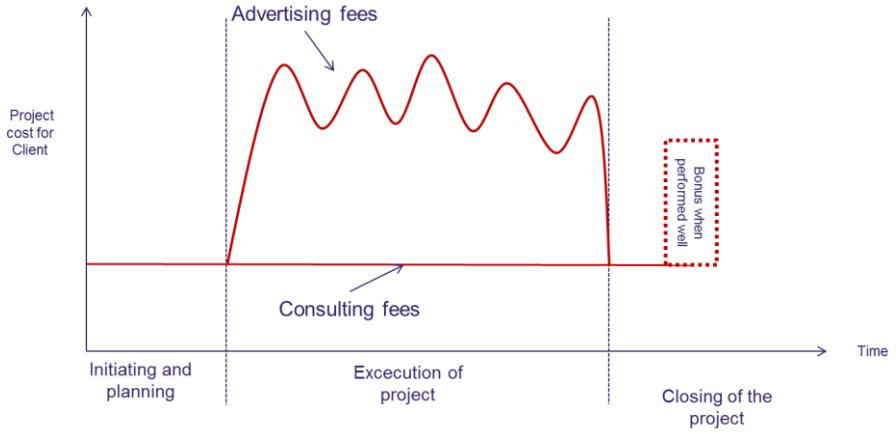

Figure 19: Cost during the projects for Online Konsultor's clients

4.2.1 Project set-up: resources, tools and tasks

The project set-up appears more or less the same way for almost all projects at Online Konsultor. Once a project has been sold to a client, the marketing consultants to work in the project are chosen. The choice of resources firstly depends on the skills of the consultant, whether he/she already has the competence to perform the project. The goal of the company was to develop multifunctional skills amongst their employees in order to increase flexibility which implied that the choice of consultants also could depend on whom needed to be educated. Secondly it depended on current work load. It was common that once a project was sold in it had to start straight away; hence, resource planning in the long term could be difficult. Either way, it was the project managers' responsibility to assign people to projects since she had the overview of what people were involved in what projects. This was normally performed in a manual manner, going through the project involvement of the consultants and estimating their work load in each project. It was noticed that the owners of the company also did some resource planning, besides the project manager, which sometimes created mismatches in the consultants' workload.

Next, the project management tool Basecamp had to be set up and the project was given a virtual workspace. It was the project manager's responsibility to administer this and also to

invite the participants to collaborate in the tool. Not only were internal project members included but also the clients were invited to participate as well. All internal staff used Basecamp but when it came to the clients, the rate of usage varied. Some clients had trouble using the tools in the beginning of the project, and then Online Konsultor would have to provide some extra support. A few clients, on the other hand, refused to use anything apart from the traditional e-mail. Online Konsultor preferred having their clients included in the tool since this was believed to facilitate communication.

In the set-up of the project, task lists were created in order to plan what needed to be done. Task lists and milestones were normally created by the project manager based on a number of factors; the project manager's previous experience from similar projects, the particular client's requirements, the project time line and also in discussion with the project members.

4.2.2 Weekly follow-up meetings and time tracking

The marketing team had weekly team meetings in order to keep track of all projects and to announce news or encountered issues. This was particularly useful for the project manager as it seemed to help her stay updated on all the projects and making sure important tasks in the different projects were actually performed. During the meetings, the project manager went through a number of task lists that she kept track of. For one part there were task lists in Basecamp which needed to be checked up on. Secondly, a separate excel task list was managed on the side, since the manager believed there were deficiencies in the task lists provided by Basecamp, in excel she was able to create priorities and get a simpler overview. Both of the task lists were shared with all team members. If problems were announced during the meetings, the project manager would try to solve these, it could be that someone needed extra help with something or that someone had trouble with a client relation.

Every second week the meeting also included a check up on the time spent on each project. The consultants were supposed to register all hours spent on working in different projects. The time tracking was performed through using a time tracking tool, basically a software application in the form of a stop-watch which recorded time. When registering the hours these ended up in Basecamp and could be retrieved and analyzed in excel. Projects were normally sold at a fixed price, hence, the billing did not depend on the recorded hours. The reason for tracking time was to make sure not too many hours were spent on non-prioritized projects but also to check whether Online Konsultor kept their budgets set for the projects.

4.2.3 Project coordination challenges

The project coordination issues that occur throughout the project are many and are often the same for all types of projects. The projects at Online Konsultor are rather small and one single project rarely consists of more actors than; the client, the project manager, 1-4 project team members, the web designer and the programmer. The difficulty did not lie in the single project itself but in the large number of projects which need to be coordinated simultaneously. This created both difficulties for the project manager, who correspondingly needed to control more instances and manage several different actors, but also for the project participants, which needed to be capable of balancing their work and coordinating their own activities to fit their different projects' needs. In the following table the encountered coordination challenges are summarized.

Table 6: Summary of the challenges which comes with managing projects at Online Konsultor

Project coordination challenges		
Phase:	**Type:**	**Explanation:**
Overall: Multiple project coordination	Balancing work and multi-tasking	Working the sufficient amount of hours in each project is a challenge since prioritizing is not always easy when working with multiple tasks. One project might suffer at times when another needs more focus.
	Coordinating human resources	All employees are involved in several projects in parallel, coordinating tasks and work load is a challenge since the intensity of work varies in each individual project.
	Tracking multiple projects	The project manager has to coordinate her own and others' work and make sure information reaches her to be able to stay up to date in every project.
Start of individual project	Project scope and requirements	The scope and requirements need to be defined together with the client and then communicated to the project members.
	Resources	Resources need to be planned, chosen and notified.
	Time line	The length of the project together with milestones needs to be set and organized around.
	Task planning	The tasks which need to be performed in order to successfully roll out the project have to be planned and assigned to project members.
	Tool introduction	The project management tool needs to be introduced to the clients and the project members need to be invited.
	Client relation	The client relation needs to be coordinated, such as meetings and communication.
Middle stage of individual project	Skill development	During the project work consultants might need to learn to perform new tasks, then teaching and learning is coordinated with the regular project work.
	Controlling and monitoring	The tasks related to controlling and monitoring the project needs to be managed.
	Billing	Advertising costs need to be gathered, either by the project manager or members and the accountant need to be notified. The consultant fee needs to be communicated by the owners to the accountant.
	Task management	Checking off performed tasks and adding new ones, assigning these to project members or clients need to be done communicated throughout the project.
	Time tracking	The time reports need to be analyzed and actions need to be taken, such as reorganization if someone's workload is too low or too high.
	Performance review and actions	If performance is low, actions need to be taken and staff might need to be reorganized quickly.
	Team meetings	Gathering with the whole team has to be organized and agendas prepared.
End of individual project	Client handover or continuation of performance tracking	At the end of the project the continuation might be done by the client or follow-ups of performance is done by Online Konsultor. This is normally a low intensive work but needs to be done – hence organization is required.
	Up-selling	At the end of a project up-selling should be intended, hence the project manager or the owners should contact the client for this – these might need to be notified and reminded to do so.

4.3 Detailed project process description

Two types of projects will be described, first the search engine marketing (SEM) campaigns and then the online reputation management (ORM) projects.

SEM are projects where adverts are put in Google search engine and similar. The SEM campaigns were run rather regularly for different clients at Online Konsultor, hence can be considered "painting by numbers" as categorized by Maylor (2010). The projects were normally run by 2 consultants, the programmer, the web designer and supported by the project manager.

The first part of the SEM projects is to define various parameters of the campaign which is to be launched. The project manager first has to discuss with the client what payment model and budget to be used. There can be different types, such as pay per click or pay per conversion. Furthermore, time line and goals need to be set to the project together with the client. Thereafter a list of keywords, the structure and the actual creation of the campaign is done. Either the project manager or a project member does this. The words which will be used in the advert need to be proposed and client needs to agree with the choice of wording. Deciding on this was normally done by sending messages back and forth on Basecamp.

The campaigns which aims at collecting potential customer data require a so called landing page[1], this landing page has to be programmed and designed, hence, a programmer is included in the spiral of the project and also a web designer. In the design of the landing page, another client interaction is required; the looks of the landing page must be satisfying in the client's opinion. In Basecamp, designs and layouts were shared through uploading pictures and that way communication took place. This process can take an iterative approach as the client might not be happy with the first proposal. When the set-up of the campaign is done, it is launched and the functioning is tested and revised.

After the set-up, the process of maintaining and following the campaign starts. The spending of the campaign has to be controlled for several reasons. Firstly, in order to make sure the **budget set to it does not get exceeded**. This is normally done on a daily basis. A couple of times the mistake of not keeping track of the consumption have resulted in spending too much of the set budget, hence this is an important task. Since the project manager is responsible, she controls and makes sure this is done every day by one of the consultants. Secondly, the reason for checking spending is also to **be able to notice deficiencies in the performance of the campaign**, if performance is low, measures of increasing the performance have to be taken. For example, the key words might have to be optimized or the content of the advert might need to be modified in order to increase visibility in the search engines. If the adverts were not running properly the clients' satisfaction would decrease, in the cases where this happened it was mainly the project manager's responsibility to take care of client complaints. In occasions where adverts were converting very slowly, the consultants had to work very intensively to **try to change the negative spiral**; a kind of firefighting took place.

To the recurring tasks of the SEM projects were also the creation of performance reports; this task was performed by a consultant on a weekly basis. Every month the billing of the clients took place, the project manager was responsible for making sure the correct amount of money was charged for the campaign spending and the owners of Online Konsultor were responsible for making sure the correct amount of the consulting fee was charged.

[1] In online marketing a landing page is a single web page that appears in response to clicking on an advertisement. The general goal of a landing page is to convert site visitors into sales leads.

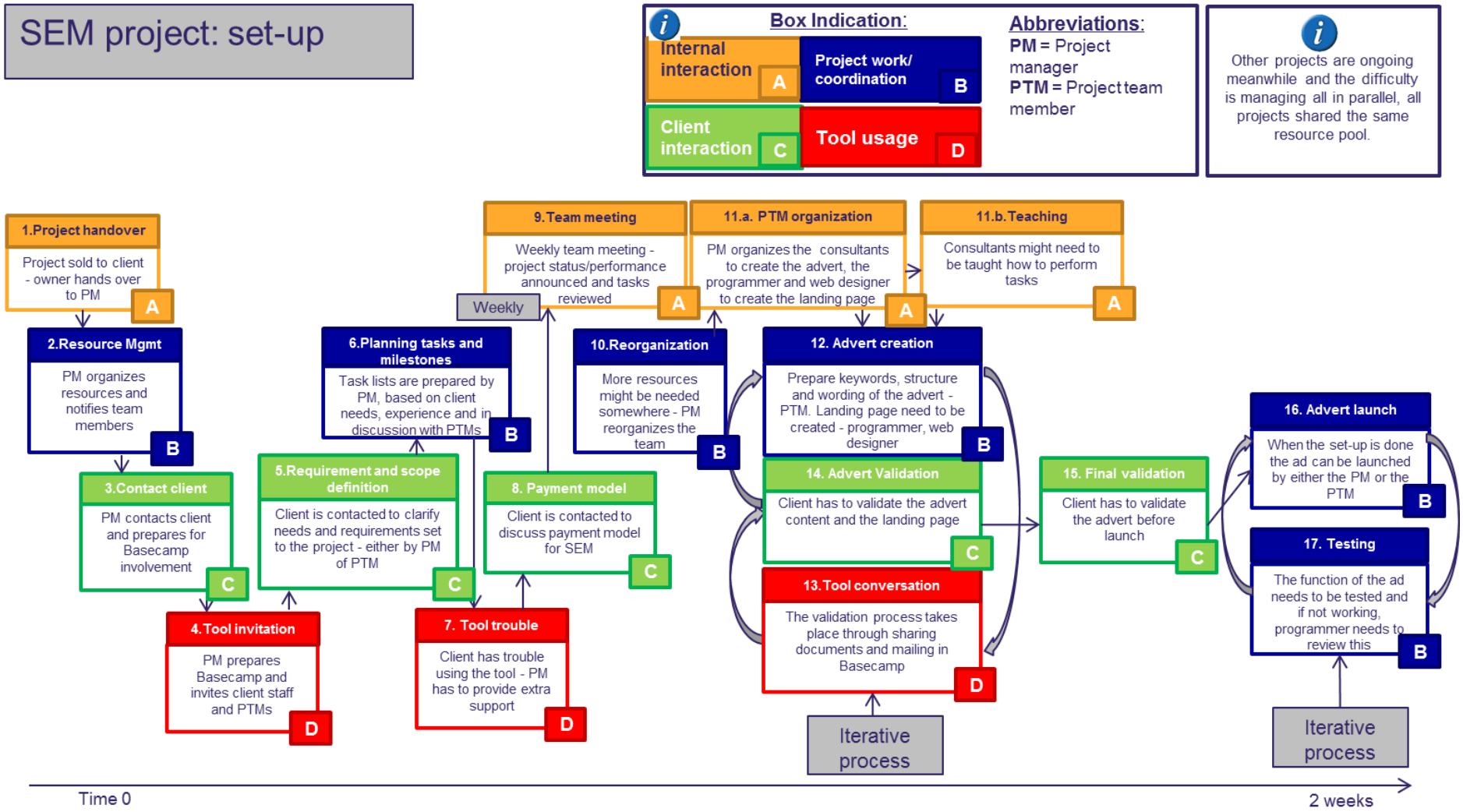

Figure 20: Overview of SEM project set-up

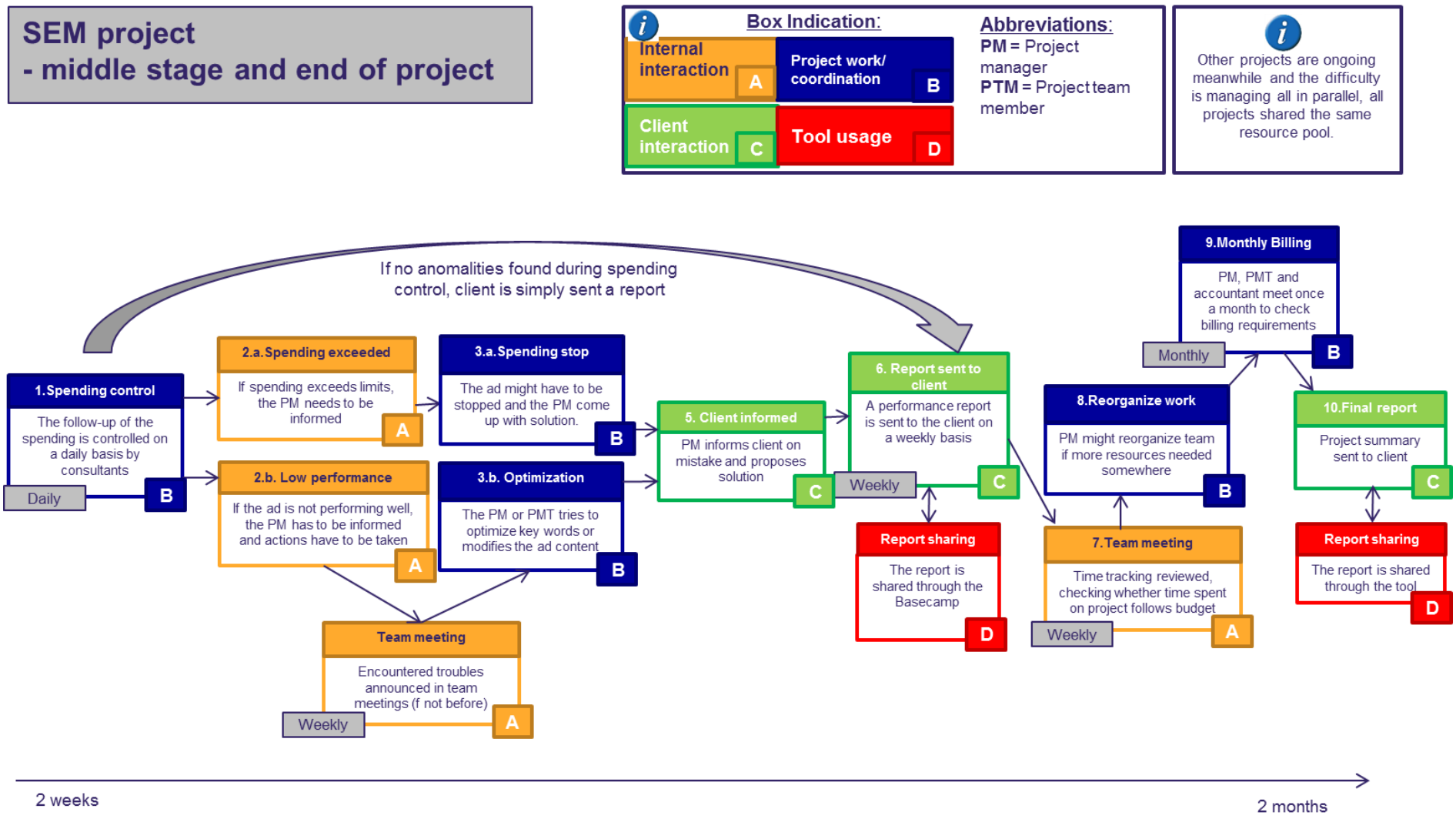

Figure 21: Overview of the SEM project's middle stage and end.

Whilst the SEM project can be considered "painting by numbers", another project called **online reputation management (ORM)** could be described as an "as…but…" project as categorized by Maylor (2010) meaning the project has some similarities to previous ones but contain some novelties. This kind of project is performed for clients who are receiving a negative reputation online.

The first part of the ORM project consists in performing a research of the online buzz using analytical tools in order to find out where and why people are talking negatively about the brand. Thereafter a strategy is proposed on short, mid and long term. The strategy will depend on the research findings and the type of client. Potential content of the ORM projects could be; **competitions online, running Facebook pages, writing blogs and creating videos.**

However, comparing to SEM there will be more client interaction in the ORM projects and the strategy will decide on how to increase the buzz and in what sequence to perform the different actions. Furthermore the project content will decide on which project members to include. To create a Facebook page for example; marketing consultants, the web designer and the programmer will be involved. The consultants and web designer will need to create the content together with the client and a landing page will need to be programmed and designed. Later, the consultants must actively create content as proposed by the client as well as managing the content created by the users. Hence interaction with Facebook users will set particular requirements of the project members having to follow the activity on a continuous basis.

Throughout the ORM projects the online buzz has to be monitored in order to analyze whether actions taken create a positive impact or not and weekly progress reports will be submitted. Depending on the performance, the consultants will need to adjust their focus. The ORM projects could be considered to contain more uncertainty then the SEM projects.

4.4 The role of the project manager

During the observation of Online Konsultor's projects it was identified that the project manager took on a number of different roles during the projects.

In the start of every project it was mainly the project manager's responsibility to decide which consultants to participate in each project, hence the project manager became a ***resource planner***. The resource planning could normally not be made with anticipation and had to be adjusted very shortly before a project start. However, to be able to do this the project manager needed to have a good overview of the different consultants' skills and current workload. To get an overview of the consultants' work load the project manager kept track of which consultants were working in which projects and sometimes simply asking who could participate in the new project. The time tracking was also a source for reviewing in what projects most time was spent at the moment and that way being able to adjust the work load of the consultants. Furthermore, during the weekly meetings the project manager kept track of all tasks that were to be performed in each project. In these meetings the project manager took on the role as an ***activity planner*** but also as a ***progress monitor*** of the projects, making sure activities were finished.

During the weekly meetings the consultants could announce encountered problems or tell whether they needed more support in one or another area, hence, the project manager's role became a ***problem solver***. If someone needed more help, the project manager tried to reorganize the resources, and hence also acted as a ***work organizer***. Many of the marketing consultants were actually rather new in the business and in order to teach them how to deliver new services, the project manager, whom was the most knowledgeable together with the owners, had to put on the hat as a ***teacher***.

Problems with performance in the projects were not only discovered during the weekly meetings. Since the project manager was ultimately responsible for ensuring project performance she also tried to check the performance reports created during every project. Hence, the project manager also had a role as ***performance insurer*** with a report function to the owners**.** In many cases though, the consultants actually turned to the project manager for help when a marketing campaign was performing badly. What the project manager then did was rather ***firefighting***, trying to steer the project back on track. Normally it was the project manager who had the formal contact with the clients, especially when problems occurred, which implied the role as ***client relationship manager***. In these occasions it was important that the project manager had a good overview of what had been going on in the project and through the centralized messaging in Basecamp it was believed to ease this task.

In many of the projects, the project manager was not only the manager but also actively working in the projects as a consultant which meant she had to wear multiple hats – both project manager and ***project participant***. Furthermore, there were never only one project running but several which had to be coordinated simultaneously all sharing the same resource pool. The project manager was therefore a ***multiple project coordinator***, as discussed previously; this was one of the greater challenges with coordination. It sets higher pressure on the ability of prioritizing and balancing the work load in each project. It also requires staying up-to-date in each project on what is going on. Either way, many times the project manager had to plan the different steps in the projects and follow-up the activities.

Then, when it comes to the more administrative roles, the project manager had responsibilities of managing the project management tool, making sure to include relevant people and to invite the clients; hence, a ***tool administrator***. In many of the projects it was the project manager's ultimate responsibility to keep the advertising budget (though not the consultant budget) hence a lot of the checking was to do with the spending on each campaign. Furthermore the billing of the clients had to be confirmed by the project manager. Hence the project manager had the role of ***budget reviewer*** and ***billing informer***.

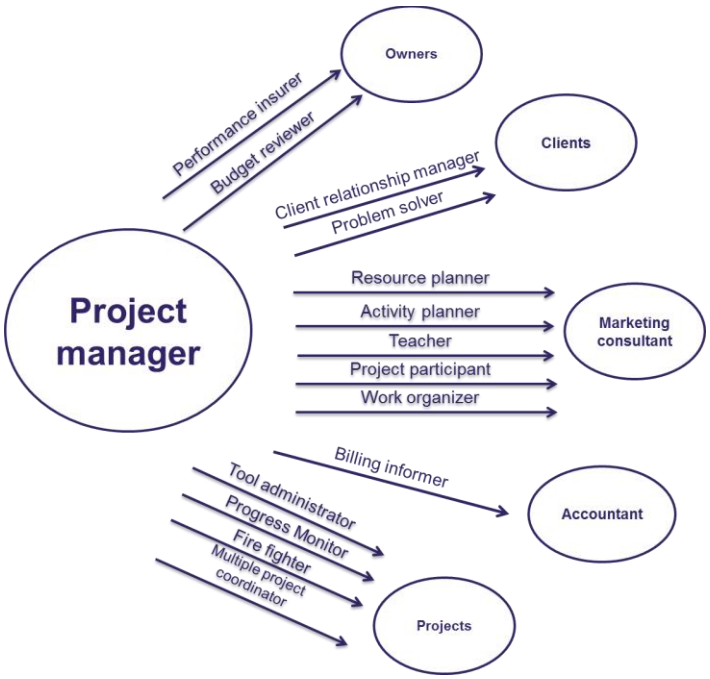

Figure 22: Overview of actors and the roles of the project manager

4.5 Study 1: Analysis

The processes of the projects at the small online media firm Online Konsultor are very similar to the one presented by PMI but the cost curve is different, where human resources normally are more intense in the start of the project but then decrease in intensity. The projects themselves can be considered rather small since there are few participants in each project. The difficulty in managing the projects was found to be the coordination between several small projects and not the project size or complexity in itself. Many of the projects were found to be "painting by numbers" or "as…but…" (as categorized by Maylor 2010) projects meaning that the projects contain less uncertainty than the so called "first timers". The challenge, therefore, comes with the coordination of a shared resource pool and coordinating activities within and between several projects, all with different stakeholders. The project participants had to work in several projects simultaneously and in parallel. Both recurring and one-time tasks needed to be organized and tracked in every project. This means that project participants have to be able to switch rapidly between tasks and projects, performing multi-tasking.

In small enterprises, specialization of each employee can create difficulties in staffing. The specialties found were the programmer and web designer. For these two staff members, the coordination of their tasks between different projects was challenging since they had no one to share the tasks with. The marketing consultants on the other hand were more flexible and multi-functional. To become flexible, teaching was an important part of the projects. Teaching or learning, appears as well in a different context related to the online industry as identified by Shelford and Remilliard (2003). The technical development is rapid which sets requirements on staying up to date, continuously learning new techniques to apply in the projects in order to increase project success and efficiency.

In small firms the project manager normally have to wear multiple hats (Kerzner, 2009) something which was confirmed at Online Konsultor. The project manager was also the "line manager" in charge of the marketing consultant team. Furthermore, the project manager had to take on several roles, such as; resource planner, progress monitor, problem solver, teacher, performance insurer, firefighter, multiple project coordinator and tool administrator (figure 22). All these roles set rather high requirements on the project manager, especially on a coordination level but also at an interpersonal level. The question is how one person alone is able to manage all these roles. According to the project manager studied in the case, the project management tool and the task lists helped in coordination and following the progress of the projects together with the weekly team meetings and billing meetings where resources, tasks and costs were tracked.

In the projects of Online Konsultor the clients were very present; following the progress, validating and approving different project steps but also performing tasks assigned to them. This was done not only through contact with the project manager but with other project members. The project manager was though ultimately responsible for client satisfaction. To facilitate the coordination of the projects and to cope with the challenges, the firm used a project management SaaS tool. The tool was used for many purposes, such as sending messages and sharing documents, internally as well as with the clients. The tool facilitated the conversations and information sharing through centralization of these. The staff believed that keeping the information in one place and open to all project participants made the communication simpler. As can be seen in the timeline of the projects (see section 4.3) there are several interactions between the different stakeholders where the centralization of communication became very useful. Furthermore, the project manager used the tool in order to control and monitor the project progress; keeping track of conversations, time spent in projects, managing task lists and programming milestones to track deadlines.

5 Study 2: Project management tool features

Apart from studying the project characteristics of the online marketing firm Online Konsultor, the first study also included semi-structured interviews regarding the firm's project management tool feature wants and needs from the perspective of the users. In study 2 this investigation was broadened to cover the wants and needs in other firms as well. The interview participants in the second study can be grouped as follows;

- Media/web firm SaaS users
- Media/web firm NON-users
- Non-media firm SaaS users
- Providers of project management SaaS tools

The last group are not users but providers of SaaS, these were included in order to understand how the providers themselves understand needs and wants of their clients as well as covering features which the providers themselves believe are important. The main purpose of the interviews was to investigate the different firm's wants and needs when it came to project management SaaS tools.

5.1 Contrasting feature wants and needs

In this section the user's wants and needs which were found in the second study will be presented as well as contrasted; firstly with the case study at Online Konsultor and secondly with literature. The result of this section is number of features which will be considered when evaluating the SaaS tools.

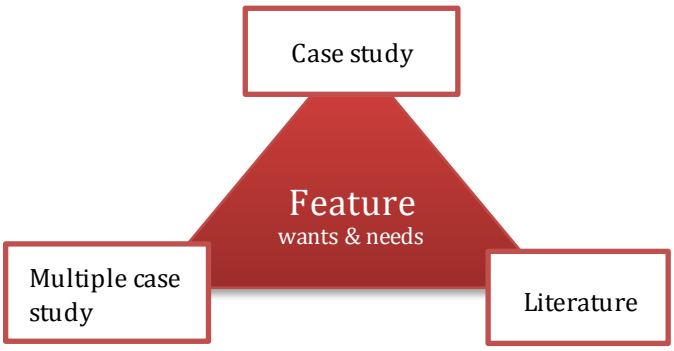

Figure 23: Overview of the feature analysis which will draw upon; the case study, the multiple case study interviews regarding tool feature desires and the literature.

5.1.1 Collaboration and centralized communication

One of the most important features considered by the *media/web firm SaaS users* was the ability to centralize communication through the use of an online project management tool. Throughout the projects of Online Konsultor their tool Basecamp was extensively used for communication and highly appreciated by the users. As Baard and Watts (2005) points out; the nature of the small business is having a close contact with customers, a characteristic that was clearly expressed during the interviews. Almost all the *SaaS-using media/web firms* invited their clients to collaborate in their project management tools and at least three of the *non-media firms* also did this. Amongst the firms which did not currently use an online tool this need had yet not been identified, for them e-mailing and telephone contact was sufficient.

Projects performed by smaller companies are characterized by continuous communication between team members (Kerzner, 2009). Intense collaboration with team members was clearly a characteristic amongst all interviewed *SaaS-using firms*; every team member

working in a project was also a user of the project management SaaS tool. In Online Konsultor the project members were logged on to the tool most of their working time. One of the largest differences between traditional and the new generation of collaborative software is that traditional project management is based on the project manager's control, him/her being the only one having project information access, whilst the new generation of collaborative software enables everyone in the project to contribute to the project work (Jansson, 2009). In the case of Online Konsultor the project participants were able to have the same information as the project manager, though the controlling function of the project manager was not diminished, it was rather facilitated by the tool.

The ways the firms communicated and collaborated were mainly through sending messages and sharing documents and files. This is basically something that could be done via e-mail as well but the project manager at Online Konsultor claimed it was easier to keep track of conversations since these were grouped in an intuitive way within the tool. Furthermore, following the progress of the projects was facilitated when using the online tool as a dashboard provided information on the latest activity.

This kind of collaborative software was proposed by Romano et.al (2002) where the authors called it a collaboration module within project management software that facilitates the collaboration between project members within and across project sites. The authors believe that collaboration in projects will become essential for success and in the year of writing they claimed the biggest issue to be the lack of collaboration tools.

The interviews performed with the *providers* of project management SaaS showed that the providers themself believed collaboration features in a project management tool was essential. The collaboration features mentioned were messaging and document sharing and the ability to include several users in one virtual project workplace.

Communication is important in project management, but it can be questioned whether centralized communication and being able to invite external users to a tool really can be considered a pure project management related feature. The current users of these tools seemed to highly appreciate these collaborative features whilst the firms not using online project management tools did not seem to request it.

Table 7: Collaboration and centralized communication findings

Collaboration and centralized communication	Findings
Media/web firm SaaS users	Considered both external user involvement and centralized communication important. Messaging and document management was appreciated features. To involve external users it was recognized that role-based access was required.
Media/web firm NON-users	Did not consider external users important. Used internal servers to share docs.
Non-media firm SaaS users	Considered the sharing of documents very important, some employed external user integration mainly for document sharing.
Providers of project management SaaS tools	Considered very important features and appreciated by their customers.
Literature	Romano et al. (2002) proposes a collaboration module for PM software. Jansson (2009) characterizes the web-based PM tools as collaborative software.

Case study	Messaging and document sharing was extensively used throughout the projects at Online Konsultor. Their clients were invited to the projects and could login to the tool. The team members had different roles which gave users access restraints to the tool.

5.1.2 Project scheduling and activity planning

According to research performed by White & Fortune (2002) the most widely used planning technique is the Gantt chart. During the interviews there were several features mentioned regarding project scheduling and activity planning; task lists, Gantt charts, calendars and mile stones.

As had been seen in Online Konsultor, the project manager had some issues with Basecamp's task lists so she had created her own excel task list. The same was mentioned by one other *media/web firm SaaS user* which had adopted a separate tool for managing tasks. Planning activities can be considered one of the key features of project management (PMI, 2008). In the PMBOK Guide, time management is one of the core knowledge areas where planning activities such as defining and sequencing activities and developing schedules are the main activities (PMI, 2008). At Online Konsultor the project manager used task lists to control the key activities in each project centrally, and the staff also had their own private task lists. During the interviews it was found that different types of task lists were used, it could be in excel, e-mail program to-do lists or simply handwritten post-its. Whether it is necessary to have a particular project management tool to manage tasks is something to question but if we consider the sharing of information and centralization as important for collaboration it might be a necessary feature.

The companies which currently used task lists believed it was important to be able to put a priority to the task, assign it to someone and also to set a deadline to it. Furthermore, tasks can either be one-timers or recurring, there were needs expressed for both kinds. Task lists is one of the core features of project management web based tools, Cabot and Wilson (2009) distinguish project management tools from groupware amongst others by task management (such as to-do lists, bug tracking and work-flow management).

Something several of the *tool-using interviewees* mentioned was that many of the tools they used lacked a comprehensible and simple overview of the project schedule and a manageable planning functionality. Especially the *media/web firms* using Basecamp, where planning is very limited and no Gantt charts views are available for example. Many of the *non-media firms* stated that they currently created Gantt charts for their projects and wanted a project management tool to support this. Some mentioned that the tools they used provided this function but due to difficulties in managing it, the feature was not used. Instead they created Gantt charts in Excel which would then be uploaded as a document and shared within the project management tool.

The project manager of Online Konsultor was very interested in being able to create Gantt charts in the project management tool since she believed it would facilitate overviewing all projects and their timelines. Though, it can be questioned whether a Gantt chart provided by a tool actually would be used in practice.

The only planning feature provided by Basecamp, apart from task lists, were calendars, where milestones could be programmed. The *tool using media/web firms* believed it was important to have a tool calendar for each project. In the projects performed at Online Konsultor some activities had to be performed at particular hours, and recurrently, for example weekly and monthly reports on the marketing performance had to be created on

a regular basis. Hence, being able to program reminders in a calendar makes sense and it could facilitate the work.

Several of the *media/web firms* worked with online projects such as marketing and web development. The greatest challenges related to these projects according to Shelford and Remillard (2003) are the quick changes in technology, changes in budgets and competition on the market. The authors also point out that the web development normally follows iterative cycles and that schedules have to be kept flexible since client needs might change throughout the course. The project method which corresponds to this type of project is the Scrum as described in the literature section. Scrum is an agile project management method which supports iterative processes (Cervone, 2010). Large parts of the project processes at Online Konsultor also had iterative approaches which mean that the progress cannot be described as linear. Flexibility and ease of changing the plan was pointed out as a must by one *NON-SaaS using media/web firm* which used a physical board instead of a digital as they had not found any tool giving the support they needed.

The final feature which was found related to scheduling is the critical path method as proposed by Kerzner (2009). It is a planning tool for project modeling which calculates the longest path of planned activities till the end of the project and this process determines which activities are the critical ones. None of the interviewees mentioned this feature, maybe because of unawareness, they had no tool supporting it or they considered it to be too complex.

Table 8: Project scheduling and activity planning findings

Project scheduling and activity planning	Findings
Media/web firm SaaS users	Task lists were the base of activity planning. Project schedule overview wanted (e.g. Gantt charts). Calendar feature needed, ability to program milestones.
Media/web firm NON-users	Activities were programmed in excel mainly, they had private calendars and some used physical board for planning.
Non-media firm SaaS users	Gantt chart views were used, mainly created in excel as the tool's Gantt feature was considered too complex.
Providers of project management SaaS tools	Considered important features, most tools provided task management.
Literature	Planning activities are recognized as key feature (PMI, 2008). Gantt charts were used extensively (White & Fortune, 2002). Task lists considered core feature of web based PM tools (Cabot & Wilson, 2009). Critical path method proposed by Kerzner (2009).
Case study	Task lists were used to plan activities; they had both centralized ones and private. The calendar was used to pinpoint deadlines and program reminders of recurring activities. Users wished for Gantt chart support.

5.1.3 Project progress, monitoring and control

One of the process groups in the PMBOK Guide is "Monitoring and Controlling" (Conchúir, 2011) which is something that goes on throughout the whole project. What needs to be monitored is the schedule, costs, resources, performance and risks. In this section monitoring the schedule and performance will be dealt with, costs, resources and risks are discussed in the next section.

At Online Konsultor, it was mainly the project manager's responsibility to follow the progress of the project and making sure of a positive development. Currently this was done through checking off task lists, following conversations in Basecamp and through holding the weekly meetings. The performance of the project was mainly measured on the success of the advertisements, Online Konsultor created reports regularly to track this. In Basecamp there was a feature showing the latest tool activity, this one was considered important not only by Online Konsultor but by other *tool-using media/web firms*.

Tracking the time spent in projects was important to several of the interviewees and was present in all groups of companies though it varied in each group. Online Konsultor believed it was important to be able to track the time, so did three of the *NON-SaaS using media/web firms*. Some of the *non-media firms* tracked time using a separate project management tool. The differences in time reporting probably depended on the companies billing models or preference when it came to tracking performance. In online marketing firms it can be difficult to track time if one works in several projects and switches project frequently during a working day.

During the Online Konsultor interviews some of the respondents articulated that they would have liked to be able to view the project progress summarized in the tool, such as a summary of the amount of hours spent in a project, summarizing number of finished and remaining tasks and similar. Another feature that could related to project monitoring is report making. At Online Konsultor, time records could be retrieved and analyzed, which was an essential tool for creating analysis.

Report making is a feature that has been mentioned by various authors (Kerzner, 2009) (Jadhav & Sonar, 2011). Though Kerzner (2009) believed that since hierarchies are lower in small companies' project managers normally work close to functional personnel and therefore heavy reporting might not be necessary. Either way, reports can be useful for the project manager; in the interview with Online Konsultor some of the participants believed reporting could be useful. There are tools offering off-the shelf reports but it is important to consider ability to extract data in order to create ad-hoc reports.

Finally, the feature issue tracking will be commented. In web development projects it is proposed to keep an issue log to track changes made to the project along its progress (Shelford & Remillard, 2003). It is a tool which can help taking care of change requests and can be essential for the project success. The programmer at Online Konsultor wanted an issue system which would notify when problems had occurred regarding the landing pages and webpages. It was also found during the interviews that two of the *SaaS-using media/web firms* already used a tool which supported issue tracking. The same was valid for the *non-media firms* which used an issue tracking tool for their customer help support.

Table 9: Project progress, monitoring and control findings

Project progress, monitoring, control	Findings
Media/web firm SaaS users	Important with recent tool activity updates as well as time reporting. . Automatic reporting on hours spent in each project. Issue tracking was used by two firms. Some kind of progress overview was wished for.
Media/web firm NON-users	Some tracked time.
Non-media firm SaaS users	Some tracked time, a few used issue tracking for their customer help desk.
Providers of project	Some tools provided time tracking and recent activity overviews as

management SaaS tools	well as issue tracking, which they believed was important to their clients.
Literature	PMBOK Guide suggests monitoring schedule, cost, performance. (Conchúir, 2011). Being able to create reports on project data can be important (Kerzner, 2009) (Jadhav & Sonar, 2011). In web development projects, issue tracking is recommended (Shelford & Remillard, 2003)
Case study	Task lists were used to control projects, weekly meetings and activity dashboard in Basecamp together with following conversations in the tool. Time tracking was used during the projects, data was retrieved and analyzed. Performance was tracked in separate client reports. A summary of performed and remaining tasks were wished for. Issue tracking was wished for by the programmer at Online Konsultor.

5.1.4 Resource planning, risk and cost management

In literature resource allocation has been considered part of a project management tool feature (Kerzner, 2009; Romano, et al., 2002) and in the PMBOK Guide, human resource management is one of the knowledge areas (PMI, 2008). During the interviews it was only one of the *non-media firms* which used a tool for resource allocation whilst all *media/web firms* considered manual handling of this sufficient. At Online Konsultor the project manager believed that a resource management feature could be useful if the company were to grow.

When it comes to risk management, none of the *media firms* used the technique in practice. Only one of the *non-media firms* actually performed risk identification through using a simple method applied in excel. In literature risk management is identified as one of the knowledge areas in the PMBOK Guide, risk is supposed to be identified, analyzed and risk responses should be planned for (PMI, 2008). The ignorance of risk management encountered by the researcher was also found in White and Fortune's (2002) investigation on current practices in project management.

At Online Konsultor the project manager had the role as *fire fighter* when something went wrong in the project. Hence, risk identification might have been a suitable tool to be used. Whether it should be included as a feature in a tool or not can be questioned, if there was one, maybe it would remind the users of actually considering risks during their projects in order to take on preventive actions. Typical project risks are requirements changes, failure of performance, budget overruns, time line overrun, and employee turnover.

As with resource and risk management; cost management is a knowledge area in the PMBOK (PMI, 2008) and it has been suggested as a software feature (Kerzner, 2009; Romano, et al., 2002). Online Konsultor as well as other interviewees used other ways of tracking costs, such as time reporting system and their accounting system. Depending on the goal of the project management tool, cost management could be included. It is important to budget and follow up project costs and it could probably be useful to have a particular tool for this. Many of the interviewees at Online Konsultor wished for a feature telling how many hours were budgeted and how many hours had been performed; hence a sort of countdown could be useful.

Davis and Martin did an evaluation of project management tools already in 1985 (Davis & Martin, 1985) recommending companies to ask themselves whether they actually needed costs, resource planning and scheduling features in their tool before adopting one. With every feature, this is an important question to ask oneself.

Table 10: Resource, risk and cost management findings

Resource, risk and cost management	Findings
Media/web firm SaaS users	*Resource management* was performed manually *Risk management* was not considered important by any interviewee *Cost management* was performed through time tracking, accounting system and excel
Media/web firm NON-users	*Resource management* was performed manually *Risk management* was not considered important by any interviewee *Cost management* – n/a
Non-media firm SaaS users	*Resource management* – one firm used a particular software tool for this *Risk management* – one firm applied risk assessment in their projects *Cost management* – n/a
Providers of project management SaaS tools	*Resource management* – 2 tools mentioned they provided this *Risk management* – not mentioned *Cost management* – not mentioned
Literature	*Resource and cost management* – recommended (PMI, 2008), (Kerzner, 2009) (Romano, et al., 2002) *Risk management* – (PMI, 2008),
Case study	Online Konsultor sometimes had trouble balancing the workload of the consultants, though some sort of resource planning was done manually. Risk management was neglected and cost management was tracked through the time tracking, excel sheets were used to track advertising costs together with the accounting system.

5.1.5 Ease-of-use and search functionality

Adopting a tool which is easy to use was probably the most important tool feature, it was mentioned by Online Konsultor and other *tool-using media/web firms*, though it was not mentioned as frequently amongst the *non-media firms nor the NON-users in the media/web firms.*

First, the meaning of ease of use should be commented. Perceived ease of use can be defined as the degree to which a person believes that using a particular system would be free of effort (Davis, 1989). Ease of use is a feature of a concept which is hard to measure since its evaluation will be influenced by subjectivity. Indicators can be used to measure it, such as setting up a number of tasks to perform and setting a score on the easiness of performing them.

Online Konsultor motivated the need of a user-friendly and intuitive tool with the client collaboration. They believed that if the tool were too complicated, and if instructions or tutorials were needed, clients would be reluctant in employing it, hence, the collaboration advantages of project management SaaS tools would be lost if they became too complex.

Even some of the *tool-using media/web firms* said they would rather choose a tool that was simple to learn before a more complex multifunctional one. Basecamp was appreciated by all its users for its ease of use and simplicity. On the other hand, many of the companies complained about Basecamp for lacking in functionality, such as not providing a good overview or a Gantt chart view. Finding a balance between complexity and ease of use is a difficult task and as one of the *non-tool using media/web firms* told, they had not chosen any tool because they were either too simple or too complex.

The reasons to why the *non-media firms* did not focus as much on the ease-of-use might be related to their sector or the fact that they did not include external users to the same

extent as the online marketing firms. It could also be due to preferring functional features before ease of use.

Ali et al. (2008) found in their investigation that the factors influencing the acceptance of project management software were system functionality and ease of use, both had a strong relationship with increased software usage. Two of the factors mentioned by Jansson (2009) that separates traditional software with the tools provided online is ease of use and flexibility of tools. Furthermore, ease of use was the tool feature which was the most promoted one by the *tool providers;* they seemed to believe their SaaS tools provided this characteristic.

One feature that can increase ease of use, or rather usability of the tool, is the provision of a search function. Many of the *tool-using media/web firms* complained about this function for being too simple in their current tool. Cabot and Wilson (2009) also pointed out this as an important feature. Using portals or online collaboration tools a search function helps linking the disparate pieces of information that comprise a project; with a search function everything related to one subject can be retrieved.

Table 11: Ease of use and search functionality findings

Ease-of-use and search functionality	Findings
Media/web firm SaaS users	Ease of use was considered essential for maintaining customers in the tool. A well performing search function was wished for.
Media/web firm NON-users	One company did not want a too simple nor to complex tool.
Non-media firm SaaS users	Some mentions of ease of use but not primary focus.
Providers of project management SaaS tools	Promoted their tools with ease of use, most supply some kind of search function.
Literature	Ease of use was found to increase software usage (Ali, et al., 2008). The web-based tools are considered to be easier to use compared to traditional PM software (Jansson, 2009). Search function were found to characterize PM SaaS tools (Cabot & Wilson, 2009).
Case study	Online Konsultor communicates extensively with customers through the tool, ease of use decreases the learning curve for the customer (and team members) and facilitates collaboration in the tool. The users also wished for a more efficient search function.

5.1.6 Data security in SaaS tools

Data security in SaaS is an issue which is widely discussed in literature. It is an issue not only to do with the fact that uploaded data is controlled by someone else, but also because of Internet being the transporter of data and the browser the application interface (Badger, et al., 2011; Armburst, et al., 2010). Subashini & Kavitha (2011) acknowledges that security is one of the major issues in cloud computing which is the reducing factor in its growth, complications with data privacy and data protection are present on the market. According to the authors, the provider's data protection has to be analyzed; Data location, protection mechanisms, transaction processing technologies and encryption amongst others.

The *SaaS providers* which participated in this investigation, all stated they took security seriously using different measures such as encryption, layers of redundancy, performing daily back-ups and so on. Amongst the other interviewees it was found that the *NON-SaaS using media/web firms* believed security was an important factor to evaluate. So did the

non-media firms which currently used SaaS. When it came to the *SaaS-using media/web firms*, they did not seem to worry about security, some confessed they had not even considered security when choosing the tool nor checked whether back-up was provided. The tool users at Online Konsultor had not considered data security an issue either.

The reasons for not giving importance to security could be various; a trust in the tools, believing that data security comes with the purchase, simply ignoring the issue, not understanding the risks, or perhaps prioritizing the functional features before a strong data security. When *the SaaS-using firms* were asked what would happen if all data got lost or hacked, they answered that it would **not** be catastrophic. In these project management tools they did not usually store confidential information, but they all agreed that it would be very time consuming if all information got lost. Hence, not storing essential information in the tool could also be a reason for overseeing the security issues.

Furthermore, it can be very hard for a regular user to evaluate the security level of a supplier, and that is probably another reason the interviewees had not looked into these areas. One of the *NON-SaaS using media/web firms* even stated that he did not think he would be capable of making such an evaluation. One author recommends asking many questions about encryptions, authentication, policies and incident handling. According to Savage (2009) the very least that should be expected is that the SaaS provider shows transparency in its business and operations. Savage (2009) also proposes to look for different audits such as SAS 70 reports, PCI Data Security Standard certifications, and ISO 27000 assessments when evaluating the security of the SaaS provider.

Back-up of data is normally included in the SaaS service (Badger, et al., 2011), it is considered an important feature and needs to be check during evaluation. The *SaaS using media/web firms* considered back-up of data a "must" and it was also recommended by *SaaS providers* to check up on this. On the other hand, several of the interviewees had not evaluated this before adopting their current tools.

Table 12: Data security findings

Data security	Findings
Media/web firm SaaS users	Several had not evaluated data security mechanisms or provision of back-up before adopting the tools, though when asked about it they believed it to be important.
Media/web firm NON-users	Believed data security was important but worried about their ability of performing such an evaluation.
Non-media firm SaaS users	More security conscious than the other interviewees.
Providers of project management SaaS tools	Stated to have taken relevant security measures and believed it to be an important feature to evaluate.
Literature	Acknowledges data security as an issue with cloud computing (Subashini & V.Kavitha, 2011) and recommends this to be evaluated before choosing a SaaS tool (Badger, et al., 2011) (Armburst, et al., 2010). Different audits could be looked for (Savage, 2009).
Case study	Conversations were stored in the tool as well as documents; the documents. Information stored there was confidential, but if it would leak it would not cause severe impact according to the staff. Online Konsultor tool users were not worried about potential security issues.

5.1.7 Service level agreements, legal liabilities and intellectual property

The *non-media firms and NON-SaaS using media/web firms* pointed out the importance of 100 % stable functionality and availability. Availability and service reliability is of concern when it comes to cloud computing. To check the availability promises and expectations, the service level agreement (SLA) has to be studied (Badger, et al., 2011). The *providers of SaaS* also recommended reading the SLAs before adopting a tool. Badger et. al. (2011) urge subscribers to carefully examine the SLA for any disclaimers relating to security or critical processing, and to search for any comment on whether the provider recommends independent back-up of data stored in their cloud. The SLA can also tell which laws and regulations apply to the service and who is liable if data goes missing and so on.

Another issue recognized by Enisa (2009) are the legal liabilities implied and these might depend on the location of the vendor, or rather the country where data is stored. Data centers might be located in countries where the legal framework and enforcement is unpredictable or in states where no respect is given to international agreements. To check this it might be required not only to investigate the SaaS provider but also its hosting firm since the SaaS provider might use cloud services for storing data (Nema, 2010). For some companies it might be important to evaluate this, as one of the *SaaS providers* mentioned; for companies within the governmental, defense or healthcare sector this could be a hinder in adopting SaaS, some might require data to be stored inside a particular country or even within the company walls. However, legal liabilities and data storage location was something the interviewed *media/web companies* had not reflected over at all.

SaaS tools are available everywhere there is Internet, which requires a stable network connection (Lu & Sun, 2009). One of the *SaaS providers* offered an offline client which implied that a project could be reached from the desktop and when again connected to Internet it would synchronize the information. It was pointed out that if your business includes travelling to other continents where Internet is not stable, an offline client could be indispensable.

Some of the *non-media firms* and one of the *providers of SaaS* suggested looking up whether the uploaded data maintained intellectual property. Enisa (2009) also pointed out that intellectual property might be at risk not only due to hacking of data but also contractual clauses, to check this, the SLA should be studied.

The *media/web firms* which had employed SaaS tools mentioned surprisingly little of this, as with data security, it can depend on unawareness of these issues or they believe the data stored in the tools is not considered intellectual property. It might be that the availability of their current tool meets expectations and therefore they have not considered stability and availability important factors to consider, at least this was true for Online Konsultor. Their only trouble had been their Internet connection which failed at times.

Table 13: SLA, legal liabilities and IP findings

SLA, legal liabilities and IP	Findings
Media/web firm SaaS users	Had not considered evaluating these factors.
Media/web firm NON-users	Believed stability and availability to be important
Non-media firm SaaS users	Evaluating stability, availability and maintaining intellectual property was important.

Providers of project management SaaS tools	Suggested SLAs to be read and one proposed checking whether offline clients were available and furthermore check in what country data is stored.
Literature	Suggest checking availability promises, SLAs and copyright clauses (Badger, et al., 2011) (Enisa, 2009) Also legal liabilities implied by the location of the vendor and data center (Enisa, 2009).
Case study	During observation Online Konsultor did not seem to experience trouble with availability or stability with their tool. On the other hand they had trouble with their Internet connection. Copyrighted material might have been uploaded to the tool. At the moment they were not working with any client whose IT environment was restricted by the location of data storage.

5.1.8 Tool exit possibilities

If the project management tool were to be changed at Online Konsultor it was important for them to be able to transfer data between the tools. Changing SaaS tools requires exit possibilities, which basically means ability to export data which is stored inside the tool and preferably being able to upload it to another tool. Other *tool-using media/web firms* agreed on this point and they wanted to be able to export data with the purpose of storing it themselves. The *non-media firms* mentioned the same in relation to being able to perform private back-ups of data.

The *tool providers* believed it was important to check the export possibilities before making a tool choice in order to avoid data lock-ins. Some of them supplied one of the following ways of exporting data:

- As a zip-file containing HTML versions
- As XML file which can be imported to another tool that supports that format
- APIs – application programming interface

The data lock-in effect should be of concern according to several authors (Cabot & Wilson, 2009; Enisa, 2009; Armburst, et al., 2010). The APIs are not standardized in cloud computing, neither in SaaS which creates a difficulty in extracting data from the applications. Furthermore, some SaaS firms offer companies to develop new applications and integrate these with the web service from other vendors (Cusumano, 2010) in order to increase the lock-in effect. When Cabot and Wilson (2009) investigated a number of project management portals it was found that none of these made it easy for users to export their projects for backup or use elsewhere.

Most *SaaS providers* which participated in the interviews seemed to supply APIs on request, though the service of performing the integrations or transfer of data was not offered normally. Only one provider offered a Basecamp import of data in order to attract those users to switch tools. However, exporting data through the use of APIs require programming skills and could become very time consuming and costly to perform depending on in-house capabilities (Enisa, 2009).

Table 14: Tool exit possibilities findings

Tool exit possibilities	Findings
Media/web firm SaaS users	Considered this very important, but it was not really evaluated before choosing their current tool. It was obvious that difficulty in switching tools made users stick to the tools they once had chosen.

Media/web firm NON-users	n/a
Non-media firm SaaS users	Considered exporting of data important for private back-up possibilities.
Providers of project management SaaS tools	Considered important, but none of the interviewed companies offered a simple solution for exporting data, only one offered importing data from Basecamp.
Literature	Important to evaluate since lock-in effects are large in SaaS tools (Cabot & Wilson, 2009) (Enisa, 2009) (Armburst, et al., 2010).
Case study	Switching tools would create difficulties since a lot of information was stored in their current tool. The project manager was worried about how to transfer data during a potential tool change.

5.1.9 Tool Customization

Online Konsultor was currently able to personalize their tool by choosing the colors of the interface, the language, the URL and putting their own logo in the tool. They thought these branding attributes were important. The importance of being able to choose language depended on a wide customer range from different countries. The other *tool-using media/web firms* were also concerned with these personalization capabilities whilst tool configuration was less important. For the *non-media firms*, the ability to configure and adapt the tool to their particular needs and processes was wished for, some of these had actually chosen a tool where this was possible.

As Lu and Sun (2009) recognize, SaaS solutions often lack of customization since these applications normally are based on industry best practices. It might create difficulties in adapting work flows and specific needs of an organization to the software or vice versa. When evaluating software tools Jadhav and Sonar (2011) propose evaluating customizability of the tool on different attributes, such as customizable fields as well as available languages.

Table 15: Tool customization findings

Tool customization	Findings
Media/web firm SaaS users	Branding and languages were important features but not configurability of workflows.
Media/web firm NON-users	n/a
Non-media firm SaaS users	For some configuring workflows was important
Providers of project management SaaS tools	Several offered different languages and branding possibilities. At least one company offered configurable work flows.
Literature	Since SaaS is based on industry standards customization possibilities can be important to evaluate (Lu & Sun, 2009). Evaluating customizability of the tool and available languages (Jadhav & Sonar, 2011).
Case study	Online Konsultor's customers were from different countries, hence different languages were needed. They performed projects which helped increase the brand of other companies, hence branding their own seemed important. The URL, logo and color of the tool was personalized in their current tool.

5.1.10 Vendor requirements

The characteristics of the vendor and its offerings were for some interviewees very important to consider when making the choice. Online Konsultor wanted the vendor to provide online support and tutorials, whilst support by telephone and in person was considered less necessary. Furthermore one interviewee mentioned that the vendor's stability on the market is important since a disappearance of the vendor could mean a close-down of the tool or in the worst case a data loss. To check the stability of the vendor Nema (2010) proposes analyzing the SaaS provider's financial situation. This can be important but also a difficult task since some foreign companies do not supply financial statements.

Other *tool-using media/web firms* also mentioned that the vendor's responsiveness to requests was important and someone would only consider a tool of he had seen it recommended in a magazine or similar before considering an adoption. The *non-media firms* had the most requirements on the vendor in evaluating them. They wanted the vendor to show "seriousness", to provide intensive support in the beginning of adoption, to have the ability to show reference customers, to have experience on the market and to show its development strategy.

The differences in vendor requirements between media firms and non-media firms could be explained with the type of business the companies are found. Intensive support in the beginning of adoption is something that could depend on internal capabilities of the enterprise and the complexity of the purchased tool.

Both *current SaaS users and SaaS providers* told that a tool recommendation or being able to show reference customers was very important to gain trust. In the software evaluation list provided by Jadhav and Sonar (2011), checking the number of references was proposed together with past business experience.

Table 16: Vendor requirements findings

Vendor requirements	Findings
Media/web firm SaaS users	Online support and tutorials, magazine recommendations and responsiveness to requests.
Media/web firm NON-users	n/a
Non-media firm SaaS users	Show "seriousness", provide intensive support in the beginning of adoption, have the ability to show reference customers, to have experience on the market and to show its development strategy.
Providers of project management SaaS tools	Vendor evaluation should include vendor stability on the market, reference customers and response to requests.
Literature	Nema (2010) proposes analyzing the SaaS provider's financial situation. Check reference customers and past business experience (Jadhav & Sonar, 2011)
Case study	The company had used the online support very few times though believed online tutorials to be important. Their current tool has around 7 million users. Stability on the market was also considered important.

5.1.11 Trialability and scalability

Being able to try out the tool before purchase is common for SaaS tools; many of the tools give the ability to create a login which is valid for a certain period of time. To the *tool using media/web firms*, trialability was important and furthermore the *SaaS providers* believed the ease of trial was one of the advantages of SaaS together with the possibility of cancelling the subscription at any time. The disadvantage, which has been recognized above, is the data lock-in which might hinder one from cancelling a subscription.

With SaaS it is no longer the Chief information officer's responsibility to make the investment decision; thanks to trial periods the employees can take part of the adaption and choice of SaaS since they quickly can test products to see whether they solve their problems (Nema, 2010). Jadhav and Sonar (2011) also proposes different parties to give their opinion on the software when evaluating it such as; end users, external consultants, magazines and so on. In order for this to be possible the tool has to be triable.

In SaaS the providers normally offer different levels of their products; the levels include different numbers of projects, number of users and amount of data storage at corresponding prices. Online Konsultor found it essential to be able to increase data storage and number of projects if needed. Hence, it is important to evaluate the suppliers' possibilities to support possible future needs, i.e. if the company grows are we able to scale the service or will a new tool be needed? As Nema (2010) points out, it is important to look for future development of the SaaS, if your company changes, will the tool be able to adapt?

Table 17: Trialability and scalability findings

Trialability and scalability	Findings
Media/web firm SaaS users	Being able to try out the tool in an easy way was important, being able to scale as well if the needs would increase.
Media/web firm NON-users	n/a
Non-media firm SaaS users	n/a
Providers of project management SaaS tools	Believed the easiness of doing trials, up-scaling and down-scaling on demand as well as being able to cancel subscription at any time were advantages of PM SaaS tools.
Literature	Scalability is recognized as an advantage for SMEs. With ease of trial not only the decision makers have to influence on the choice of software but all can participate (Nema, 2010)
Case study	Online Konsultor had a tool which was possible to try out before purchase, it had unlimited users already but the possibility to increase the number of projects and data storage if needed, which was also considered important to the users.

5.1.12 Application integration

For back office integration purposes the provision of APIs was important for the *non-media firms* but for the *SaaS-using media/web firms* pre-programmed application integrations were considered valuable together with e-mail integration. Pre-programmed applications of plug-ins which were appreciated were for example Google docs[2], Dropbox[3]

[2] Google docs as an online application which provides creation of documents which can be edited by several users
[3] Dropbox is an online file sharing application

and mobile devices. It could also be third party developers offering applications such as billing software, time tracking tools, report making tools and customer relationship management modules and similar. Online Konsultor considered plugin applications important in the case where the actual project management tool lacked in some features, e.g. if there are third party tools available to plug in this could be useful if the chosen tool did not support all needs.

The *providers of SaaS* believed the provision of APIs was important since it allowed for integration between different software applications. SaaS providers do not usually offer back office integration though simplifications of the integrations are becoming more common (Hai & Sakoda, 2009). On the other hand, SaaS firms offer companies to develop new applications and integrate these with web services from other vendors (Cusumano, 2010).

E-mail integration was considered very useful for Online Konsultor and other *tool-using media/web firms*. Basecamp allowed messages and documents to be sent to conversations within the tool without having to log into it. This was appreciated since it increased the ease of collaboration and centralization of information. Many of the other tools at least provided e-mail notifications, which was highly appreciated as well, not only amongst *SaaS-using media/web firms* but also amongst the *non-media firms*. The e-mail notification feature was also proposed by (Ahmad & Laplante, 2006). E-mail notifications help keeping team members informed of the current status of the projects and notifies the ongoing activities.

Table 18: Application integration findings

Application integration	Findings
Media/web firm SaaS users	E-mail integration considered essential for collaboration. Available plugin applications were valuable, such as Dropbox, Google docs, billing software, mobile device, CRM etc.
Media/web firm NON-users	n/a
Non-media firm SaaS users	Some believed it was important to be able to integrate with back-office software. E-mail notifications were appreciated.
Providers of project management SaaS tools	Supplied APIs but not the service of integration. Some offered e-mail integration and almost all offered e-mail notifications.
Literature	Few offer integration as a service but more and more offer simplified integration. (Hai & Sakoda, 2009). Proposes e-mail notification as a relevant feature (Ahmad & Laplante, 2006). SaaS firms offer companies to develop new applications and integrate these with web services from other vendors (Cusumano, 2010).
Case study	Online Konsultor used a plugin stopwatch for their time tracking since Basecamp did not support this. Both internal users and clients used their e-mail to send messages through Basecamp and this feature was considered essential.

5.1.13 SaaS pricing model

One common characteristic of the small firm is the financial instability and lack of resources (Baard & Watts, 2005; Kerzner, 2009). As recognized by Nema (2010), SaaS is particularly interesting for small and medium sized enterprises (SME) since it gives them the access to achieve the same IT possibilities as the large enterprise but to a lower cost.

Although cost was one of the advantages promoted by the *SaaS provider* interviewees one of them commented that cost can also be reason for hesitation in the SaaS adoption. The interviewee meant that in the long run SaaS might be expensive due to monthly cumulative costs. Whilst the up-front cost is rather low; there is no need for hardware installation or maintenance or extra costs for updates, there are disadvantages in terms of cumulative rental and uncertain enhancement expenses. There are authors who also recognized this disadvantage (Lashar, 2008; Nema, 2010; Lee, et al., 2009).

One *SaaS provider* mentioned that if continuous updates and online access are not needed it might be good enough to use a traditional software. Therefore it can be important to evaluate cost in the long run, if the monthly charge is determined by the number of users it could be wise to check whether it is possible to run the application on a private server in case the company grows and a large number of users are needed.

The *media/web firms* which used SaaS considered their tools as relatively cheap and appreciated automatic updates and free maintenance.

Table 19: SaaS pricing model findings

SaaS pricing model	Findings
Media/web firm SaaS users	Believed SaaS project management tools had favorable cost models, included updates and maintenance were appreciated.
Media/web firm NON-users	n/a
Non-media firm SaaS users	Believed SaaS had favorable pricing models
Providers of project management SaaS tools	Most of them promoted their tools as low cost, though one announced that while the monthly cost is low it is cumulative. Being able to run the software on a private server could be a valuable option to evaluate.
Literature	Generally promoted SaaS as a low cost solution but also recognized the cumulative cost it implies and uncertain enhancement costs. (Lashar, 2008; Nema, 2010; Lee, et al., 2009)
Case study	At the moment Online Konsultor paid a monthly fee of $100USD which included unlimited users, 100 active projects (when project finished it could be archived) and 40 GB storage.

5.2 Differences in tool wants and needs

In this section the different groups of firms will be placed in graphs indicating what feature preferences they had. The firms which will be contrasted are; Online Konsultor, Media/web firms using SaaS, the Non-media firms using SaaS and the Media/web firms not using SaaS. The SaaS providers were only interviewed to be able to extract important features from their point of view, and literature was used to understand what features had been recognized by previous researchers. The mismatches which will be analyzed are the following:

- Centralized communication vs. Planning and tracking
- Data security and service level vs. Exporting data
- Ease of use vs. Customization and integration
- Vendor requirements and trialability vs. Price and scalability

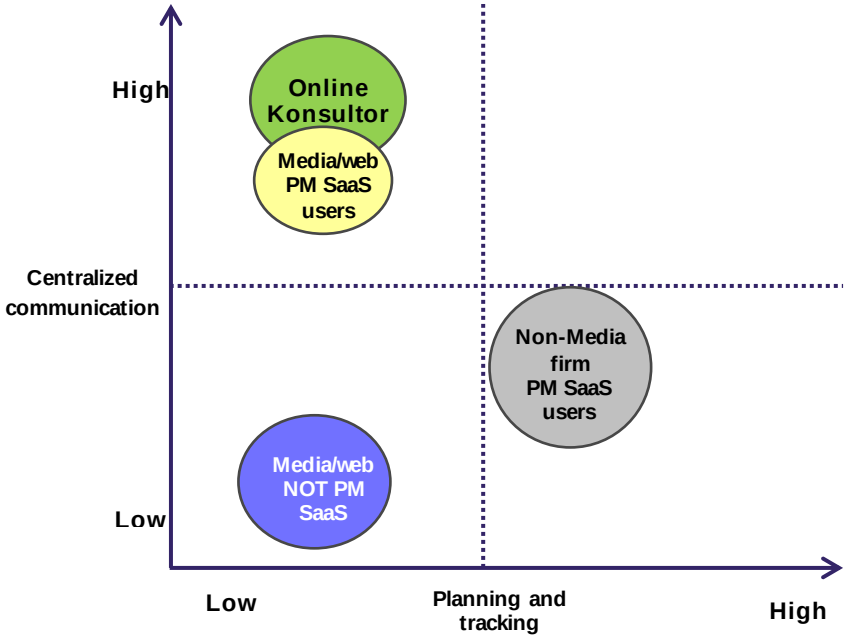

Figure 24: Centralized communication vs. Planning and tracking

As can be seen in the graph, the *media/web firm SaaS users*, just as Online Konsultor, had an inclination towards preferring centralized communication, such as messaging, document sharing and also e-mail integration over advanced planning and tracking. The *non-media firms* used document sharing to a high extent, but messaging was not of focus. All parties believed planning and scheduling to be important, though it was performed in different ways. Task lists were the core for planning in the tool-using media firms and time reporting the core for tracking the project spendings. Gantt charts were wanted by all *media firms* but not used by many of them whilst the *non-media firms* used Gantt charts extensively together with resource, cost planning and tracking.

The *NON-SaaS using media firms* were not interested in increased collaboration features such as centralized communication; they shared documents through internal servers. Neither did they use more advanced planning than creating Gantt charts or planning manually on physical whiteboards.

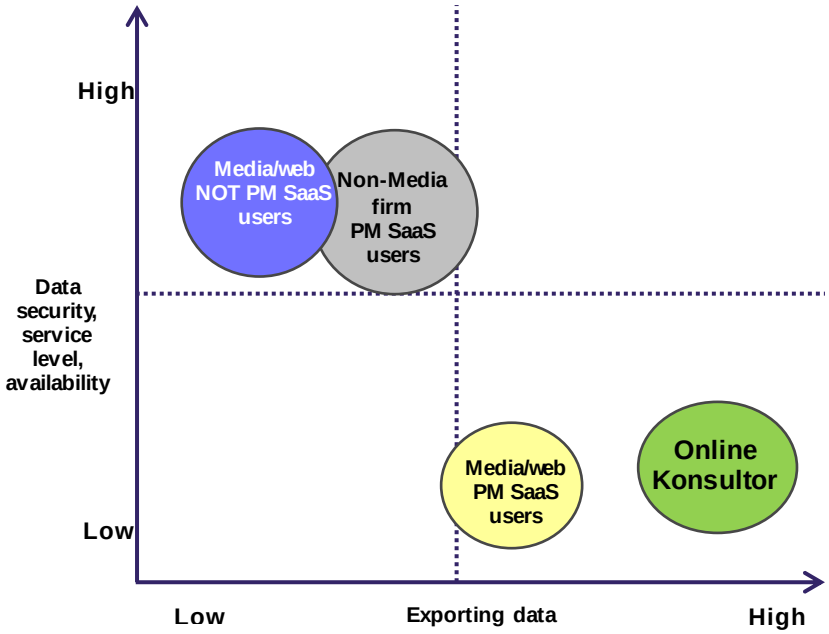

Figure 25: Data security and service level vs. exporting data

When comparing data security level with exporting data, or tool exit possibilities, it was shown that the *tool-using media/web firms* together with Online Konsultor were more worried about not being able to transport data in case of a tool switch compared to the other two groups of firms. Neither had they considered checking the SLAs before subscribing to the tools, or checked intellectual property rights. Actually they had not checked export possibilities either but had realized after employing the tools that a tool switch would be very difficult.

On the other hand, the *non-media firms* and the *media/web not using SaaS* were more security conscious and worried about how to evaluate security, furthermore, were both groups rather concerned about availability and stability of the tool.

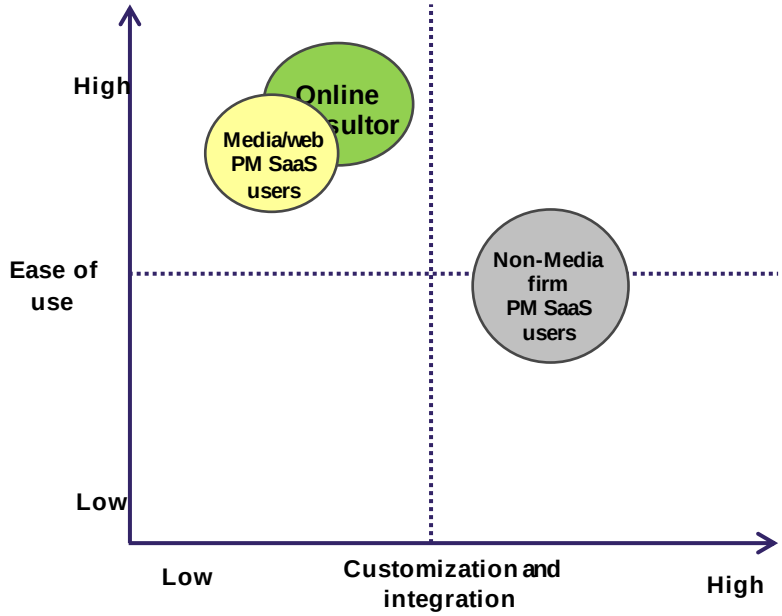

Figure 26: Ease of use vs. Customization and integration

Ease of use was mentioned by Online Konsultor and *the tool-using media/web firms* to be a very important feature, but amongst the *non-media firms* this was not the main focus. The NON-SaaS *using media/web firms* are excluded from this graph since they had no opinions or focus in these areas.
Regarding tool customization, the *media/web firms* accepted that the tools were difficult to customize, what they wanted was just ability to personalize looks and languages whilst some of the *non-media firms* wanted to be able to customize workflows. Furthermore, Online Konsultor together with the other *media/web firms* wanted ready to plugin integrations such as Dropbox, Google docs and mobile apps; while the *non-media firms* wanted to be able to perform back-office integration.

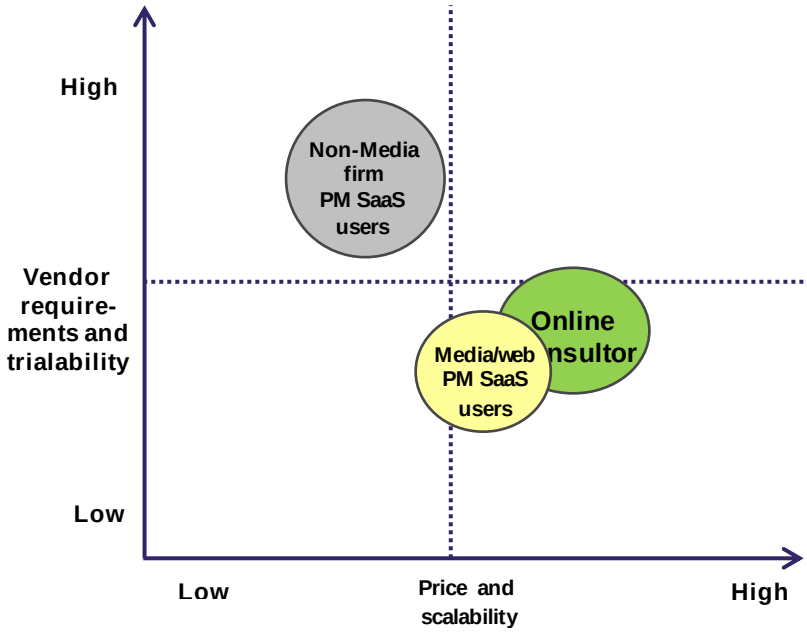

Figure 27: Vendor requirements and trialability vs. Price and scalability

On vendor requirements there were several differences; the *SaaS-using media/web firms* wanted online support, magazine recommendations and responsiveness to requests. Online Konsultor wanted more or less the same but also a stable and experienced vendor. The *non-media firms* wanted to see development strategy of the vendor and extensive support in the start of use of project tools such as telephone support and training.

The pricing of SaaS, did not seem bother any of the firms really. The fact that the tools have accumulative costs and that this might result more expensive in the long run compared to in-house hosting was not seen as an issue.

Trialability and scalability; it was important for the *media/web firms* that the tool would be simple to try out. Scalability was also important since the number of employees or size of projects might change from time to time.

5.3 Study 2: Analysis

The study has shown that the needs and wants found at Online Konsultor were very similar in other tool-using media/web firms. On the other hand, when compared to tool-using firms in other sectors and to media/web firms not using these tools, there were differences.

The differences in the wants and needs between the groups of firms may stem from several sources. The most obvious is that the current users of project management SaaS have already seen the advantages and disadvantages of the tools, hence, know more specifically what they want. The non-users were not able to tell their wants and needs in such detail, especially not regarding the more SaaS specific features, most likely due to lack of experience.

A reason for the differences between media/web firms and the non-media firms is probably that their projects differ in nature resulting in different needs and priorities. In online marketing, most of the work is performed by the computer and in small teams whilst the projects run in the other firms were for example; new product development projects, research projects, and IT system development involving a larger number of users.

The tool-using media/web firms preferred **centralized communication** over planning and tracking; though at a minimum they wanted **task lists and time tracking**. The motive for not requiring advanced tools for planning of resources was probably due to the size of the firms but could also be due to the complexity of the problem the projects aimed at solving. It can be argued that if the problem is not difficult, it does not require advanced methods to solve, hence, rigor planning might not be necessary for these firms. Centralized communication was believed to facilitate collaboration, and as the clients were invited to the tools, ease of use was also considered important since the opposite could imply reluctance to using the tools. Furthermore, **e-mail integration** was wanted as it was considered to increase the centralized communication and collaboration. Apart from facilitating communication, the tools provided availability of information to all project participants, meaning that the project manager was not the only one in control of project information. These media/web firms might have lower hierarchies then the other firms, which might be a result from either size of company or company culture.

However, the opposite preferences were found amongst the non-media firms which were more inclined towards robust **tracking and planning** as well as **customization** possibilities. The reasons for this was that the firms currently used resource planning and particular work flows for their issue tracking and therefore wanted to be able to adjust the tools accordingly. Moreover, were their customers not integrated in the tools to the same extent as the media/web firms. The media/web firms which did not use any project management SaaS tools at all were not inclined towards planning neither collaborative features.

For the tool-using media/web firms it seemed that **scalability** was important in case their firms would grow. When it came to **vendor requirements**, these were rather low; the most important for these firms was online support and tutorials. For the non-media firms on the other hand a good record of reference customers and intensive support such as by telephone was wished for.

It was shown that the media/web firms currently using project management SaaS were more risk-prone, considering importance given to data security, than the other groups of firms. The reasons for this might be several; the importance of the information stored in the tools, whether it is confidential, copyright material or neither. It could also be due to unawareness of the risks, ignorance or possibly that the functional features were more important than the security factors. It could also be due to the fact that these firms worked a lot online, hence, were already virtual and more inclined to adopting new technologies online. When it came to tool switching possibilities, on the other hand, the media/web firms were more concerned since they had realized it would now be difficult for them to switch tools as **extracting** the data and moving it to another tool would require some

programming skills and time. Though, this was something they had realized after choosing the tool and not before adoption. Hence, they can still be considered risk prone as this is something they should have evaluated before adopting the tools in the first place.

Finally, a reflection has to be made of whether the firms might have asked for more features than what they actually needed or would use. Online Konsultor for example used no Gantt charts at the moment, nor advanced tracking of the project progress but during interviews these features were stated as important. If a tool would provide these features it is hard to say whether they would actually employ them.

5.4 Feature list to be evaluated

The next step of this research was to set up a number of features to be evaluated in the tools. The features which have been included are basically all features which have been recognized so far resulting from the literature study, the case study and the multiple case study. The reason for including all features that has been found, and not only the features mentioned by the media/web firms is to get a broader picture of what the tools cover. The list of features can be viewed in appendix 7. The list is built up by first naming an overall feature and then relating sub-features, e.g. *Centralized communication* is considered an overall feature whilst *messaging* and *sharing documents* are sub-features in the domain of *centralized communication*.

Considering the evaluation of the features, there are some of these which will not be evaluated fully due to difficulties in its investigation;

- Ease-of-use will be omitted since it would require an actual trial, instead it will checked whether the provider promotes its tool as easy to use
- Financial stability will be omitted due to the extensive time required to perform this evaluation.
- Plug-in applications - there might be applications available for the tool but the researcher cannot be sure to cover all of these.
- Published recommendations will be searched for but might all available might not be covered.
- Development strategy of the vendor might be an issue to find without contacting the vendor, this will not be done.

Finally, throughout the investigation more features have been added as these were found in the tools and considered to potentially provide an added-value to the media/web firms. The ones which have been added during investigation are clearly indicated in the feature list.

6 Study 3: Project management SaaS tool evaluation

The second empirical analysis ended with a feature list which in this section will be applied to a number of project management SaaS tools. The eleven tools which were evaluated are the following;

1. *Basecamp*
2. *Projectplace*
3. *Proworkflow*
4. *Teamwork live*
5. *Visionproject*
6. *Clarizen*
7. *Celoxis*
8. *Projectturf*
9. *Same-page e-studio*
10. *Teamwork PM*
11. *Zoho projects*

This section will first present the evaluation of these tools, then a grouping of the tools will be made and an analytical reflection presented. Finally, the applied evaluation framework is revised and applicability discussed.

6.1 Evaluation results and analysis

The purpose of the evaluation has been to analyze the project management SaaS tools firstly as a group and not each individual provider, hence summaries of the results will presented without reference to the particular tools. Secondly, the providers will be categorized into different groups depending on their overall characteristics in the next section.

When looking at the diagrams it is important know that every feature noted **"**NEW"** means that it is a feature which was included during the evaluation, in other words, it was not identified during the previous empirical analysis but during the actual evaluation. The reason for their inclusion is because the researcher found these features important to include, as they could add particular value to the tool functionality or be important tool aspect for small marketing firms. Furthermore, when something has been recorded as **"N/A"** it means the researcher has not found the feature on the website, but it might not mean it does not exist.

6.1.1 Collaboration and centralized communication

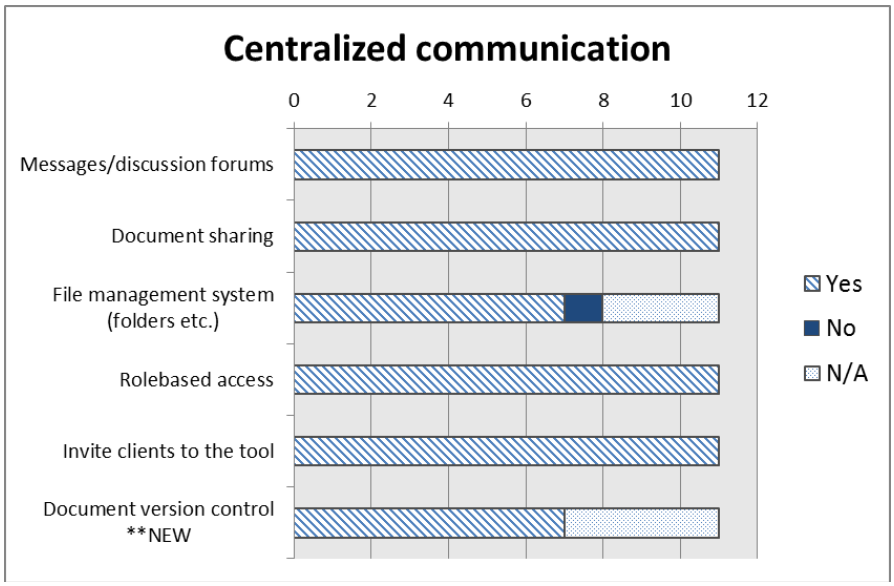

Figure 28: Results of centralized communication

The messaging function had previously been used as filter when selecting the tools, hence, it was obvious that all tools in this evaluation would support this. Other collaboration

features such as document sharing and client involvement were found to be provided by all tools. Though these features were provided, it has to be noted that the level of attributes to each feature were rather differing.

Messaging: some tools offered not only posting messages but archiving of messages, saving drafts, text editing, organizing of messages, ability to send private as well as group messages and similar. These features can be important attributes as it might have an impact on the usefulness of the tool.

Document management was also found to be supplied at different levels:

- **Document sharing** was provided by all tools
- **File management** was provided through folder systems by the majority of the tools
- **Version control of documents** increasing the ability to keep track of the latest file version

Furthermore a document icon preview was supplied by some which can make it simpler to find the document one is looking for.

Clients could be involved in the tools and given access thanks to the **role-based feature**. The SaaS pricing model basically comes in two ways – pay per user and fixed price per month. In the latter, clients could normally be invited for "free" whilst in the pay per user involving the client came at an increased tool cost. Furthermore, the level of collaboration differed; there was one tool which only let clients be part as viewers of the projects.

Summary: Collaboration features are highly provided by the tools, messaging and sharing of documents are features which all tools supplied. As role-based access is permitted, the ability to involve all internal as well as external partners also increases collaboration and information sharing.

6.1.2 Project scheduling and activity planning

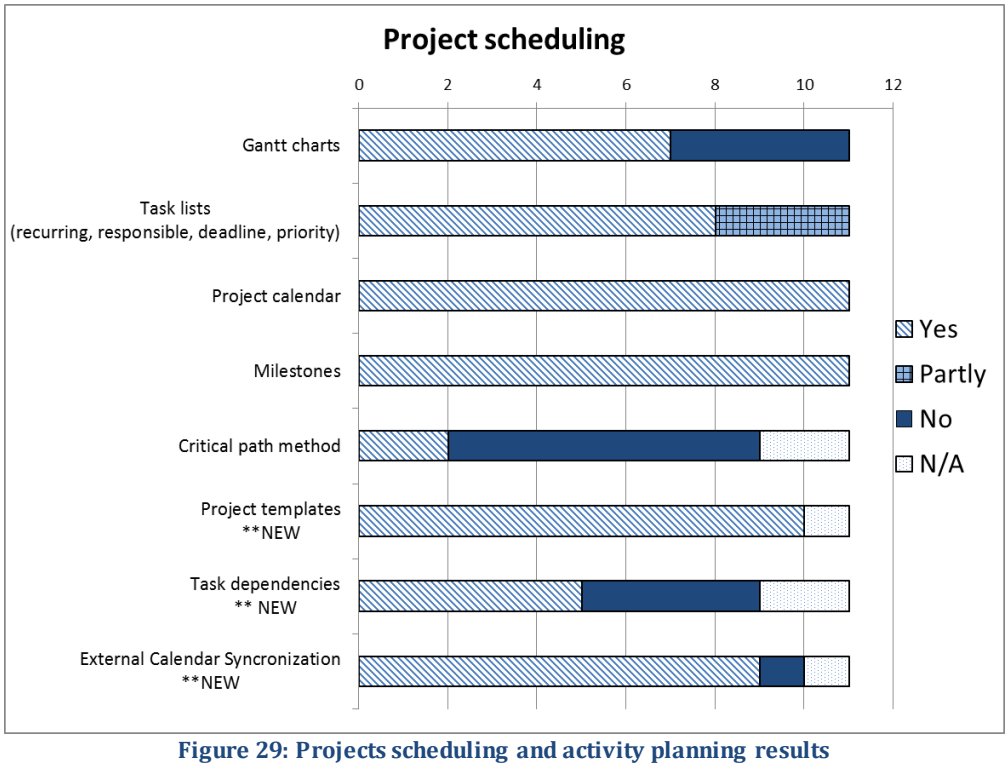

Figure 29: Projects scheduling and activity planning results

Gantt charts and project overviews were provided by several tools (7/11), but at different levels of sophistication. A few could be programmed in a detailed way, setting **dependencies between tasks** and providing estimations of time as well as calculating the **critical path,** determining the critical activities which will set the project length.

Tasks were provided by all tools. During the interviews with the media/web firms it was found that task lists were very important for these companies, hence, in the evaluation the researcher looked for several attributes such as being able to:

- Program recurring tasks
- Set priorities to the tasks
- Set deadlines
- Assign tasks to different staff

The tools which received the degree "partly" did not support all attributes, e.g. recurring tasks or priorities but maybe only supported deadlines and assignation. It was also noted that some tools provided assignment of one task to several team members and time could also be tracked against tasks.

Project calendars were provided by all tools as well as programming **milestones**. Some tools offered calendar **synchronization** between the project calendar and other calendars such as Google calendar and MS Outlook; this was believed to be a useful feature and hence added during the investigation. Finally, **project templates** could be created in order to help increase productivity in the set-up of a new project. The templates could be programmed with a set of predetermined tasks and the layout of the tool could be adjusted.

Summary: Task lists together with calendars and milestones seem to be the core of project planning in these tools, whilst more advanced features such as Gantt chart views and calculating the critical path were not prioritized features.

6.1.3 Project progress and tracking

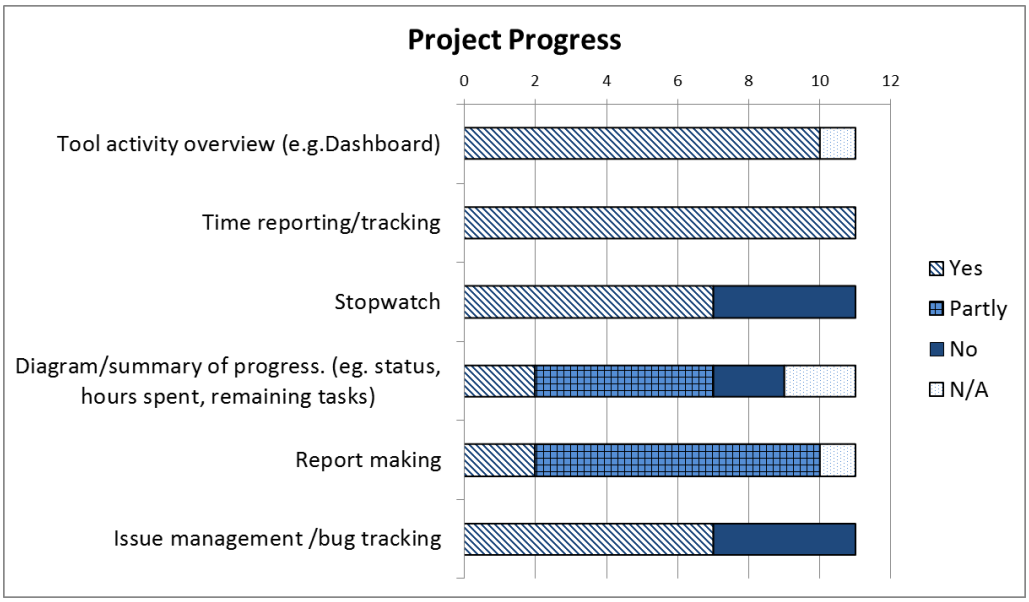

Figure 30: Project progress and tracking results

A dashboard showing recent tool activity was provided by almost all tools as well as **time reporting function**. Time reporting was basically provided in two different ways, by manually recording hours spent in a project or it could be recorded using a **stopwatch** tracking the time of work in real time and reporting it automatically to a database.

Diagrams and reports presenting the tracking of the project progress was only provided to a limited extent. Most tools made it possible to extract time reports, but the reports were not always automatically created but had to be exported to MS Excel and then calculated manually. Anyway, some of the tools provided overviews of project accordance to timeline, indicating tasks which were overdue or showing number of tasks remaining.

Issue management and bug tracking can be useful to track project change requests or software bugs. As can be viewed in the diagram, several tools supplied this but normally through an add-on to the project management tool.

Summary: Dashboard views and time reporting seem to be the core features for project progress and activity tracking whilst report making in general and project progress tracking through automated diagrams and charts was supported to a lower extent. Bug and issue tracking was also supported by many tools.

6.1.4 Resource, cost and risk management

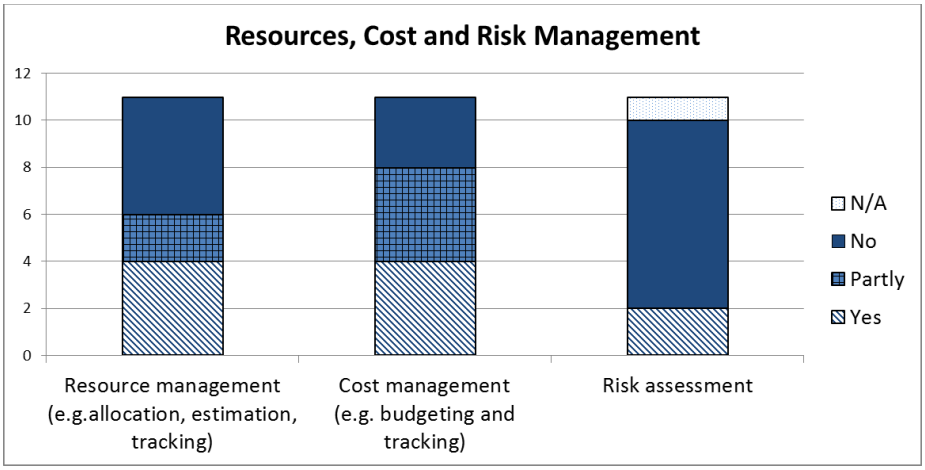

Figure 31: Resource, cost and risk management results

Robust **resource management** was provided by four tools and simpler resource planning was provided by two tools. The reason for the lack of this feature might be that many of the tools are created for smaller teams, and as Online Konsultor mentioned during interviews, they did not believe it was necessary since they had very few team members.

Cost budgeting and tracking was also a feature which lacked in several tools. The tools which were given the value "Partly" provided tracking of project costs in terms of worked hours whilst the ones given "yes" also provided budgeting and tracking of other costs apart from human resources.

Risk assessment was provided by solely two tools, where potential risks could be registered and assigned values of probability of occurrence and impact of occurred.

Summary: Neither resource, cost nor risk management can be considered core feature of these project management SaaS tools, but are available in some.

6.1.5 Ease of use and search functionality

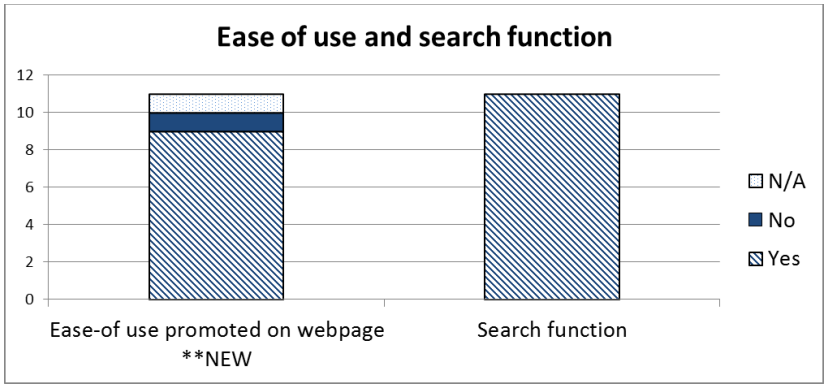

Figure 32: Ease of use and search functionality results

Ease of use and simplicity was considered important by all the tool-using media/web firms which participated in the interviews. As ease of use is highly subjective and would require a number of indicators to measure as well as a trial of the tool, it has not been measured properly. The only indicator used in this evaluation was whether the tool provider promoted their tool as easy to use, simple or intuitive on their web site.

Provision of a **search function** was important to many interviewees. All tools provided this feature, in some tools the kind of item to be searched for could be specified, whilst in others it was only possible to search for everything in one search string.

Summary: All tools provide search functions, but at different levels and most of the tool providers promote their tools as easy to use.

6.1.6 Data security

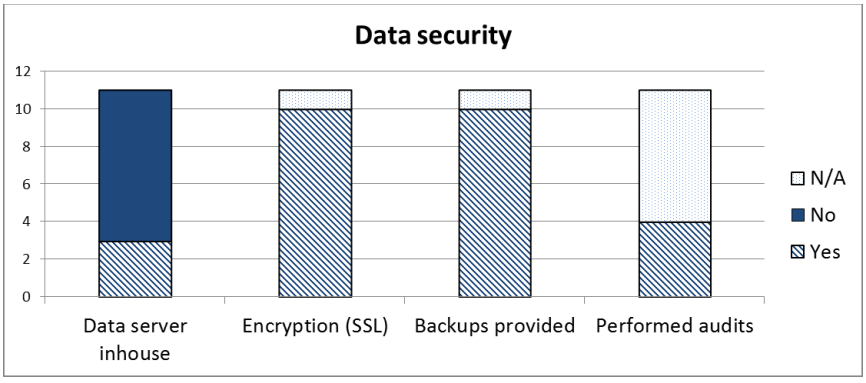

Figure 33: Data security evaluation results

Data security was widely discussed in literature (Badger, et al., 2011; Armburst, et al., 2010; Nema, 2010) and many of the interviewees believed security evaluations were important. For the layman, this kind of evaluation can be very difficult and so it was for the researcher. Anyway, the following was checked and observed:

Data server management: It was found that most SaaS tool providers outsourced the tool data storage to the cloud which means that user's data will not only depend on the tool provider but on the data storage provider.

The **encryptions** used were 128bit and 256bit between server and computer. Though some providers still declined responsibility for encryption; "*You understand that the technical processing and transmission of the Service, including your Content, may be transferred unencrypted and involve (a) transmissions over various networks; and (b) changes to conform and adapt to technical requirements of connecting networks or devices.*"

Backups were normally provided on a regular basis by the SaaS providers but some recommended the user to actually perform backups themselves as well. One provider stated that performing backups was the sole responsibility of the user.

The **audits** which had been performed were: SS-ISO/IEC 27001:2006 and SAS70 type II.

- SS-ISO/IEC 27001:2006 states which requirements to be fulfilled in order to introduce a management system for information security.
- SAS70 type II is an audit performed on service organizations or service providers which have to demonstrate that they have adequate controls and safeguards when they host or process data belonging to their customers.

Summary: SaaS providers seem to have implemented several measures of security such as encryptions and back-up of data, but even so, they do not take full responsibility for security. Many of them do not manage their own data centers but outsource these to cloud providers. Some had information security audits performed to them as well.

6.1.7 SLA, legal liabilities and Intellectual property

When studying the terms of service and service level agreements (SLA) information on promises, intellectual property rights, responsibilities and liabilities could be found for each tool.

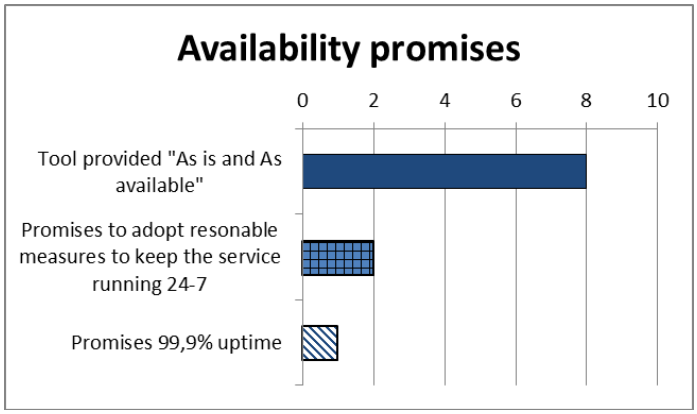

Figure 34: Availability promises results

There was only one provider which made a promise of **99.9% uptime**, but the rest of the tools made no such promises. When a tool is provided "**as is and as available**" it means that the provider makes no warranties in terms of the condition of the tool, the buyer have to accept the tool *as it is*, nor are any warranties given on the availability and uptime of the tool. Two of the "as is and as available" stated they aimed at a level of 99.9% availability and one provider offered a backup site in case the regular project site would be disabled. Two of the tool providers **promised to adopt reasonable measures** to keep the application running, but no warranty was actually given.

One has to be careful during tool evaluation, reading the SLAs was found to be very important. On the registration page of one of the tools the following was found:

Figure 35: Exposed on sign-up page of one of the evaluated tools

Though when reading the terms of service it was found:

- *"Your use of the service is at your sole risk. The service is provided on an "as is" and "as available" basis. The provider expressly disclaims all warranties of any kind, whether express or implied, including, but not limited to the implied warranties of merchantability, fitness for a particular purpose and non-infringement."*

Furthermore, regarding the continuation of the service and tool availability it was found that some providers (4 of them) made no warranties in this area either:

- *"The provider reserves the right at any time and from time to time to modify or discontinue, temporarily or permanently, the Service (or any part thereof) with or without notice."*

During the interviews with SaaS providers in the second study it was found that some companies might appreciate the ability of working offline when Internet connections were not available. Furthermore, it could be important for some to be able to run the service in-house due to data storage location restraints or due to the accumulative cost which comes with SaaS.

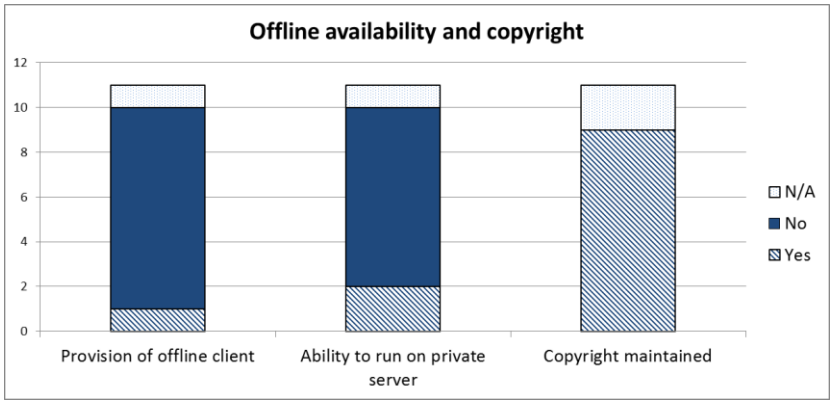

Figure 36: Offline availability and copyright results

As can be seen in the graph, **offline clients**, or desktop applications were normally not supported by the tools and very few offered the possibility of **hosting the tool in-house**.

The **copyright** of the information uploaded to the tools were in nine cases maintained but in two cases no clauses were found.

Compensations for failures were hard to find in general during the evaluation, but one was encountered;

- "IN NO EVENT SHALL OUR AGGREGATE LIABILITY [...] EXEEDTHE TOTAL FEES PAID TO US BY YOU FOR USE OF THE SERVICES DURING THE PRECEDING TWELVE MONTH PERIOD, PROVIDED HOWEVER THAT WITH RESPECT TO INTELECTUAL PROPERTY INFRINGMENT CLAIM AGAINST OUR SERVICES ONLY, OUR TOTAL LIABILITY TO YOU WOULD BE LIMITED TO THREE MILLION US DOLLARS (US $3,000,000)..."

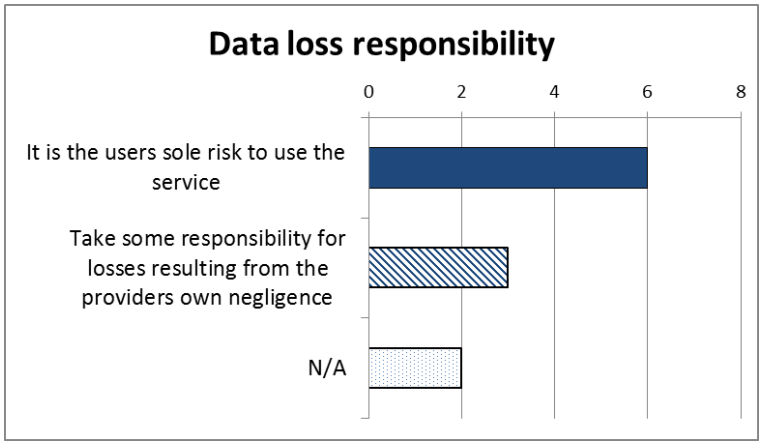

Figure 37: Data loss responsibility results

Although the SaaS tool providers stated during interviews that they took security seriously, none of the investigated tools took on any responsibilities for data losses, nor performance or availability promises. The following paragraph was seen in several terms of service agreements:

- "*You expressly understand and agree that [provider] shall not be liable for any direct, indirect, incidental, special, consequential or exemplary damages, including but not limited to, damages for loss of profits, goodwill, use, data or other intangible losses (even if [provider] has been advised of the possibility of such damages), resulting from: (i) the use or the inability to use the service; [...](v) or any other matter relating to the service.*"

Only three of the tool providers seem to take some responsibility, one which offered compensations for direct losses corresponding to the amount of the fee paid for the tool as long as the user claims the sanction within 45 days after awareness of the ground of the claim.

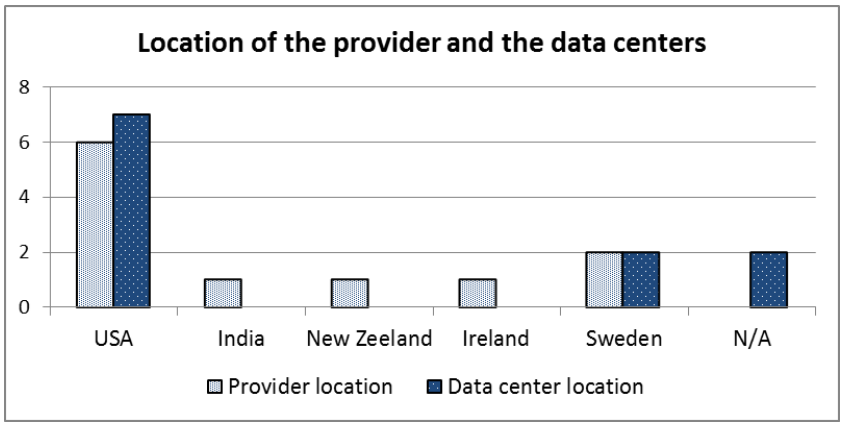

Figure 38: Overview of location of the tool provider and the data centers

The location of the provider and its data host were as the diagram above shows. All data centers were placed either in the US or in Sweden, while the countries of the SaaS provider could be found in India, New Zeeland and Ireland as well. The laws and regulations applied to the different tools were difficult to find but, normally it was the laws of the country of the vendor which applied in case of settlement.

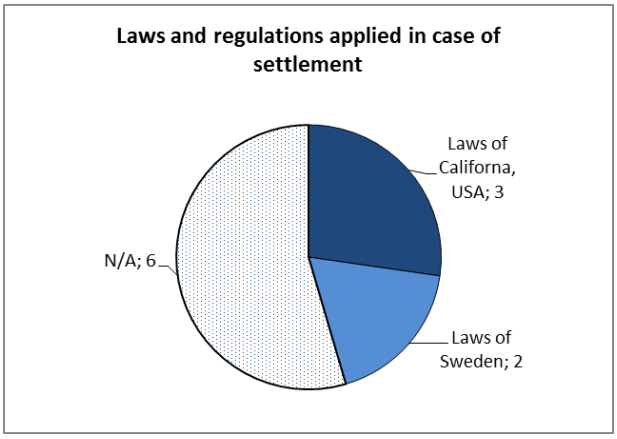

Figure 39: Laws and regulations results

Summary: Since hardly any promises are made regarding the service levels of the tool the use of these services is at the sole risk of the user, hence, compensations for low availability, data loss or failure to perform cannot be expected. In general, the SaaS tools are totally dependent on an Internet connection and hosting the tools in-house is normally not possible. At least, the information uploaded to the tools maintains intellectual property of the users. Using a SaaS tool means in most cases not only leaving your data in the hands of the tool provider but also in the hands of a data storage center, and both of these might derive from different countries. Furthermore, if something severe would happen, the laws and regulations which apply might be different from the laws of the country where the user is located, which can be important to have in mind.

6.1.8 Exporting Data

When storing information in a tool it is important to be able to export the information, especially in the case where a subscription is to be cancelled or the user wishes to change tools.

It was found that almost all tools provided their application programming interface (API), which makes it possible to integrate the tool with other applications or to create a program to extract information from the tool. Furthermore, it was found that **data could be exported** as: HTML, XML, JSON, MySQL and also some parts of the content as XLS or CSV, which is MS excel compatible and PDF.

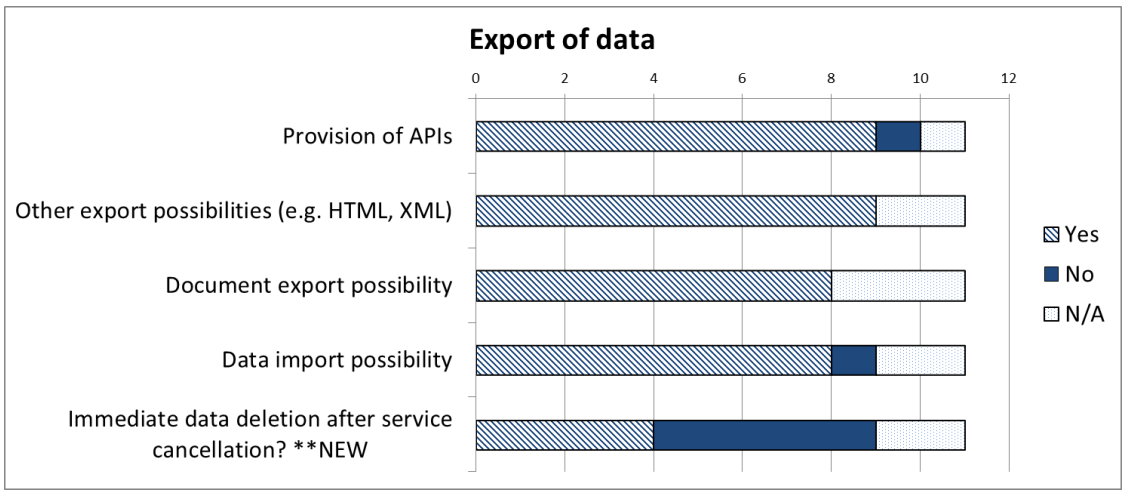

Figure 40: Data export and import possibilities results

However, even though there are possibilities to export data, Enisa (2009) points out that customer data is typically stored in a custom database scheme designed by the SaaS

provider and if the provider only offers APIs and no readymade data 'export' routine, the customer will need to develop a program to extract their data and write it to a file ready for import to another provider. The authors Cabot and Wilson (2009) also points out that exporting projects for backup or use elsewhere is difficult, even content exported as XML needs parsing and interpretation in order to be used elsewhere. The difficulty comes when the content is to be imported to another tool. According to Enisa (2009), few formal agreements on the structure of business records are available, customer records at one SaaS provider may have different fields than another provider, although there are common underlying file formats for the export and import of data, e.g. XML.

It was found though, that some tools actually offered **import possibilities** from the tool Basecamp, an option which would facilitate the tool switch, furthermore data could be imported from MS project. Regarding the **downloading of files,** there were different possibilities; either they could be downloaded one by one or as a zip-file containing all files.

Finally, it was investigated what would happen if a tool subscription would be **cancelled**. Four of the providers clearly stated that all data stored would be deleted whilst the others retained the data for 10-90 days.

- *"All of your Content will be immediately deleted from the Service upon cancellation. This information cannot be recovered once your account is cancelled."*

Summary: Difficulties with data export for use elsewhere makes the user locked-in with the tools. Though there are possibilities to export data, these require programming and interpretative skills, hence, switching cost is rather high. Some tools offer data import from other project management tools (mainly from Basecamp) which can ease the switching. Finally, it is important to have backed up one's data before cancelling subscriptions since some providers delete all customer data at termination of contract.

6.1.9 Tool customization

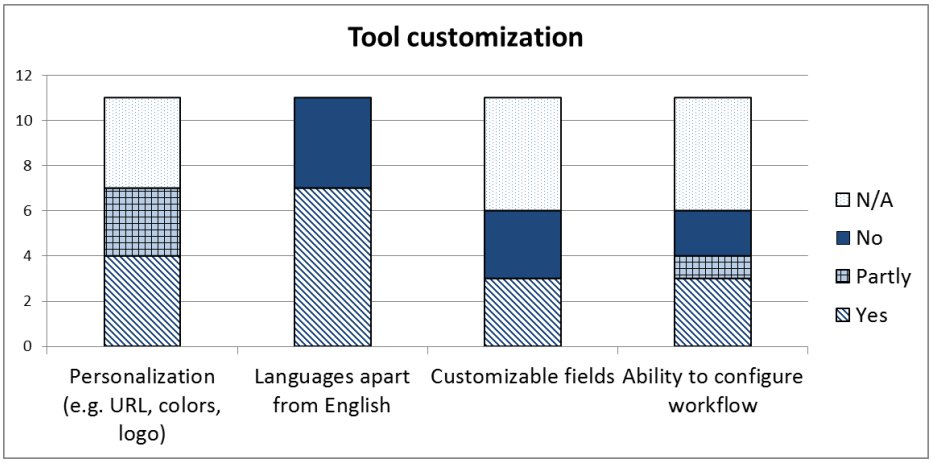

Figure 41: Tool customization possibilities results

Online Konsultor wanted to be able to **personalize** the colors of the tool, they also appreciated the possibility to increase their branding by customizing the URL and uploading company logotype to the tool. Furthermore, it was important for them to be able to provide the tool in other **languages** apart from English, such as Spanish and German. As can be seen in the graph; seven tools provided multi-languages and seven tools provided at least some kind of personalization.

Ability to **customize fields and workflow** was not provided by many tools, only three were found. Most of the tools which provided issue tracking allowed for this work flow adaption.

Summary: The SaaS tools are rather standardized when it comes to customizing fields and workflows, some support personalization in terms of looks inside the tools (e.g. colors and logo) and some also provides their tools in several languages.

6.1.10 Vendor requirements

The interviewees believed it was important to have a vendor which was **experienced** on the market, as can be seen in the following diagram, the tool which had been available the longest was started in 1998 and the shortest in 2008.

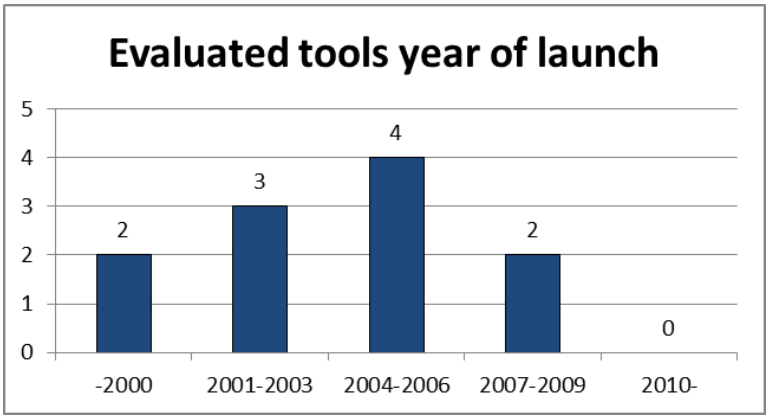

Figure 42: The year of launch of the tools which were included in the evaluation

Another important factor was popularity and reference customers; hence, the researcher also looked for number of users:

- Basecamp - 7 million
- Projectplace - 750 000
- Same-page estudio - 350 000
- Zoho projects- 6 million

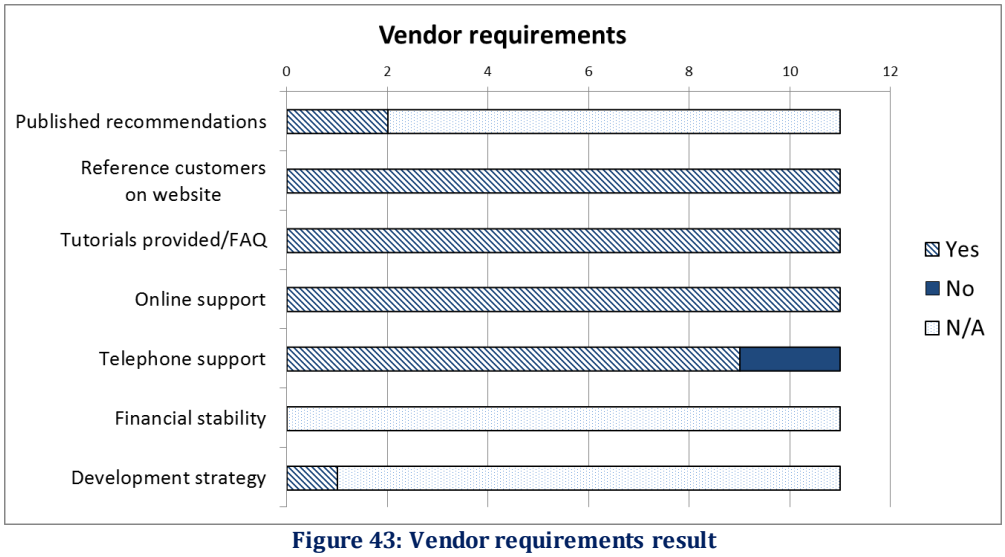

Figure 43: Vendor requirements result

Other factors regarding the vendor which were found were **recommendations** of the tools had been made in magazines (several have been denoted N/A since all were probably not

found during investigation). All providers had **reference customers** published on their home pages, all provided **tutorials** and **online** support but not everyone offered **telephone** support. **Financial stability** was not evaluated in this investigation and the development strategy was presented by only one of the providers showing the **roadmap** of what they were working on.

Summary: Experienced project management SaaS tools providers can be found on the market and several companies are already using these tools. They all provide tutorials and online support but only one shared their development strategy on their web site. Financial stability was excluded in this investigation.

6.1.11 Application Integration

As was seen in the section "Exporting data" most tools provide API's which support the possibility to integrate the tool with other applications. As can be seen in the diagram below, there were readymade integrations such as with **CRM, billing and time tracking** software which could be plugged-in to the tools. **Google docs and Dropbox** were also applications which were integrated by some of the tools.

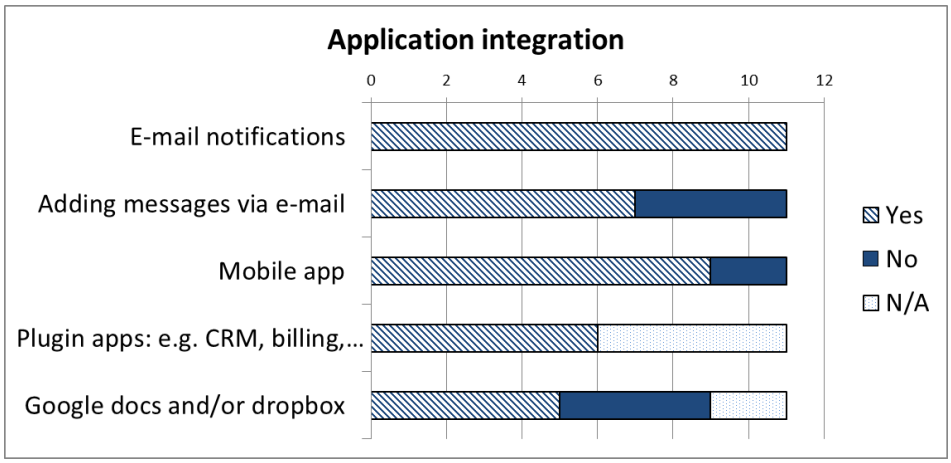

Figure 44: Application integration possibilities

Probably, the most important feature in this section for Online Konsultor was the possibility for the tool to work in tandem with the e-mail. For one part, **e-mail notifications** were considered very important, being able to notify staff when new tasks were added or when a new messages were sent. Secondly, Online Konsultor wanted to be able to **reply to a message thread in the tool via e-mail**, without having to log onto the tool. Seven tools provided this feature, and some even provided the possibility to add tasks via e-mail and programming the calendar via e-mail. Finally, most tools provided a mobile application.

Summary: Some tools already provide plug-in applications, either created by themselves or by third parties. E-mail notifications can be expected from every tool but sending information to the tools via e-mail cannot be expected from all.

6.1.12 Trialability, scalability and pricing

One of the advantages of SaaS, as was mentioned by several interviewees was that it is simple to try out before purchase.

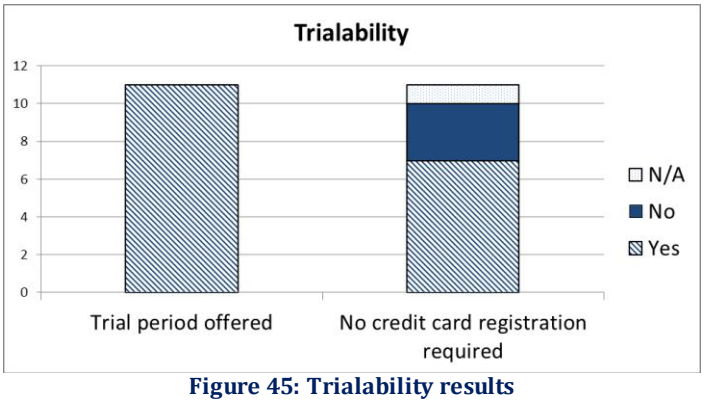

Figure 45: Trialability results

During evaluation it was found that not all tools were easy to try out, the ones which were not possible to try out without contacting the vendor were excluded from the investigation, hence all tools evaluated here offered a **trial period**, though some required the user to register a **credit card** in order to being able to try out the tool. Requiring a credit card registration lowers the easiness of trying the tool, it can be risky if the subscription is not cancelled after trial period, then the user might have to pay for using the tool. Either way, the providers offered trial periods between 14 and 60 days.

Table 20: Results of pricing models

Pricing Models			
Pay per user [5 tools]:		**Fixed price per month [6 tools]:**	
Projects range: 1 project -Unlimited		**Projects range**: 1 project - Unlimited **Users range**: 1 user-unlimited (*one max 50 users but unlimited clients)	
Storage ranges:	**Price range:**	**Storage ranges:**	**Price ranges:**
Unlimted	24.95$-44,95$/user/month (36 month contract)	Max 100GB	$20-150/month
1GB + 0,25GB per user	$5-19/user/month	Max 100GB	$39-199/month
0-10 GB	$10-30/user/month	Unlimited	$39.99-199.99/month
0,5GB/user	$14.95/user/month	Max 80GB	$0-149/month
N/A	$21/user/month	Max 80GB	$39-499/month
		Max 30GB	0-$80/month

The table above summarizes the pricing models and prices found amongst the investigated tools. Five of the tools were provided as *pay per user* and six with a *fixed price per month.* The price ranges varied with **number users, projects and the size** of **the data storage.** All tools were **scalable** to the extent that unlimited users and projects could be subscribed for, but there were limits set to the size of the data storage.

Apart from number of projects, users and storage size, the price might depend on different modules, such as issue tracking, chat modules, wikis, which if chosen, would increase the monthly price.

In a test calculation of some of the tools it was found that the pay per user model ended up **more expensive** than the fixed price alternatives. When calculating the cost for: 15 users, 100 projects, 10 GB storage. The prices varied:

Fixed monthly price: $80 - 149/month
Pay per user price: $224-375/month

Finally, the price change policies applied were investigated, it was found that:

- The provider reserves the right to price changes with notifications [2 cases]
- Prices were reviewed annually or 6 every months [2 cases]
- All prices are subject to change at any time [1 cases]

Summary: Most tools are simple to try out but some require credit card registration. In general, the tools with a pricing model of *pay per user* are more expensive than the ones which are provided at a *fixed monthly price*. The tools can be scaled to unlimited users and unlimited projects, but the data storage is limited. Price changes are normally notified but can be changed at any time.

6.1.13 Other value-adding features

During the tool evaluation a number of potentially value-adding features were found. Many tools offer several features, some which can be useful or some which might not. When picking a tool, some users might be attracted by the number of functions provided but one should be careful; the main priorities to have is that the tool supports the features which are essential to the users. These features were not included in the evaluation framework.

- Project portfolio management
- Approval of designs and tasks
- Online editing of documents
- Wikis
- Online meeting
- Online chat
- Idea management
- Invoicing/Billing
- Address books

6.2 Grouping of SaaS tools

In the previous part the project management SaaS tool features have been evaluated as a group, in this part the tools will be grouped and categorized based on the features they provide. The tools have been grouped in two figures which can be viewed below.

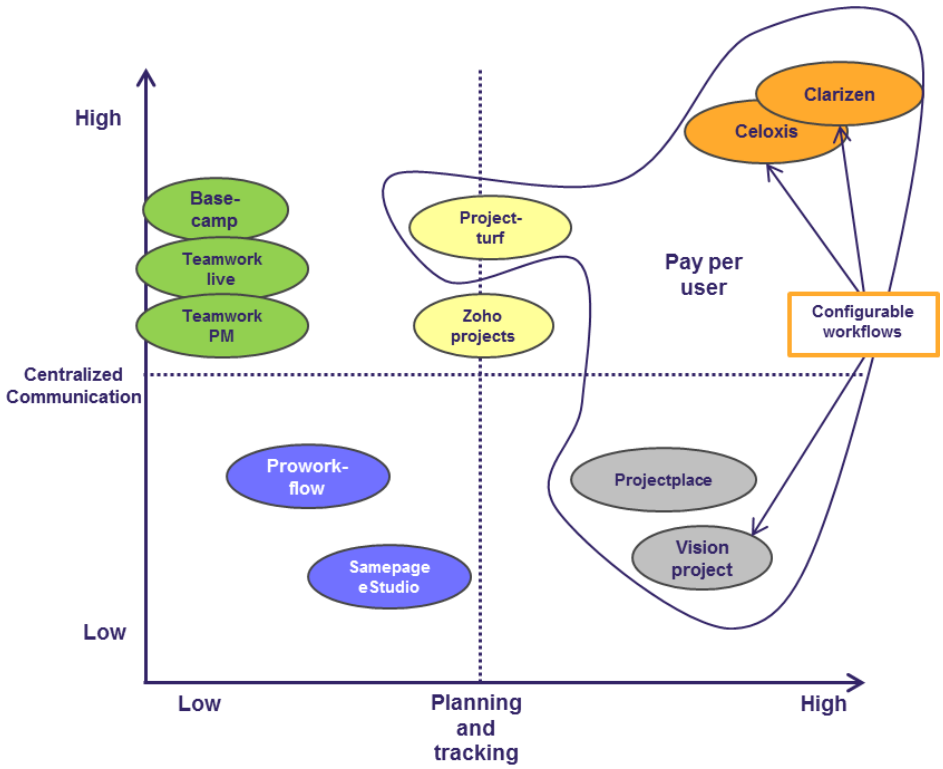

Figure 46: Centralized communication vs. planning and tracking

Five groups of tools can be identified in the figure. Regarding centralized communication the ones which are considered *high* are the ones which offer e-mail integration, allowing for sending messages and adding documents via e-mail to the tools. E-mail integration has previously been categorized within the integration features but as recognized by the tool using media/web firms and Online Konsultor, this was also related to increase collaboration possibilities, hence it is added here. The *low* area of centralized communication include at least document sharing and messaging.

In the scale used for planning and tracking; *low* includes provision of dashboards for tool activity and ability to create task lists. *High* includes features such as resource planning and tracking, cost management and progress overviews and also portfolio management. The *medium* segment includes for example Gantt charts. For a full description of the categorization procedure of the tools, view appendix 8.

An interesting finding was that the tools which were categorized as *high* planning and tracking had the pricing model pay per user, which can be considered more expensive as was seen previously when comparing the pricing models. Furthermore, three of these tools also offered configurable workflows. However, the five groups could be identified;

- Collaboration focused tools (Basecamp, Teamwork live and TeamworkPM)
- Planning and tracking tools (Projectplace and Vision project)
- All inclusive (Celoxis and Clarizen)
- Collaboration and medium planning (Zoho and Projectturf)
- Little inclusive (Proworkflow and Samepage eStudio)

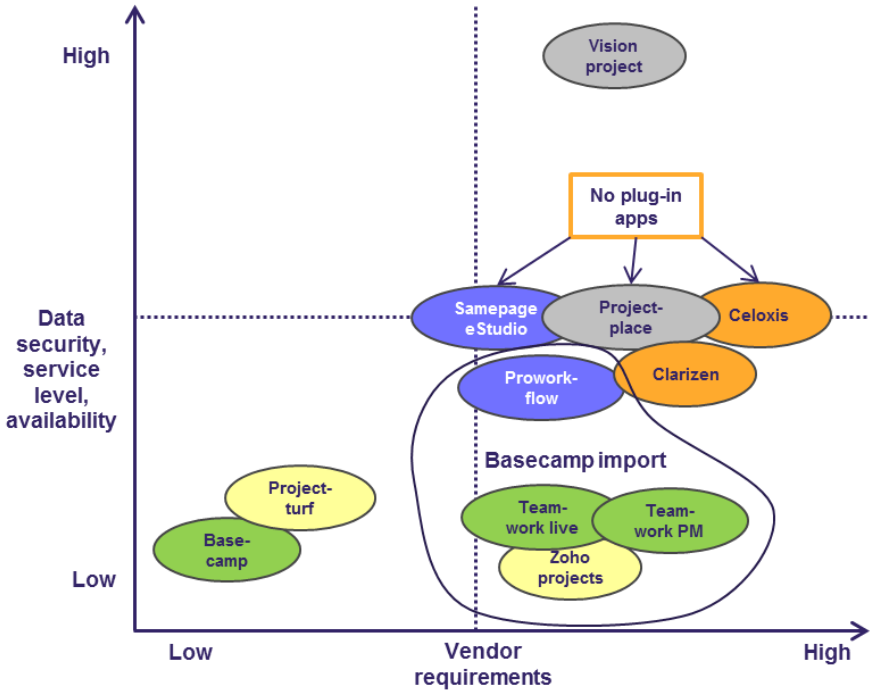

Figure 47: Data security, service level and availability promises vs. vendor requirements

The second groping was done through contrasting security, service level and availability promises versus vendor requirements. Four groups of tools were identified. The first one, starting from the top, was vision project. It was the only tool providing comparatively high availability promises and the provider took some responsibility for data loss, moreover the vendor supplied telephone support and ability to host the tool in house.

The second group consisted of five tools, Samepage eStudio, Projectplace, Celoxis, Clarizen and Proworkflow. These all provided rather high vendor requirements such as telephone support and medium security or medium service levels. A few took some, though still limited, responsibilities for data loss, and a few tools aimed for a high service availability, though none of them made any clear promises.

The lowest promises were made by the last 5 vendors; Basecamp, Projectturf, Teamwork live, Teamwork PM and Zoho. These applications were provided purely "as is and as available", furthermore some of these stated that that the service might be terminated at any time. Moreover, was data deleted immediately after cancellation of service. The lowest vendor support was provided by Basecamp and Projectturf.

The reason for not categorizing the tools in the same manner as the firms in the previous chapter, was due to the following:

- all tools were scalable and trialable
- ease of use could not be tested during this evaluation
- integration could be performed with basically all tools apart from one which did not provide the APIs
- most tools were customizable in terms of colors and languages
- exporting data was not made easy in any case though importing of Basecamp data was offered by 4 tools which increased switching possibilities for the Basecamp users

6.3 Study 3: Analysis

Several of the tools were found to support collaboration and centralized communication, which was wished for by the tool-using media/web firms as this was believed to facilitate communication. There were also tools which supported more advanced planning and tracking features, which were wanted by the non-media firms. The trade-off between the different types of tools seemed to be the price. The tools with more advanced planning features were sold as pay per user, which means the cost will increase with the number of users, whilst the ones which came at a fixed price per month provided a cheaper solution for many users.

The collaborative tools, however, came with some kind of planning functionality; they all provided task lists for planning. Though the provided task lists differed in sub features; some supported recurring tasks for example and some did not. The trend in these tools seem to be that robust resource and tracking functionality is not included (in the study 4/11 supplied this) and risk management was supported by even fewer. It might be that that these features are it not important anymore, or maybe unnecessary for the users. For small companies, robust planning might not be necessary, especially in an environment of constant change. After all, Basecamp is used by 7 million users (basecamphq.com, 2012) and does only support simple task lists and calendars.

Data security aspects and availability promises were vague in most SaaS tools. Only one provider clearly stated to give some availability promises and took some responsibility in case client data would get lost. The data centers used by the tool providers were normally outsourced for hosting on the cloud, which means dependence to a third party. Most of the tools were only provided "as is and as available" and the vendors made it clear that they at any time, temporarily or permanently might terminate the service of providing the tool. Furthermore, the findings of the investigation shows that export of data was not made easy, interpretative and programming skills would be necessary to be able to move data

from one tool to another. Even downloading documents stored in the tools were made difficult, only being able to download these one at a time in some cases.

Support from the tool providers was given at different levels, some offered phone numbers but others only provided tutorials and online support. Anyhow, most firms provided examples of reference customers. All the tools were scalable in terms of number of users and projects which is an aspect that can be very important for small growing firms. On the other hand, some tools were provided with the price model "pay per user" which means that scaling the tool in terms of users could be rather costly. Only one tool offered in house hosting, which could be an option for larger firms in order to decrease the costs.

Regarding configurability, it was found that the majority of the tools did not support a high level of customization but were standardized; hence the users of these tools must be able to accept low influence on the tool layout.

Hardly any of the tools provided offline clients which means Internet is required. Therefore it can be argued that these tools are suitable for users which have good Internet connections and Internet availability. Furthermore, the collaborative features are suitable for dispersed teams, which was the reason many of the current users had chosen this kind of project management tool.

To summarize, the investigated SaaS tools showed that it is possible to find tools which are able to support both extensive planning features and collaboration with the tradeoff of price, data security and service level. In general the project management SaaS tools make few promises to the users, hence, as a user one must be risk prone and be little affected if data would get lost. The user must also be prepared for encountering difficulties when transferring data from one tool to another in the case where the user wishes to change tools.

6.4 Evaluation framework revision and applicability

A notion should be made on the feature evaluation framework which has been applied in the third study. First of all, more features than the ones extracted from the empirical analysis of the second study were found to be potentially important and hence included in the framework. Secondly, it was found that the sub-features which had been identified probably could be divided into a more detailed level in order to make the evaluation more extensive and precise. The sub-feature "Resource management (e.g. allocation, estimation, tracking)" could be divided into separate sub-features in order to provide a clearer and more thorough evaluation, i.e.:

- Resource allocation
- Resource estimation
- Resource tracking

If the framework was to be used by a firm, the researcher would recommend defining the sub-features to a more detailed level compared to the level of detail of the current framework. Furthermore, the selection of what features to evaluate should be based on the firm's tool users' wants and needs. That way, the features would be chosen accordingly in order to increase possibilities of finding a perfectly matching tool. However, the framework is suitable in order to cross-check features as to make sure no important features are forgotten when setting up the evaluation framework for the firm. This is relevant to do since it has been noticed that the users might not be aware of the requirements which should be evaluated, especially the ones related to SaaS such as data security responsibility, exporting possibilities, service promises and limitations.

7 Discussion of project management SaaS

In previous sections, the small marketing firm's project management environment and tool needs has been analyzed. A feature evaluation framework has been created and applied on a number of project management SaaS tools. This chapter will take a reflective approach to discussing this new generation of project management SaaS tools in a larger perspective and also try to describe what problems these tools are solving.

As has been seen in the evaluation, most of these tools embrace collaboration. Helbrough predicted already in 1995 that the next big change in project management would be collaboration (Helbrough 1995, cited in Romano et al. 2002). As projects become more and more distributed, collaboration becomes more important. It has previously been stated that conventional project management theories view projects as consisting of transformation of inputs to outputs, Romano et al. (2002) mean that process management should be focused instead. Sharing knowledge produced during project processes is necessary in order to be able to make the process repeatable by other people in new projects. In traditional project management, progress tracking through task status updates might have been sufficient to manage the process but is believed to be insufficient in for distributed projects due to the dynamics and complexity (Romano, et al., 2002). People in different locations or organizations need to know not only the status of the most current work, but also the actual work itself and that is why collaboration is of focus. Hence, it can be claimed that this new generation of collaborative project management SaaS tools can support and increase the efficiency of process management.

As could be seen in the findings of this thesis the small media/web firms highly appreciated the collaboration features as these permitted them to collaborate more effectively both internally and with clients. The tools allowed for sharing documents and sending messages, all centralized in one place and available to all. Jansson (2009) points out that traditional project management is based on the project manager's control, the new generation of collaborative software enables everyone in the project to contribute to the project work. This way, the project can to some extent be led and developed by the whole team giving full access to all information. Adopting project management SaaS can be claimed to come with a new way of working as project information becomes more available to everyone, something which possibly could ruin the traditional hierarchy in the company. With these tools it is not only the project manager which can have control over the project but everyone, hence, it could be argued that the role of the project manager could be less controlling as the project members could participate in the coordination of the project.

Moreover, it could be argued that these new tools support a solution to the emerging critics to conventional project management theories, Koskela and Howell (2002) amongst others, blame traditional theories for constraining the efficiency of project management. The new generation of tools could be reasoned to help in overcoming these constraints in several manners. The high degree of collaboration supports a two-way communication between managers and project members (moving away from the dispatching model theory) and control is moved from top-down to bottom up where planning is not only for the project manager but can be supported by everyone involved in the project. The project manager takes on several roles, and apart from planning also can take the role of organizing the project work (moving from "management as planning" to supporting "management as organizing"). Finally, as has been identified during evaluation, there were very few of the evaluated tools which supported progress overviews and performance checks. Instead more focus seems to be put on real time information which could be argued to result in higher focus on solving the problems as these occur; through

collaboration and instant updates on the project progress by following conversations and activities in the software (moving from the thermostat model towards problem solving).

Furthermore, these tools could be argued to be part of the soft paradigm of project management as described by Pollack (2007). Pollack states that traditional project management belongs to the hard paradigm as it tends to emphasize efficient, expert-led delivery, control against predetermined goals and an interest in the underlying structure where the project manager has the control. The soft paradigm on the other hand focuses more on learning, participation, the facilitated exploration of projects, and typically demonstrates an interest in underlying social process. Moreover, Cicmil et al. (2006) believe that projects should be seen within this soft paradigm and as complex social settings characterized by tensions between unpredictability, control and collaborative interaction, instead of the hard paradigm. The project management SaaS tools support the soft paradigm in that it focuses more on collaboration, interaction and communication instead of planning and structuring of the projects.

Finally, the fact that these tools are Internet based should be commented since this probably is the most significant characteristic. The environment many companies work in today, especially the ones providing services through Internet, is that firms are constantly connected. As we live in a world of unpredictability, real-time information has become very important, changes occur constantly and rapidly, especially within the online industry. SaaS is a result of a natural development of technology and could be argued to support the emerging needs of the firms which have high requirements of staying up to date and where knowledge sharing is essential for their existence, hence, it could be claimed to be a good fit of the needs of these companies and the tools.

8 Conclusions

The purpose of this thesis was to identify wants and needs in small marketing firms regarding project management SaaS tools and to investigate whether these tools are useful for the tool users in these firms. The thesis was guided by three research questions:

1) How are projects coordinated at Online Konsultor, a small European online marketing firm, and how are project management tools used during their project processes?

2) From the user perspective; what project management tool features and what SaaS tool characteristics are wanted and needed?

a) What are the needs and wants present amongst the marketing firm SaaS tool users?

b) To what extent and in what ways do the tool-using marketing firms' wants and needs differ from the non-tool users and from tool-users in other business sectors?

3) To what extent and under what circumstances do the existing project management SaaS tools support the work in marketing projects and the users' wants and needs deriving from the previous questions?

In this thesis it was found that the project management challenges in the small online marketing firm, Online Konsultor, were mainly related to multiple project coordination; managing several projects at the same time simultaneously. The project manager's main challenges are coordinating and organizing the projects but also the ability to take on several roles. Project management tools were used to facilitate several project related problems, such as information sharing, tracking, planning tasks and client collaboration. Even though the tool facilitates coordination and tracking for the project manager and project members, having an organizational mind can be considered necessary together with the ability of working with multiple tasks.

Selecting a suitable tool in order to support the project management in a firm is important as it can facilitate the communication and coordination. In this thesis there were four groups of firms which participated in the multiple case study investigating the tool feature wants and needs. The outcome showed that the needs and wants found at Online Konsultor were very similar in other tool-using media/web firms. On the other hand, when compared to tool-using firms in other sectors and to media/web firms not using these tools, there were differences.

The preferred features amongst the tool-using media/web firms were centralized communication over planning and tracking, as well as ease of use over customizable work flows. The opposite was found amongst the non-media firms. The media/web firms not using project management SaaS, were neither inclined towards planning nor collaborative features. Moreover, it was found that the tool-using media/web firms were more risk-prone than the other ones. These firms did not consider data security an issue though had realized after adopting their tools that a tool switch would be difficult.

The encountered differences might depend on several factors. Preferring centralized communication and ease of use was probably due to the manner the media/web firms collaborated with clients. Centralized communication was believed to facilitate collaboration and ease of use would increase tool usage. The differences between the current SaaS tool users and the non-tool users were most likely due previous experience. The variation in requirements on data security could depend on the information stored in

the tools, unawareness, ignorance or possibly user priorities regarding functional features versus security factors.

The empirical analysis of the second study of this thesis resulted in a feature framework which was applied to a number of project management SaaS tools. These project management SaaS tools were evaluated through their web sites, it would probably have been more appropriate to perform trials of the tools, that way ease-of-use could have been evaluated for example. However, when comparing the results from the tool evaluation with the results from the case studies it can be concluded that there are SaaS tools available which seem to support several of the features these users are looking for.

Several of the tools were found to support collaboration and centralized communication, which was wished for by the tool-using media/web firms. There were also tools which supported more advanced planning and tracking features, which were wanted by the non-media firms. The trade-off between the different types of functions seems to be the price where the planning focused tools would result more expensive. However, a trend which could be noticed in project management SaaS tools was that robust resource management and tracking functionality was lacking in most cases. Risk management was found to be supported even less.

Whilst the tools were found to supply a large range of functional project management features the biggest trade-off comes with data security and availability promises. These were weak in most SaaS tools where only one provider clearly stated availability promises and took some responsibility for data losses. Furthermore, the findings of the investigation shows that export of data for use elsewhere was not made easy. However, as Sultan (2011) recognizes; for large companies low service availability could be disastrous but for SMEs on the other hand it is a question of tradeoff, a loss of service may not be catastrophic.

Furthermore, the discussion of project management SaaS tools suggests these tools to support the emerging theories of project management. Collaboration and information available to everyone supports the project manager in taking a more organizing role and permits two-way communication. Moreover can these tools be argued to belong to the soft paradigm as they focus more on collaboration, interaction and communication instead of planning and structuring the projects.

Finally, in order for the feature evaluation framework presented in this thesis to be useful for firms, the researcher recommends to adjust the feature list basing the selection on the firm's wants and needs. Moreover should the features be stated on a more detailed level and the evaluation process should include actual trials of the tools. The current evaluation framework should be used as a cross-checking reference in order to not omit important features which otherwise might be disregarded by the users, especially features related to SaaS.

9 Future research

In order to suggest some potential enhancements of this thesis this section will make a number of proposals for further studies. First of all, the overall investigation has focused on evaluating whether the project management SaaS tools are suitable for online marketing firms. The research included one in depth case study and one multiple case study of a more superficial nature. To increase the transferability of the findings it could be suitable to perform in depth case studies of the firms which were included in the multiple case study in order to be able to describe their project processes and way of managing projects.

Secondly, it could be interesting to evaluate whether these project management SaaS tools also suit the needs and wants of firms in other sectors. This could be done through a multiple case study, including firms such as; other types of consulting companies, manufacturing companies or perhaps retail. That way, the feature framework could be developed and adjusted to other types of firms.

Thirdly, the tool evaluation was performed through checking reading documentation on the providers' web sites. To enhance the findings it would be very suitable to evaluate more tools but also at a deeper level by performing trials. That way the performance of the tools could be evaluated as well as more features, such as ease-of-use which could not be evaluated with the employed evaluation method.

Finally, this thesis has only focused on project management SaaS, comparisons with traditional desktop software have only been done through referring to previous studies performed by other authors. It could be interesting to compare this new generation of tools to traditional software employing the same feature framework on both types of tools in order validate previous studies and verify what the largest differences really are.

10 Bibliography

Ahmad, N. & Laplante, P., 2006. *Software Project Management Tools: Making a Practical Decision Using AHP.* s.l., IEEE Computer Society .

Ali, A. S. B., Anbari, F. T. & Money, W. H., 2008. Impact of Organizational and Project Factors on Acceptance and Usage of Project Management Software and Percieved Project Success. *Project Management Journal,* June, 39(2), pp. 5-33.

Armburst, M., Fox, A., Griffith, R. & al., e., 2010. Above the Clouds: A Berkley view of cloud computing. *Communications of the ACM,* 53(4), pp. 50-58.

Baard, V. & Watts, T., 2005. *The design of a performance measurement model for small firms within the service sector.* s.l., http://www.sbdc.org.au/Text/1125550350054-2059/uploadedFiles/1131943433435-6521.pdf.

Badger, L., Grance, T., Patt-Corner, R. & Voas, J., 2011. *Draft Cloud computing synopsis and Recommendations,* Gaithersburg: s.n.

basecamphq.com, 2012. *basecamphq.* [Online]
Available at: http://basecamp.com/
[Accessed 20 April 2012].

Bryman, A. & Bell, E., 2007. *Business research methods.* 2nd edition ed. Oxford: Oxford University Press.

Cabot, J. & Wilson, G., 2009. *Tools for Teams: A Survey of Web-Based Software Project Portals.* [Online]
Available at: http://drdobbs.com/tools/220301068
[Accessed 19 September 2011].

Cervone, H. F., 2010. Understanding agile project management methods using Scrum. *OCLC,* 27(1), pp. 18-22.

Chung, L. & Leite, J. C. S. d. P., 2009. On Non-Functional Requirements in Software engineering. In: G. Goos, ed. *Conceptual Modeling: Foundations and Applications.* Berlin: Springer, pp. 363-379.

Cicmil, S., Williams, T., Thomas, J. & Hodgson, D., 2006. Rethinking Project Management: Researching the actuality of projects. *International Journal of Project Management,* 24(8), p. 675–686.

Conchúir, D. Ó., 2011. *Overview of PMBOK Guide, Shortcuts for PMP Certification,* Berlin: Springer-Verlag Berlin Heidelberg.

Cusumano, M., 2010. Cloud Computing and SaaS as New Computing Platforms. *Communications of the ACM,* 53(4), pp. 27-29.

Davis, E. W. & Martin, R. D., 1985. Project management software for the personal computer: An evaluation. *Industrial Management,* January-February, 27(1), pp. 1-21.

Davis, F. D., 1989. Percieved usefulness, percieved ease of use, and user acceptance of information technology. *MIS quarterly,* 13(3), pp. 319-340.

Eisenhardt, K. M., 1989. Building theories from case studies. *The Academy of Management Review,* 14(4), pp. 532-550.

Enisa, 2009. *Cloud computing: benefits, risks and recommendations for information security.* [Online]
Available at: http://www.enisa.europa.eu/act/rm/files/deliverables/cloud-computing-risk-assessment
[Accessed 12 dec 2011].

Finch, C., 2006. The Benefits of Software-as-a-Service Model. *Employee Benefit Plan Review*, February, pp. 25-26.

Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qualitative Inquiry,* pp. 219-245.

Hai, H. & Sakoda, S., 2009. SaaS and Integration Best Practices. *Fujitsu Science Technology Journal,* 45(3), pp. 257-264.

Jadhav, A. S. & Sonar, R. M., 2011. Framework for evaluation and selection of the software packages: A hybrid knowledge based system approach. *The Journal of Systems and Software,* 84(8), pp. 1394-1407.

Jansson, K., 2009. *Project management based on software services - New approaches for socail and collaborative internet based project management,* Espoo: VTT technical research centre of Finland.

Kerzner, H., 2009. *Project management.* Hoboken, New jersey: John Wiley & Sons inc.

Koskela, L. & Howell, G., 2002. *The theory of project management: Explanation to novel methods.* Gramado, Brazil, s.n.

Koskela, L. & Howell, G., 2002. *The underlying theory of project management is obsolete.* Seattle, Washington, s.n., pp. 293-302.

Lashar, D., 2008. The hidden cost of saas. *Customer relationship management*, May, pp. 13-14.

Lee, J. Y., Lee, J. W., Cheun, D. W. & Kim, S. D., 2009. *A Quality Model for Evaluating Software-as-a-Service in Cloud Computing.* Haikow, IEEE Computer Society, pp. 261-266.

Liberatore, M. J. & Pollack-Johnson, B., 2003. Factors Influencing the Usage and Selection of Project Management Software. *IEEE Transactions of engineering management,* May, 50(2), pp. 164-174.

Liu, D. & Mei, H., 2003. *Mapping requirements to software architecture by feature-orientation.* Portland, Oregon, ICSE, pp. 69-76.

Lu, Y. & Sun, B., 2009. *The Fitness Evaluation Model of SAAS for Enterprise Information System.* Macau, IEEE International, pp. 507-511.

Marshall, M., 1996. Sampling for qualitative studies. *Oxford University press,* 13(6), pp. 522-525.

Marston, S. et al., 2010. Cloud Computing - The business perspective. *Decision Support Systems,* 51(1), p. 176–189.

Maylor, H., 2010. *Project Mangement.* 4th edition ed. Harlow: Pearson Education Limited.

Mays, N. &. P. C., 1995. Rigour and qualitative research. *BMJ,* Volume 311, pp. 109-112.

Mell, P. & Grance, T., 2011. *The NIST Definition of Cloud Computing,* Gaithersburg, MD 20899-8930: NIST, National institute of Standards and Technology, U.S. Department of Commerce.

Narayan, B., 2009. *The cloud computing service providers of 2009.* [Online]
Available at: http://www.techno-pulse.com/2009/12/top-cloud-computing-service-providers.html
[Accessed 25 September 2011].

Nema, P., 2010. *Best Practices for adopting Saas: A holistic evaluation approach,* Santa Clara, California: Silicon Valley Bank.

Patanakul, P., Iewwongcharoen, B. & Milosevic, D., 2010. An empirical study on the use of project management tools and techniques and their impact on projet success. *Journal of General Management,* 35(3), pp. 41-65.

PMI, P. m. I., 2008. *A Guide to the Project Management Body Of Knowledge (PMBOK® Guide).* 4th ed. Newton Square, Pennsylvania: PMI.

Pollack, J., 2007. The changing paradigms of project management. *International Journal of Project Management,* 25(3), pp. 266-274.

projectmanagementsoftware.com, 2011. *A comprehensive guide to project management software solutions.* [Online]
Available at: http://www.projectmanagementsoftware.com/
[Accessed 05 10 2011].

Riege, A., 2003. Validity and Reliability test in case study research: a literature review with "hand-on" application for each research phase. *Qualitative MArket Research - An International Jorunal,* 6(2), pp. 75-86.

Romano, N. C. J., Chen, F. & Jr., J. F. N., 2002. *Collaborative project management software.* Hawaii, IEEE Computer Society.

Savage, M., 2009. *Carefully evaluate providers' SaaS security model.* [Online]
Available at: http://searchsecurity.techtarget.com/magazineContent/Carefully-evaluate-providers-SaaS-security-model
[Accessed 1 June 2011].

Scott, M. & Bruce, R., 1987. Five stages of growth in small business. *Long range planning,* 20(3), pp. 45-52.

Shelford, T. J. & Remillard, G. A., 2003. *Real web project management - Case studies adn best practices from the trenches.* 2nd Edition ed. Boston: Addison Wesley Professional.

Shrivathsan, M., 2009. *Product management insights.* [Online]
Available at: http://www.accompa.com/product-management-blog/2009/07/13/features-vs-require ments-requirements-management-basics/
[Accessed 22 01 2012].

Strategies, E. k., 2007. *Project Management Online for Small Teams.* [Online]
Available at:
portal.evenkeelstrategies.com/MakingHeadway/Lists/Posts/Post.aspx?List=d9500e2d-8f8d-47cc-a1d8-763bdd1d4ffb&ID=4
[Accessed 01 09 2011].

Subashini, S. & V.Kavitha, 2011. A survey on security issues in service delivery models of cloud computing. *Journal of Network and Computer Applications,* 34(1), pp. 1-11.

Sultan, N. A., 2011. Reaching for the "cloud": How SMEs can manage. *International Journal of Information Management,* 31(3), pp. 272-278.

White, D. & Fortune, J., 2002. Current practice in Project management - An empirical study. *Internatonal Journal of project management,* 20(1), pp. 1-11.

Yin, R., 2009. *Case study research: design and methods.* Los Ángeles: SAGE Inc..

Appendix 1: Dictionary

Abbreviation/Word	Definition/Explanation
API	Application Programming Interface – a set of rules intended to be used as an interface by software components to communicate with each other.
Cloud computing	Cloud computing normally refers to two things; the applications delivered as services over the Internet, and the hardware and systems software in the data centers that provide these applications.
Collaborative software	Software designed to support multiple users.
Desktop applications	The traditional software, where an application/program is installed to the desktop of a PC.
Landing page	In online marketing a landing page is a single web page that appears in response to clicking on an advertisement. The general goal of a landing page is to convert site visitors into sales leads.
SLA	Service Level Agreement. Normally contains: Promises made to the subscriber, limitations of the service and obligations that the subscriber must accept.
SaaS	Software deployed as a hosted service and accessed over the Internet.
Web-based software	The software can be implemented as a web application and accessed through an intranet or Internet using a web browser.

Appendix 2: Software evaluation criteria

The following are a general software evaluation criterion which was presented by Jadhav and Sonar (2011). *There criterion has been referred to during the feature framework creation.*

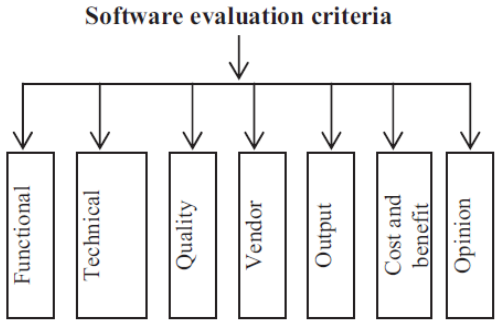

Fig. 1. Software evaluation criteria.

The **functional criteria** depend on the type of software: if it is CRM, ERP, Project management and so on.

The **Quality criteria** are used to assess quality of the software package.

Quality criteria:

Sub-criteria	Basic criteria	Criteria meaning	Metrics
Portability	Middleware standards	Breadth of the middleware standards supported by the software package	CORBA, DCOM, RMI, ODBC, JDBC, OLE_DB
	DBMS standards	Breadth of the DBMS systems supported by the software package	MS-Access, MS-SQL, MS-Excel, Oracle, DB2, Informix, Sybase, MySQL, Ingrace
	Communication standards	Inter-organizational data exchange standards supported by the software package	EDI, XML
	OS compatibility	Package compatibility with the operating systems	MS-Windows, Novell, Unix, Linux, MAC
	Hardware compatibility	Package compatibility with the hardware	Supercomputer, Mainframe, Minicomputer, Microcomputer
Personalizability	Vertical solution	Number of customized versions of the software package	Numeric
	Customizable fields	Ability to personalize layout of the software package	Yes, No
	Customizable reports	Ability to personalize layout of the report produced by the software package	Yes, No
	Interface type	Interface type of the software package	Character based, Window based
	Programming languages	Ability to personalize modules of the software package by programming languages	Yes, No
Maintainability	Modules	Average size of the independent code modules	Numeric
	Number of independently installable modules	Level of independence among the modules by indicating whether groups of modules or sub-modules need to be simultaneously installed even if only subset of them is required	Numeric
	Number of workstations	Maximum number of simultaneous users that can be supported by the software package	Numeric
	Maximum number of distribution tiers	Ability to split the software package into separate application tiers that can be distributed onto different servers	Numeric
	Number of modules that can be installed on separate servers	Ability to distribute modules on different servers	Numeric
	Scalability	Ability to support an increasing number of users and higher load of transaction	Yes, No
Usability	User interface	Ease with which user can use interface of the software package	Yes, No
	Learning curve	Ease with which user can learn and operate the package	Yes, No
	User types	Ability of the software package to support beginners, intermediate, advanced users or a combination of user types	Beginners, intermediate, advanced users, and experts
	Data visualization	Capability of the software package to present data effectively	Yes, No
	Error reporting	Error reporting and messaging ability of the software package	Yes, No
	Domain variety	Capability of the software package to be used in different industries to solve different kinds of business problems	Yes, No
Reliability	Robustness	Capability of the software package to run consistently without crashing	Very poor, poor, fair, good, very good
	Backup and recovery	Capability of the software package to support backup and recovery feature	Yes, No
Efficiency	Time behavior	Capability of the software package to produce results in reasonable amount of time relative to data size	Very poor, poor, fair, good, very good
Security	Auditing	Products logging and auditing capabilities	Very poor, poor, fair, good, very good
	Password	Package support for password	Yes, No
	Data security	Level of support for data security	Very poor, poor, fair, good, very good
	Individual and group access rights	Package support for managing and enforcing access rights	Yes, No
	Field level security	Package support for security at the field level	Yes, No
	Data/document encryption	Package support for data/document encryption	Yes, No

Vendor criteria are used to assess vendor capabilities of the software packages:

Table 3
Vendor criteria.

Sub-criteria	Basic criteria	Criteria meaning	Metrics
Training and documentation criteria	Tutorial	Availability of tutorial to learn how to use the software package	Yes, No
	Troubleshooting guide	Availability of troubleshooting guide	Yes, No
	Training	Vendor support for training courses to learn the software package	Yes, No
	User manual	Availability of user manual with indexes, with important information and the main commands	Yes, No
Maintenance and up-gradation	Consultation	Availability of technical support and consultancy by the vendor	Yes, No
	Communication	Communication with the vendor	Telephone, 24 × 7 toll free, online
	Demo	Availability of on-site demo and free-trial version	Yes, No
	Response time	Level of service rendered by the vendor	24 h, 3 days, 1 week
	Business skills	Business skills of the vendor	Very poor, poor, fair, good, very good
Vendor reputation	Vendor popularity	Popularity of vendor in the market	Very poor, poor, fair, good, very good
	Product history	Popularity of vendor product in the market	Very poor, poor, fair, good, very good
	Length of experience	Experience of vendor about development of the software package	Very poor (less than 1 year), poor (1–2 years), fair (3–5 years), good (6–8 years), very good (above 9 years)
	Number of installations	Number of installations of the software package	Very poor (less than 3), poor (4–10), fair (11–20), good (21–30), very good (above 30)
	Number of references	Number of references of the existing customers	Very poor (less than 3), poor (4–10), fair (11–20), good (21–30), very good (above 30)
	Past business experience	Past business experience with the vendor, if any	Very poor, poor, fair, good, very good

Cost and benefits criteria are used to assess cost and benefits related characteristics of the software package:

Table 4
Cost and benefits criteria.

Basic criteria	Criteria meaning	Metrics
License cost	License cost of the software package	Numeric
Hardware and software cost	Cost of an additional hardware and software required to run the software	Numeric
Installation and implementation cost	Installation and implementation cost of the software package	Numeric
Maintenance cost	Maintenance cost of the software package	Numeric
Training cost	Training cost of the software package	Numeric
Upgrading cost	Upgrading cost of the software package	Numeric
Direct benefits	Direct benefits of the software package	Very poor, poor, fair, good, very good
Indirect benefits	Indirect benefits of the software package	Very poor, poor, fair, good, very good

Table 5
Opinion criteria.

Basic criteria	Criteria meaning	Metrics
End users	Opinion of end users about the software package	Very poor, poor, fair, good, very good
External consultants	Opinion of external consultants about the software package	Very poor, poor, fair, good, very good
In-house experts	Opinion of in-house experts about the software package	Very poor, poor, fair, good, very good
Magazines	Opinion about the software package given in the magazines	Very poor, poor, fair, good, very good
Outside personal acquaintances	Opinion of outside personnel about the software package	Very poor, poor, fair, good, very good
Product leaflets	Opinion about the software package in product leaflets	Very poor, poor, fair, good, very good
Subordinates	Opinion of subordinates about the software package	Very poor, poor, fair, good, very good
Vendor and sales representatives	Opinion of vendor and sales representatives about the software package	Very poor, poor, fair, good, very good

Opinion criteria (above) are measurable attributes of criteria related to the opinion of different stakeholders of the software package.

Technical criteria are measurable attributes of criteria related to the technical requirements (hardware and software) of the software package:

Table 6
Technical criteria.

Basic criteria	Criteria meaning	Metrics
Communication protocol	Communication protocols supported by the package	TCP/IP, UDP, NETBUI, HTTP, FTP, SOAP, etc.
External storage	External storage capacity required	Numeric
Network technology	Network technology supported by the package	LAN, WAN, MAN
Primary storage	Primary storage capacity required	Numeric

Appendix 3: Semi-structured interview, Online Konsultor

This interview guide was used when interviewing the staff at Online Konsultor.

Questions:

1. What is your position in the company?
2. For what purposes and how do you use the current project management tool?
    a. How often do you use the tool?
3. Why do you think the company has employed this tool?
4. What are the advantages which come with using it?
5. What aspects of the tool do you wish were better?
6. Are there features provided by the tool that you never use?
    a. If yes, which are these and why is that so?
7. How do your clients use the tool?
8. How do you think the clients experience collaborating through the tool?
9. What do you think would be important to evaluate in a new project management SaaS tool?
    a. In terms of project management features?
    b. In terms of SaaS?
    c. In terms of the vendor?
10. What would be your biggest worries if the tool would be changed and why?
11. Is there anything else you would like to add?

Participant Position	Date of interview
1. Project manager	18th May 2011
2. CMO	18th May 2011
3. Web designer	20th May 2011
4. Marketing Consultant	20th May 2011
5. Programmer	26th May 2011
6. Marketing Consultant	27th May 2011
7. Marketing Consultant	30th May 2011
8. Marketing Consultant	31th May 2011
9. Marketing Consultant	31th May 2011

Appendix 4: Semi-structured interviews, SaaS tool Users

This interview guide was used when interviewing firms which already used project management SaaS tools. Both media/web firms and other "non-media" firms were interviewed.

Background questions:

1. What is your position in the company?
2. How old is your company?
3. What does the company/department do?
4. How many employees does it have?

Project management questions:

1. What kind of projects do you do (length, no. of people involved, products)?
2. During the projects, how do you communicate with:
    a. Other project members?
    b. External project stakeholders (e.g. clients)?
3. What project management SaaS tool do you use?
    a. For how long have you used the tool(s)?
    b. How many people use the tool(s) – inside and outside of the company walls?
4. Are there any other tools you use for project management purposes?
5. For what purposes and how do you use the tool(s)?
6. What would you say are the advantages of using these tool(s)?
7. What features support you in managing projects?
8. Are there features missing in the tool? If so, how do you solve this currently?
9. How come you chose to employ this tool?
10. What were you worried about before adopting this tool?
11. What would happen if you lost all your data?
12. If you would choose another tool, what would be your priorities in terms of:
    a. Project management features (functional)?
    b. The tool provider?
    c. Tool supportive (SaaS) features?

Depending on what features were mentioned by the interviewee, a question regarding the interviewees' opinions on the following features and factors was also asked, whether these were important or not:

Tool and vendor related:

1. Ease of use
2. Mail and mobile integration
3. Customized branding
4. Tool access rights
5. Integration possibilities
6. Price
7. Backing up information
8. Exit possibilities
9. Data security
10. Scalability
11. Continuous updates and response to requests
12. Exit possibilities
13. Personal support
14. Training
15. Online help and tutorials
16. Provider stability and popularity on market

Project management related:

1. Collaboration with customers
2. Message function
3. Document sharing
4. Task management
5. Planning and Gantt charts
6. Project progress overview
7. Activity overview
8. Time reporting
9. Bug/issue tracking
10. Resource management
11. Risk management
12. Cost/expense management
13. Search engine

Participants [Firm, position]	Company/department type	Tool used	Date of interview
1. Jon Media, founder	Web and online marketing	Basecamp	14th Sep 2011
2. Firm A, director	Editorial, media	Basecamp	14th Sep 2011
3. Firm B, project manager	Web development	Basecamp	15th Sep 2011
4. Visitsweden, project manager	Web strategies and marketing	Basecamp	16th Sep 2011
5. Firm C, project manager	Marketing and web development	Basecamp, Active collab, Agilezen	16th Sep 2011
6. Firm D, project manager	Marketing and communication	Projectplace	19th Sep 2011
7. Firm E, CEO	ERP systems	Visionproject	19th Sep 2011
8. Firm F, quality manager	Management and IT consulting	Projectplace	15th Sep 2011
9. Tillväxtverket, project member	Governmental institution	Projectplace	22th Sep 2011
10. Firm G, project manager	International projects at an online search engine firm	Sharepoint, projectplace	19th Sep 2011
11. Firm H, project manager	IT department	Projectplace	15th Sep 2011
12. Firm I, IT manager	IT department	Visionproject	16th Sep 2011
13. Gothia innovation science park, project coordinator	Business incubation at university	Meltwaterdrive	19th Sep 2011
14. Havsmiljöinstitutet, Media coordinator	University institution	Meltwaterdrive	19th Sep 2011
15. Camfil, Innovation manager	Innovation & R&D	Projectplace	22th Sep 2011

The classification of the interviewees was the following:

- Number 1-6 have been classified as "Media/web firms"
- Number 7-15 have been classified as "non-media firms"

Appendix 5: Semi-structured interviews, non-SaaS using media/web firms

This interview guide was used when interviewing firms Media/web firms which did not use project management SaaS tools.

Background questions:

1. What is your position?
2. How old is the company?
3. What does the company/department do?
4. How many employees does it have?

Project management questions:

1. What kind of projects do you do (length, no. of people involved, product)?
2. During the projects, how do you communicate with:
    a. Other project members?
    b. External project stakeholders (e.g. clients)?
3. What tool(s) or techniques do you use during projects?
4. If there is a software tool used:
    a. How do these tools/techniques support you in your project management?
    b. For how long have you used the tool(s)?
    c. How many people use the tool?
    d. What are the advantages of using this/these tools?
    e. How come you chose this tool? What were your requirements?
5. What software features are most important to support your project management?
6. Have you considered employing project management SaaS tools?
    a. Why/why not?
7. If you would employ SaaS, what would be important the features considering;
    a. Project management?
    b. SaaS?
    c. The vendor?

Participants [Firm, position]	Company type/ department	Date of interview
1. Our media group, owner	Online Marketing	7th September 2011
2. Webpartner, project manager	Web development	7th September 2011
3. Firm J, project manager	Market research and traditional media	20th September 2011
4. Skandnet, project member	Online Marketing	20th September 2011
5. Medieanalys, project manager	Online Marketing and web development	26th September 2011
6. Firm K, project manager	Branding and marketing campaigns	26th September 2011

Appendix 6: Semi-Structured interview, PM SaaS vendors

This interview guide was used when interviewing providers of project management SaaS.

Background questions:

1. What is your position in the firm?
2. For how long has the tool been on the market?

Customer related questions:

1. What types of companies do normally buy your product?
    a. Large/small firms?
    b. Type of business (e.g. marketing, consulting, manufacturing)?
    c. What types of projects do they do?
2. What features do you think are most appreciated amongst your subscribers?
    a. What is appreciated amongst the marketing/web firms?
3. Are there features currently not provided that customers ask for?
4. What do you think are the main reasons small service companies choose your tool?

Tool and vendor related questions:

1. What are the reasons for choosing SaaS instead of traditional software?
2. What are the customers normally worried about when adopting SaaS?
3. For the subscribers, what do you think are the most important aspects to think of before adopting a SaaS tool for project management?
4. How does your company deal with these issues?
   Depending on the answers, the interviewees' opinions on the following factors were checked:
    a. Data security and privacy
    b. Exit possibilities
    c. Scalability
    d. Rapidness
    e. Collaboration abilities
    f. Availability
    g. Continuous updates
    h. Import export of data

5. What are the important offerings that the vendor should provide to the users?
   Depending on the answers, the interviewees' opinions on the following factors were checked:
    a. Online, telephone or personal help support
    b. Training
    c. Responsibility in case of data loss
    d. SLA agreements – service and availability promises
    e. Respond to requests and provide continuous updates
    f. Provide exit possibilities

Participants [Firm, position]	Date of interview:
Vendor 1, Support	5rd September 2011
Vendor 2, sales	5rd September 2011
Vendor 3, support	6th September 2011
Vendor 4, sales	6th September 2011
Vendor 5, sales	6th September 2011
Vendor 6, support	12th September 2011
Projectplace, sales	12th September 2011
Meltwaterdrive, sales	13th September 2011
Vendor 7, sales	13th September 2011
Vendor 8, support	13th September 2011
Visionproject, sales	14th September 2011
Vendor 9, sales	14th of September 2011

Appendix 7: Tool feature listing

*The following features were extracted from the empirical analysis of the first and the second study. Note; all features marked **NEW means they were added during the evaluation of the project management tool evaluation in study 3. These sub-features are included in this framework as they were considered to supply a certain value to the overall features and to the users. In the end of this appendix other value adding features which were found during investigation can be seen, though these were not included in the framework but could potentially be useful for some users.*

Feature	Sub-feature	Explanation	Evaluation metrics
Centralized communication	Messages/discussion forums	Ability to send messages to other team members within the tool	Yes, No, N/A
	Document sharing	Ability to share documents within the tool, either attaching them to messages or simply uploading them to the tool	Yes, No, N/A
	File management system (folders etc.)	Provision of a system to organize the uploaded documents	Yes, No, N/A
	Role-based access	Ability to give different permission levels to different users allowing collaboration	Yes, No, N/A
	Invite clients to the tool	Ability to involve and invite the client to the tool, or external users	Yes, No, N/A
	Document version control **NEW	Ability to track versions of a document in order to keep track of the latest version	Yes, No, N/A
Project progress and scheduling	Gantt charts	Ability to program and show activities in the form of a Gantt chart	Yes, No, N/A
	Task lists (recurring, responsible, deadline, priority)	Ability to create task lists; assigning tasks to people, setting deadlines, priorities as well as programming recurring tasks.	Yes, Partly, No, N/A
	Project calendar	Provision of a calendar where project related events can be programmed	Yes, No, N/A
	Milestones	Ability to plan milestones	Yes, No, N/A
	Critical path method	Ability to calculate the critical path of activities	Yes, No, N/A
	Project templates **NEW	Ability to set up project templates and reuse these	Yes, No, N/A
	Task dependencies ** NEW	Ability to set dependencies between different tasks	Yes, No, N/A
	External Calendar Synchronization **NEW	Ability to synchronize the project calendar with external ones, e.g. the project events would turn up in an outlook calendar	Yes, No, N/A
Project progress, monitoring and issue tracking	Tool activity overview (e.g. Dashboard)	Provision of a page where all recent activity is summarized, such as added tasks, posted messages etc.	Yes, Partly, No, N/A
	Time reporting/tracking	Ability to record the time worked in a project	Yes, Partly, No, N/A
	Stopwatch	Ability to time the working hours with the help of a stopwatch	Yes, Partly, No, N/A
	Diagram/summary of progress. (e.g. status, hours spent, remaining tasks)	Provision of an overview of the project progress, such as; hours spent, time line accordance, no. of tasks remaining.	Yes, Partly, No, N/A
	Report making	Ability to create project reports, e.g. time reports, status reports etc.	Yes, Partly, No, N/A
	Issue management /bug tracking	Provision of an issue tracking system	Yes, Partly, No, N/A
Resource planning, cost and risk management	Resource management (e.g. allocation, estimation, tracking)	Ability to program, plan and track resources	Yes, Partly, No, N/A
	Cost management (e.g. budgeting and tracking)	Ability to budget and track the costs occurring during a project	Yes, Partly, No, N/A
	Risk assessment	Ability to perform project risk analysis and assessment	Yes, No, N/A

Ease of use and search functionality	Search function	Ability to search for information inside the tool	Yes, No, N/A
	Ease-of use	Whether the tool is easy to use and intuitive	Yes, No, N/A
Data security and privacy	Data server in-house	Whether the provider store tool data on in-house servers or if data storage is outsourced and hosted by someone else	Yes, No, N/A
	Encryption (SSL)	Whether encryption is used during transportation of data	Yes, No, N/A + text
	Backups provided	Whether the provider perform regular backups of tool data	Yes, No, N/A + text
	Performed audits	Whether any audits have been performed on the tool provider	Yes, No, N/A + text
	Other protection mechanisms	Other mechanisms used by the provider to increase security	Yes, No, N/A + text
Availability, SLA and copyright	Availability/stability promises	Whether the provider give any tool availability or stability promises	Yes, No, N/A + text
	Laws and regulations applied	What laws would be applied, e.g. in the case there would be a settlement between the provider and the client	Text, N/A
	Responsible for data loss	Whether the provider would take responsibility for any customer data loss	Yes, No, N/A + text
	Provision of offline client	Whether there are any offline clients available, such as a desktop application which could be used offline	Yes, No, N/A
	Ability to run on private server	Whether the tool could be bought as in-house software and run on a private server	Yes, No, N/A
	Copyright maintained	Whether intellectual property stored in the tool remains property of the client	Yes, No, N/A + text
	Location of the provider	The country where the provider is located	Text, N/A
	Location of data storage	The country where tool data is stored (location of servers)	Text, N/A
	Service promises **NEW	Whether the provider makes any other service promises	Text, N/A
	Privacy policy **NEW	What data privacy policy is applied	Text, N/A
	Response time promise **NEW	Whether there are any promises regarding rapidness of the tool's response time	Text, N/A
Tool exit and exporting data	Provision of APIs	Whether tool APIs are available for usage, e.g. to export data or integrate with other applications	Yes, No, N/A
	Other export possibilities (e.g. HTML, XML)	Whether and how data stored in the tool can be exported from the tool for storage elsewhere apart from employing the APIs	Yes, No, N/A + text
	Document export possibility	Whether and how documents can be exported from the tool	Yes, No, N/A + text
	Data import possibility	Ability to import data to the tool and in that case, how?	Yes, No, N/A + text
	Immediate data deletion after service cancellation? **NEW	Whether customer data is deleted at cancellation or maintained for a period of time	Yes, No, N/A
Tool customization	Personalization (e.g. URL, colors, logo)	Ability to personalize the tool layout and looks	Yes, Partly, No, N/A
	Languages	What languages are available	Text, N/A
	Customizable fields	Ability to customize fields in the tool	Yes, Partly, No, N/A
	Ability to configure workflow	Ability to customize the work flow in the tool	Yes, Partly, No, N/A
Vendor requirements	Tool age	The year of when the tool was first launched (gives an indication of experience on the market)	Year, N/A
	Company age	The age of the company providing the tool	Year, N/A
	Number of users	Number of clients or users using the tool	Number, N/A
	Published recommendations	Number of published recommendations, could be on websites, magazines etc.	Number, N/A
	Reference customers on website	Whether tool provider has published customer testimonials	Yes, No, N/A

	Tutorials provided	Whether tutorials are provided, could be in the form of a document or a help center	Yes, No, N/A
	Online support	Whether the provider can be contacted for help via e-mail or chat	Yes, No, N/A
	Telephone support	Whether there is a telephone number to call for support	Yes, No, N/A
	Financial stability	Whether the financials of the provider seem stable	Yes, Partly, No, N/A
	Development strategy	Whether the provider can show what their development strategy is or what their future plan is	Yes, No, N/A
Trialability	Trial period offered	Ability to try out the tool before purchase	Yes, No, N/A + number
	No credit card registration required	Ability to try out the tool without registering a credit card	Yes, No, N/A
Application integration	E-mail notifications	Provision of e-mail notifications, e.g. when new tasks are added or when messages are sent inside the tool	Yes, No, N/A
	Adding messages via e-mail	Ability to send messages to a discussion thread in the tool via one's private e-mail	Yes, No, N/A
	Mobile application	Ability to log into the tool via mobile devices such as mobile phones	Yes, No, N/A
	Plugin apps: e.g. CRM, billing, time tracking	Whether there are other applications which can be plugged in /integrated with the project management tool, what types	Yes, No, N/A + text
	Google docs and/or Dropbox	Whether the tool provides integration with Google docs or Dropbox	Yes, No, N/A + text
SaaS pricing model and scalability	Price model	Whether the price is based on "per user per month" or "per month"	Text, N/A
	Number of users	What number of users can be included in the tool	Number, N/A
	Storage size	What size of data storage is provided by the tool	Number, N/A
	Number of projects	What number of projects can be created and managed in the tool	Number, N/A
	Separate modules provided	Whether the tool provides separate modules, such as resource management module, billing modules, bug tracking modules which can be included/excluded affecting the price	Yes, No, N/A + text
	Price range	What is the cheapest and most expensive option of subscription	Text, N/A
	Maintenance	Whether maintenance cost is included in the fee	Yes, No, N/A
	Continuous updates	Whether continuous updates are included in the fee	Yes, No, N/A
	How are price changes handled?	How price changes are handled	Text, N/A

Other value adding features which were found during evaluation are shown in the following table. These are not considered as important as the others but could be beneficial for some users.

Other value-adding features	Project portfolio management	Ability to manage and evaluate all current and potential projects
	Wikis	Ability to create a knowledge data base such as Wikipedia but in a smaller scale, project knowledge data base
	Idea management	Ability to discuss and evaluate ideas
	Address books	Ability to manage an address book with the tool
	Online meeting	Provision of online meeting modules
	Facebook-likes	Ability to "like" comments, documents and messages
	Approval of designs and tasks	Provision of module where approvals can be managed
	Online chat	Possibility to chat online with other tool users
	Online editing of documents	Ability to edit documents online without having to download files

Appendix 8: Categorization of SaaS tools

After having evaluated the tools in research study 3, the tools were categorized as seen in chapter 6.2. In this appendix the grouping procedure will be described.

The first grouping was centralized communication vs. planning and tracking. As can be seen in the figure below, the following features were required in order for a tool to be categorized within a certain square.

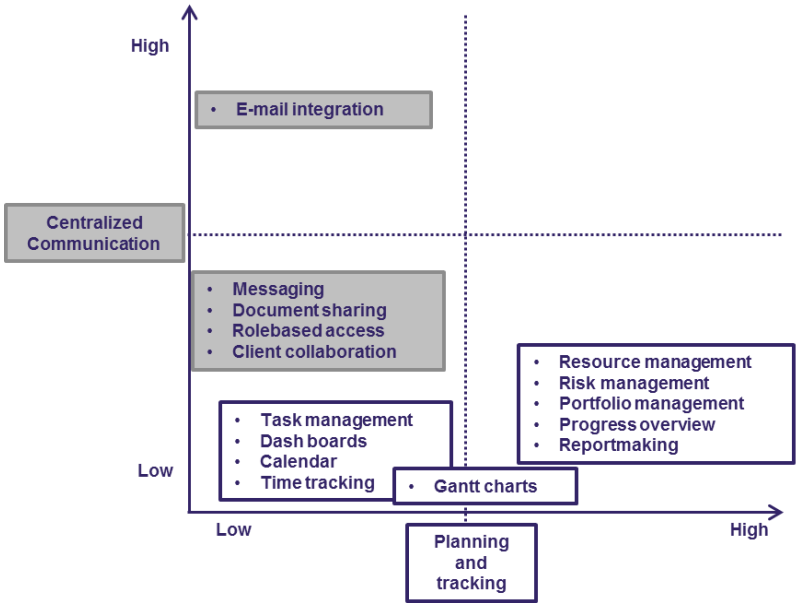

Figure 48: Categorization criteria for centralized communication and planning and tracking

Regarding centralized communication, the tools which were considered *high* were the the ones which offered e-mail integration, allowing for sending messages and adding documents via e-mail to the tools. E-mail integration has previously been categorized within the integration features but as recognized by the tool using media/web firms and Online Konsultor, this was also related to increase collaboration and centralization possibilities, hence it is added here. The *low* area of centralized communication included document sharing, messaging, role-based access and client collaboration.

In the scale used for planning and tracking; *low* included provision of dashboards for tool activity overviews, ability to create task lists, tracking time and provision of a calendar. *High* included features such as resource planning and tracking, progress overviews, risk management, report making and portfolio management. The *medium* segment included for example Gantt charts.

Though, subjectivity is intended to be lowered through spelling out this procedure a certain level of subjectivity appears when placing the tools within each square as the tools can be placed either slightly to the right/left or upwards/downwards within each square. Where the tools were placed depended on the fulfillment of features, some tools did not fulfill all features within one square and therefore had to be inclined either downwards or towards the left. The researcher also tried to place the tools in relation to each other, hence some subjectivity is present in the grouping.

In the figure below, the categorization criteria for data security, service level and availability vs. vendor requirements are shown.

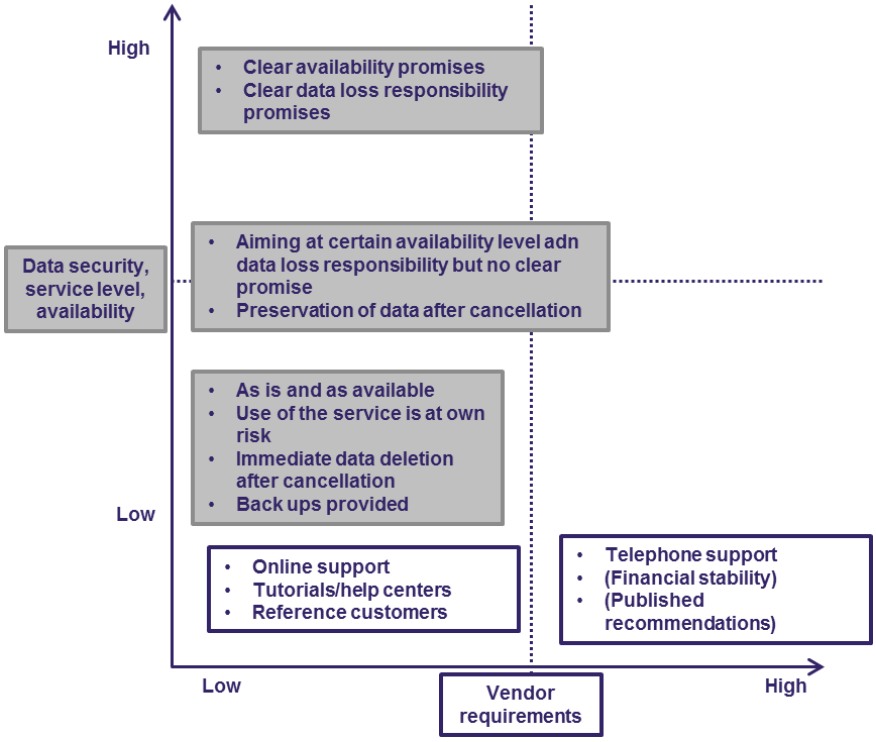

Figure 49: Categorization criteria for data security and vendor requirements

To receive a *high* data security, service level and availability the tools had to make a promise regarding availability and take data loss responsibility. In the *medium* segment the tools which aimed at certain service levels and took some responsibility but did not really make any clear promises were placed. Also preservation of data after subscription cancellation was required in order for a tool to be placed in that region. To receive the *low* level, the tools were provided on an "as is and as available" basis, data was deleted immediately after cancellation of service, but at least backups were provided.

On vendor requirements scale, in the *low* segment the vendors provided reference customers on the web page, tutorials and online support. On the *high* level they also provided telephone support. In this research, the financial stability and published recommendations were not evaluated, but if they were they would have been considered here.