



EKONOMIHÖGSKOLAN

Lunds universitet

Department of Informatics

LIMITED PROJECT MANAGEMENT TOOLS

EVALUATION

Master Thesis: 15 ECTS, Department of Informatics

Submitted: 2011-06-06

Author: Thuse Lise-Lotte

Supervisor: Olerup Agneta

Examiners: Lars Fernebro, Claus Persson

ABSTRACT

TITLE: Project Management Tools Evaluation

AUTHORS: Thuse Lise-Lotte

PUBLISHER: Department of Informatics, Lund University

SUPERVISOR: Olerup Agneta

EXAMINERS: Lars Fernebro, Claus Persson

SUBMITTED: 2011-06-06

LEVEL: Master

LANGUAGE: English

KEY WORDS: Swedish Project Management Software, Microsoft Project, ProjectPlace.se, Effectiveness, Usability Test, CVF framework

ABSTRACT: The research questions in this study address perceived effectiveness when performing common project management tasks with locally installed Project Management Tools software vs. Cloud Computing Project Management Tools software with Swedish as language. With the Competitive Values Framework framework as a basis, Usability Experiments and questionnaires are used to study perceived effectiveness using the variables *control*, *cooperation* and *quality* in two different software. The result of the study was that Project Managers find both software effective as Project Management Tools, and was slightly more positive towards the Cloud Computing Project Management Tool.

Acknowledgments

I would like to thank all the participants in the study for letting me borrow some of their time, and to the supervisors and students for giving feedback during seminars and meetings.

I would also like to say “spas dilemin” to my fiancé.

CONTENTS

1	Introduction.....	1
1.1	Background.....	1
1.2	Problem Area.....	2
1.3	Purpose and Delimitations	3
1.4	Research Limitations	3
2	Theories in use	4
2.1	Effectiveness.....	4
2.1.1	Software Process Improvement and Effectiveness.....	5
2.1.2	Effectiveness Literature Summary	7
2.1.3	Software Evaluation and Effectiveness	7
2.1.4	Cloud Computing And Effectiveness	9
2.2	Common Project Management Tasks	10
2.3	Research Model.....	12
3	Approach.....	13
3.1	Methodology	13
3.2	The objects of Study	13
3.3	Usability Experiment	14
3.4	Questionnaires	15
3.5	The Informants	18
3.6	Practical Approach.....	19
3.7	Quality	20
3.8	Lessons learned	21
4	Empirical Findings and Analysis.....	22
4.1	Findings.....	22
4.1.1	Control.....	23
4.1.2	Cooperation.....	24
4.1.3	Quality	25
4.1.4	Usage of PMT	26
5	Conclusions	27
	Appendix A: Formal E-mail Introduction.....	28
	Appendix B: Usability Experiment.....	29
	B1: Part I	29

B2: Part II	31
Appendix C: Questionnaires	33
C1: Questionnaire for Part I.....	33
C2: Questionnaire for Part II.....	37
Appendix D: Empirical data	41
D1: Survey Part I	41
References.....	47

List of Tables

Tables	Page
Table 2.1: Effectiveness Literature in Organizational Theory	7
Table 2.2 Significant differences in Positive attitude towards Open Source Software, Developer Community members vs. Non-Developer Community members	9
Table 2.3 Significant differences in Positive attitude towards Open Source Software, Developer Community members vs. Developer Non-Community members	9
Table 2.4 Common Project Management Tasks in Org. Theory Literature	11
Table 3.1 Features in Locally Installed PMT vs. Cloud Computing PMT	13
Table 3.2, Instructions e-mailed to Participants for Usability Experiment Part I & II	14
Table 3.3 Shih & Huang's Questions for Control Technology Compared to this study	15
Table 3.4 Shih & Huang's Questions for Cooperative Technology Compared to this study	16
Table 3.5 Shih & Huang's Questions for Process Quality Compared to this study	17
Table 3.6, Profiles of Responding Organizations	18
Table 3.7 Quality Factors application in this study	20

List of Figures

Figures	Page
Diagram 2.1 Composed Research Model	12
Diagram 4.1, The Control variable in Part I & Part II of the questionnaires	23
Diagram 4.2, The Cooperation variable in Part I & Part II of the questionnaires	24
Diagram 4.3, Presenting data from the Quality variable in Part I & Part II of the questionnaires	25
Diagram 4.4, Presenting data of Usage of PMT's from Part I of the questionnaire	26

1 INTRODUCTION

1.1 BACKGROUND

Project success rates have improved in recent years but still many projects fail (Shore, 2008). Project failure can take many different forms from premature project closure to go above project budget. In Athens in 2005, the Olympic Games was estimated to have a cost of 3 billion € but eventually ended up costing 12 billion € (News.Scotsman.com, 2011). In Sweden in 1992 a project started to drill two train-tunnels through the Hallandsås ridge, and the project was estimated to last 5 years and cost 1 billion. After 17 years one tunnel was finished at the cost of 6.4 billion, and the project is still ongoing (SvD, 2011; Trafikverket, 2011). Thus, project management is a high risk business endeavor.

The increase in success rates can be subscribed to the evolution in project management techniques and tools like Project Management Institute's (PMI's) A Guide to the Project Management Body of Knowledge and the studies on critical success factors (Shore, 2008). The effective use of Project Management Tools (PMT) is also a contributing factor in increasing success rate (Raymond & Bergeron, 2008; Patanakul, et al., 2010). PMT is used as a tool to aid Project Managers in planning, decision making, controlling and evaluating projects (Patanakul, et al., 2010; Tonnquist, 2009). If the correct tool is chosen for the appropriate phase in the project life-cycle the outcome can be positively affected (Raymond & Bergeron, 2008; Patanakul, et al., 2010). The opposite is true, if an inadequate tool is chosen it can have a negative effect upon the project success rate (Patanakul, et al., 2010). Hence PMT's is one of the vital factors for successful projects and choosing wisely is of importance.

Project Management Tools (PMT) comes in many different packages and sizes with a large variety of features (Ali, et al., 2008; Tonnquist, 2009). The features can help with creation of charts with tasks and time-plans; communication between project members; statistics of open, closed and in-progress assignments; possibilities to create reports and final overviews in any stage of the project (Ali, et al., 2008; Tonnquist, 2009). In several studies comparisons between different kinds of PMT's has been made to simplify the choice of the appropriate PMT for the project to make the positive effect on the project and minimize the business risks (Essex, 2005; Younge, et al., 2010; Simmhan, et al., 2010; Margea & Margea, 2011).

Alternatives to traditionally installed Software have been developed recent years such as Open Source and Cloud Computing (Younge, et al., 2010; Simmhan, et al., 2010; Margea & Margea, 2011). Open-Source utilizes the Internet and free source code to create platforms and software in many different areas and one of them is Project Management. Several studies compare different Open-source solution to give recommendations for the ones most suitable for the given purpose (Essex, 2005; Younge, et al., 2010; Simmhan, et al., 2010; Margea & Margea, 2011). Cloud Computing offers a wide range of products and software solutions through the Internet often based on Open Source solutions (Cordeiro, et al., 2010). Open-Source and Cloud Computing can be considered as alternatives to consider instead of traditionally installed software.

1.2 PROBLEM AREA

In the scientific field of Organizational Theory, studies have shown a relationship between project management and the effective use of PMT's and project success rate (Shore, 2008; Patanakul, et al., 2010). Benchmarking and evaluating studies have been made that compares different Open Source PMT's to aid the project managers in choosing the right PMT for their project (Essex, 2005; Younge, et al., 2010; Simmhan, et al., 2010; Margea & Margea, 2011). Regarding Cloud Computing the studies are limited to architectural effectiveness, energy effectiveness, data transfer effectiveness and comparisons between platforms (Younge, et al., 2010; Simmhan, et al., 2010, Cordeiro, 2010; Peng, et al., 2009).

In the scientific field studies examining the relationships between effective usages of PMT's on different platforms are scarce, especially on Cloud Computing platforms. To fill the gap in the scientific field this study will look into effective use of PMT's and make comparisons between traditionally installed and Cloud Computing platforms. The research question will be formulated as such:

- How is effectiveness perceived when using PMT performing common Project Management tasks in locally installed software vs. Cloud Computing software solutions that has Swedish as language?

1.3 PURPOSE AND DELIMITATIONS

The purpose of the study is to measure how project managers perceive effectiveness when performing common project management tasks and compare the results between locally installed PMT and Cloud Computing PMT's.

The ideal result would be to see clear patterns in perceived effectiveness between Cloud Computing PMT and locally installed PMT. Perhaps the data will be more positive towards some variables than others.

The study is delimited to 2 different platforms, because it would be difficult to get the participants to test more platforms and utilize more of their time.

Mainly the participants work in the IT-sector (IT consultancy companies). Participants are from the IT-sector due to practical reasons, as explained further in research limitations below.

1.4 RESEARCH LIMITATIONS

Limitations of this study are that it has only has 8 key informants, to represent project managers attitudes in general. The informants have been selected based on the use of Key Informants as an accepted practice in the scientific field where the researcher picks a smaller group of informants to represent a larger group (Thorburn, et. al., 1991).

The informants in this study have different backgrounds ranging from management positions as CEO to Technical Project Manager with management experience from 1 to 8+ years and an age span from 30 to 40+. The responding companies differ in sizes and geographical positions from Sweden based to global offices.

The key informants have been chose to diversify the informant pool to be able to make generalizations based on their answers in the study. I feel that the study's result can be used to make some generalizations and conclusions in a wider sense regarding Swedish project managers, based on the selected informants.

When performing the study common project management tasks were selected from project management literature (2.2 Common Project Management Tasks). Nine different tasks were found in the literature and only 2 were in common between the two platforms chosen. The study was based on the 2 tasks that the platforms had in common. The platforms offered a variety of different possibilities to the project managers that was not covered in Usability Experiment because they were not in common between the platforms and could not be directly compared, but the participants were encouraged to explore the different platforms on their own. That may affect the result of the study, since if 2 platforms with totally comparable features could be compared then the result might be different.

2 THEORIES IN USE

2.1 EFFECTIVENESS

Effectiveness is a term often used both in academic and non-academic situations. In the academic situation effective can be defined as “successful or achieving the results that you want” (Cambridge University, 2011) (where effectiveness is the noun derived from effective). Within the fields of Informatics, organizations and the effectiveness within them are studied at length (Gregory, et. al., 2008; Parhizgaria & Gilbert, 2003; Steers 1976). Different studies have different definitions of effectiveness and instruments used to measure differ between studies (Steers 1976). The authors within the field have not reached consensus upon how to measure and label effectiveness (Gregory, et. al., 2008; Parhizgaria & Gilbert, 2003; Steers 1976). For this study a suiting model for measuring effectiveness will be chosen.

In Organizational Theory studies focus on organizations, people within them and the surrounding environment (Steers, 1976; Gregory, et al., 2009; Shih & Huang, 2010). The main focus for this study is the human perception of efficiency, thus Organizational Theory suits this well and that is why it models and literature from this field chosen. The purpose and the research question in this study include human perception of effectiveness and human interaction with system built to manage temporary and time-limited organizations also know as projects.

Effectiveness in organizations has been an area of interest for a long time, and in the mid 1970's a comparative study was made to find frequently used factors for measuring effectiveness (Steers, 1976). The study first had some main questions for example, is there such a thing as organizational effectiveness and how consistently valid are the measuring factors? The question of organizational effectiveness was asked to project managers and they were to define and explain how they use the term (Steers, 1976). The valid and consistent effectiveness measurements were a problem to grasp since a measurement could be dependent on the business factors at the moment. The conclusion was drawn that effectiveness measurements had to be flexible and variable over time to fit changes in the business (Steers, 1976). Several more questions regarding validity, reliability of effectiveness measures were discussed and then 17 different factors for measuring effectiveness were found when comparing different studies (Steers, 1976).

Later several studies were made in the field of effectiveness, and a large scale framework to handle measurement of effectiveness was built in the 1980's called the CVF framework (Competing Values Framework, Quinn & Rohrbaugh, 1983). The framework provided guidelines on how to measure effectiveness within an organization. They created the model by giving researchers in the field of organizational theory the task to find similarities in assessment criteria used for measuring effectiveness (Competing Values Framework, Quinn & Rohrbaugh, 1983). The lists of those similarities were compared with the result of a blind-test with another group of researchers doing the same task. The converging results from the two groups of researchers suggested three value dimensions:

- ✓ control-flexibility
 - ✓ internal-external
 - ✓ means-ends
- (Quinn & Rohrbaugh, 1983)

Those three were the foundation of the CVF framework that gave the base for creating measuring instruments for organizational effectiveness (Quinn & Rohrbaugh, 1983).

When the CVF model was created in the 1980's it had a big impact on how effectiveness were, and still is, measured in organizations.

In early 2000, studies about effectiveness and differences in measurement between the private and public sector were made (Parhizgari & Gilbert, 2004). In one of the studies a couple of hypotheses were tested, effective factors could be found in each organization – private or public sector; views and opinions of stakeholders in the domain of effective factors provided the measure for organizational effectiveness (Parhizgari & Gilbert, 2004). The study made a large scale comparison between the two sectors and found that in the organizations, public or private, internal structures and processes could be found and used to measure effectiveness, but generalization should be sector specific (Parhizgari & Gilbert, 2004).

2.1.1 SOFTWARE PROCESS IMPROVEMENT AND EFFECTIVENESS

In a later study an addition to the CVF framework was made, combining the CVF framework with hypotheses for impact on the Software Improvement Process. To the different roles a manager can have, identified in the CVF framework, a few more roles were added by this study (Lawrence & Lenk, 2009).

In 2010, a large scale study was made in 62 organizations that tested eight hypotheses regarding the relationship between Software Improvement Process and organizational culture, with the use of the CVF framework (Shih & Huang, 2010). They created a research model with eight hypotheses and sub-hypotheses combined with the CVF to test during the deployment of Software Improvement Process (SPI). They concluded from the study that the 8 hypotheses were true, and there were a relationship between organizational culture and SPI. The study was performed in Taiwan on 62 organizations. They noted that the limits of the study were that it was made in Taiwan and on CMMI as software process improvement approach (Shih & Huang, 2010).

In the study by Shih and Huang (2010) they used a two parted questionnaire measuring attitudes regarding Software Process Improvement. The first part maps the Informants opinions regarding the organization, based on the CVF model. The second part of the questionnaire investigates the attitudes regarding Software Process Improvement in that organization and was divided into five variables:

- ✓ *Production Technology*
- ✓ *Control Technology*
- ✓ *Cooperative Technology*
- ✓ *Product Quality*
- ✓ *Process Quality*

(Shih & Huang, 2010)

The first variable, *production technology*, measured the Software Process Improvement (SPI) approach perceived effect on the production in the organization (Shih & Huang, 2010). The following variable, *control* measured how the SPI was perceived as an instrument of control (Shih & Huang, 2010). Then *cooperation* measured how the SPI was perceived when helping with cooperation within the organization (Shih & Huang, 2010). The qualities of the SPI were measured in two variables, *process quality* and *product quality* (Shih & Huang, 2010). In the end of the questionnaire there was a final question regarding the usage of SPI.

Shih and Huang wanted to prove that there was a relationship between attitudes regarding effectiveness during the deployment of a Software Improvement Process and organizational culture. They found correlations between their hypotheses and the results from the study on 62 companies (Shih & Huang, 2010). To perform the study they used a questionnaire with two parts, the first part collected participant's attitudes towards the organization and the second part collected the participant's attitudes towards the Software Improvement Process (Shih & Huang, 2010).

In this study I have chosen the following 3 variables:

- ✓ *Control Technology* → *Control*
- ✓ *Cooperative Technology* → *Cooperation*
- ✓ *Process Quality* → *Quality*

In Shih and Huang's study the area of interest is technology and the product during the SPI. They have focused on investigating effectiveness during a process, but in this study the main focus is on effectiveness when using a PMT. The variable of *production technology* and *product quality* is tightly interconnected with the product itself and production and is not relevant for this study. The remaining variables *Control Technology*, *Cooperative Technology* and *Process Quality* lies closer to the effective usage of a tool so they are slightly abbreviated and adapted to this study. The questions in contained in each variable is compared and discussed in 3.4 Questionnaires.

2.1.2 EFFECTIVENESS LITERATURE SUMMARY

To summarize the literature regarding effectiveness in the beginning the definition of effectiveness was made by project managers and effectiveness factors differed between studies (Steers, 1976). The CVF framework revolutionized the effectiveness field by providing a model and instruments that gave researchers the ability to define effectiveness factors to make measurements in studies (Quinn & Rohrbaugh, 1983). The CVF framework was widely tested and improvements were made and it was discovered that effectiveness measurements differed between private and organizational sectors (Parhizgari & Gilbert, 2004). Further amendments were made to the framework as more roles to the project manager was added (Lawrence et al., 2009). Large scale studies were made using the CVF framework with positive results (Shih & Huang, 2010). From the literature conclusions for this study can be made that effectiveness factors needs to be determined by the researcher before conducting the study, and they need to be adapted to the private sector. The CVF framework has been proven as a good base and has been adapted to use with SPI that lies closely to effectiveness when using PMT's.

Table 2.1: Effectiveness Literature in Organizational Theory

Author	Effectiveness Factors	Model	Relevance
Steers, 1976	Yes	No	Effectiveness was defined by project managers.
Quinn & Rohrbaugh, 1983	Yes	Yes	Base for this study.
Parhizgari & Gilbert, 2004	Yes	No	Effective factors have to be chosen for private organizations.
Lawrence et al., 2009	Yes	Yes	Adaptations to the CVF framework.
Shih & Huang, 2010	Yes	Yes	The final base for this study with CVF-framework

(Steers, 1976; Quinn & Rohrbaugh, 1983; Parhizgari & Gilbert, 2004; Lawrence et al., 2009; Shih & Huang, 2010)

2.1.3 SOFTWARE EVALUATION AND EFFECTIVENESS

Models and studies for software evaluation are researched in the academic field (Martin, 1992; Gwebu & Wang, 2010; Jadhav & Sonar 2011). The models give basis for selecting software packages by providing a framework to identifying factors for software evaluation, establishing criteria hierarchy and measurements (Jadhav & Sonar 2011). Models constructed towards measuring effectiveness in Software focuses on effectiveness, efficiency and flexibility (Martin 1992). Effectiveness is defined as:

“[...] the degree to which a SSWP is functional, i.e., what a package is capable to do.”

(Martin, 1992, pp. 250)

The main criterions to fulfill for a software package to be effective are that it meets the functional requirements of the application area and is focused on functional quality of actual functions supporting the application area (Martin, 1992).

An evaluation study, using an exploratory approach, to research attitudes towards Open Source software used by free open source software (FOSS) community members and non-FOSS members (Gwebu & Wang, 2010). They distributed a survey to Ohio LinuxFest conference attendees, senior-level undergraduate students, part-time graduate students (i.e., working professionals) from a large university in the Midwest. They sent out 325 requests and 180 completed the survey, and 168 of them were usable. Their model of exploration of user perceptions was based on a framework from the well known acceptance model (TAM) developed by Davis et al. (1989), and combined with research from several other authors.

The participants in the study were divided between FOSS community members, non-members and software developers and non-developers. They defined 6 measurement factors defined as:

- 1) Perceived Usefulness (PU)
 - 2) Perceived Ease of Use (PEOU)
 - 3) Perceived Risk (PR)
 - 4) Compatibility with software philosophy (CWSP)
 - 5) Compatibility with Software Experience (CWSE)
 - 6) Satisfaction (SAT)
- (Gwebu & Wang, 2010)

Perceived usefulness and *perceived ease of use* determine intentions to adopt new software, which in turn leads to certain behavior and use of the software (Gwebu & Wang, 2010).

Perceived risk is which degree of uncertainty is associated with using specific software. If the risk is perceived as high the participants are less likely to use the software since it has the possibility to result in some form of economic, psychological or social loss (Gwebu & Wang, 2010).

Compatibility with software philosophy is a normative measure to register if the software complies with the informant's values. *Compatibility with Software Experience* measures if the software matches previous experiences and knowledge with the informant. Both compatibility with philosophy and previous experiences could play an important role adaption and use of new software (Gwebu & Wang, 2010).

Satisfaction with software can have a positive influence on its usage, and it has been demonstrated in several studies documented by Gwebu & Wang (2010).

In the analysis after the study they found differences between the groupings of participants and an interesting finding was that there were differences in perception of CSWP between Developer Community members and Non-Developer Community members. It was interesting because of the relationship was not found between Developer Community members and Non-Developer & Non-Community members. An explanation for this can be found in the studies regarding socialization in FOSS communities were less technical members are generally more

positive towards FOSS norms to get in a better position to be voted in as a formal members (Gwebu & Wang, 2010).

The implication of these findings for organizations and companies interested is that if they wish to convert potential users from the mainstream FOSS market (non-developer non-community members) they need to focus on publishing and promoting the benefits surrounding the FOSS ideology, including freedom to use software and to acquire knowledge (Gwebu & Wang, 2010).

Table 2.2 Significant differences in Positive attitude towards Open Source Software, Developer Community members vs. Non-Developer Community members

	Developer Community members	Non-Developer Community members
Perceived Usefulness (PU)	-	-
Perceived Ease of Use (PEOU)	-	-
Perceived Risk (PR)	-	-
Compatibility with software Philosophy (CWSP)	Yes	-
Compatibility with Software Experience (CWSE)		-
Satisfaction (SAT)	Yes	-

When comparing developer community members to developer non-community members an interesting finding was made, that even though the participants had similar technical backgrounds PEOU and SAT was higher with developer community members. An explanation for this can be that Open Source Software is a “work in progress” when released and can be hard to understand for non-community members. Community members in general are well informed, have technical support and technical information available. An implication of this is that companies and organizations should not assume that developers automatically are generally positive towards Open Source Software, and instead assure that there is technical support available for the software to improve attitudes towards open source solutions (Gwebu & Wang, 2010).

Table 2.3 Significant differences in Positive attitude towards Open Source Software, Developer Community members vs. Developer Non-Community members

	Developer Community members	Developer Non-Community members
Perceived Usefulness (PU)	-	-
Perceived Ease of Use (PEOU)	Yes	-
Perceived Risk (PR)	-	-
Compatibility with software Philosophy (CWSP)	-	-
Compatibility with Software Experience (CWSE)	-	-
Satisfaction (SAT)	Yes	-

2.1.4 CLOUD COMPUTING AND EFFECTIVENESS

Cloud Computing in general is a rather newly hyped technology and it means a shift from traditional software to using software available through a third party often as a service via the Internet (Younge, et al., 2010; Simmhan, et al., 2010, Cordeiro, 2010; Peng, et al., 2009). Cloud Computing is a development of parallel computing, distributed computing and grid computing

(Peng, et al., 2009). With the ability to scale out applications beyond locally installed software and handle variable load over time (Simmhan, et al., 2010). Cloud Computing gives an on-demand, scalable and economic solution for those requirements.

Studies about effective usage of Cloud Computing software is very scarce, as mentioned in the 1.1 Background (Essex, 2005; Younge, et al., 2010; Simmhan, et al., 2010; Margea & Margea, 2011). When searching for scientific literature in different scholar databases the efforts were futile, hence the value of this study.

The studies found in this field are about security risks and suitability/adaptability to cloud computing in different areas (Misra and Mondal, 2010; Rosenthal, et. al, 2010). Another popular field to investigate is comparisons between Open Source Cloud Computing platforms (Peng, et al., 2009; Simmhan, et al., 2010).

2.2 COMMON PROJECT MANAGEMENT TASKS

In the research questions of this study the phrase “common project management tasks” is used, and what they contain may differ between different projects and project phases. To make a general selection, the “common project management tasks”, are selected based on project management literature (Harrison, 1993; Albert, 2007; Tonnquist, 2009). In the literature the tasks sometimes have different names but contain similar sub-tasks to be performed (Albert, 2007; Tonnquist, 2009).

In the beginning of the project or the pre-study phase usually initial task are performed like *cost and benefit analysis* were the costs vs. the benefits gained from performing a certain task or collection of tasks is calculated and analyzed (Albert 2007). The analysis can provide the basis for deciding if the tasks should or should not be in the scope of the project. *Scope Definition and Structuring* or *Project Definition* contains the tasks of discussing and finding the scope and or boundaries of the project to be able to create milestones and tasks later on (Harrison, 1993; Tonnquist 2009).

Using *objectives identification* the main objectives may be identified and documented for the project to be used as a basis for time-planning, resource-planning, task-assignment and design-specifications (Albert 2007). *Work Breakdown Structure* (WBS) is another way to categorize and find the tasks within the project (Harrison, 1993; Tonnquist 2009).

To get a clear picture of either the project organization or the whole organization the project is carried out in, an *organizational breakdown structure* can be made (Albert 2007). It usually hierarchal documents the different management and non-management roles or positions within the project or organization. *Resource Definition* and *Project Organization* contain similar tasks to define resources and document the organization of the project (Harrison 1993; Tonnquist 2009). Different literature uses different names for similar tasks.

Estimations of time needed are the basis for project planning, to make educated guesses regarding time consumption *PERT cost* (Program Evaluation Review Technique) are often used (Albert 2007). Estimated time is calculated by estimating time used in a pessimistic-scenario

(P), optimistic-scenario (O), likely-scenario (L), and then use the formula $(O + (4 * L) + P) / 6$. The result is a time estimation using PERT cost.

Cost Breakdown Structure (CBS) is to clarify categories for the different costs in the project (Harrison 1993), whereas *PENG-analysis* a cost/benefit model to estimate the usefulness of a project, to see if the costs is smaller than the benefits (Harrison 1993; Tonnquist 2009).

GANTT-charts are a created during the planning stage of the project and give an overview of tasks, collection of tasks and resources on the time-line for executing the project (Albert 2007). The GANTT-charts are continuously updated through-out a project to give a current overview of the status of the project, and to plan ahead. *Trend analysis and Forecasting* is another way to explain methods similar to GANTT-charts used in some literature (Harrison 1993).

Histograms and *Resource Histograms* shows the usage of resources over time, and gives the possibility of resource leveling between tasks and over time (Albert 2007; Tonnquist 2009).

In the last stages of a project *earned value analysis* can be made to see if value of the tasks accomplished within the project was worth the costs accumulated (Albert 2007). Performance Measurement and Economic Follow-Up are contains similar activities as made in earned value analysis, different authors use different terms (Harrison 1993; Tonnquist 2009).

The *cash flow diagram* and *Exit Calculations* displays usage of the budget throughout the project (Albert 2007; Tonnquist 2009).

The final report for the project, the *close-out report* and *close procurements* can be created as a summary of tasks completed in the project, analyses of value gained, budget used, lessons-learned for the future etc (Albert, 2007; Tonnquist, 2009).

Table 2.4 Common Project Management Tasks in Org. Theory Literature

Harrison	Albert	Tonnquist	Common Tasks
Scope Definition and Structuring	Cost and Benefit Analysis	Project Definition	Initialization analysis
Work Breakdown Structures	Objectives Identification	Work Breakdown Structure	WBS
Resource Definition	Org. Breakdown Structure	Project Organization	Define Project Org.
Cost Breakdown Structure	PERT cost	PENG-analysis	Financial analysis
Trend Analysis and Forecasting	GANTT charts	GANTT charts	GANTT-charts
N/A	Histograms	Resource Histograms	Histograms
Performance Measurement	Earned Value Analysis	Economic Follow-Up	Economic analysis
N/A	Cash Flow Diagram	Exit Calculations	Economic summary
N/A	Close-out Report	Close Procurements	Close Report

(Harrison, 1993; Albert, 2007; Tonnquist, 2009)

2.3 RESEARCH MODEL

The research model is based on the CVF framework for measurements of effectiveness, and the instruments for performing the measurements are a Usability Experiment combined with a questionnaire divided into different variables. The CVF framework is a well known and accepted framework for measuring effectiveness, as described above, and through the study by Shih and Huang (2010) a well suited questionnaire and variables are available. The questionnaire and variables will be modified to suit the purpose of this study. The empirical data will be analyzed based on the variables given by Shih and Huang bases on the CVF framework, to answer the research question of how is effectiveness perceived when performing common project management tasks on locally installed PMT vs. Cloud Computing PMT with Swedish as language.

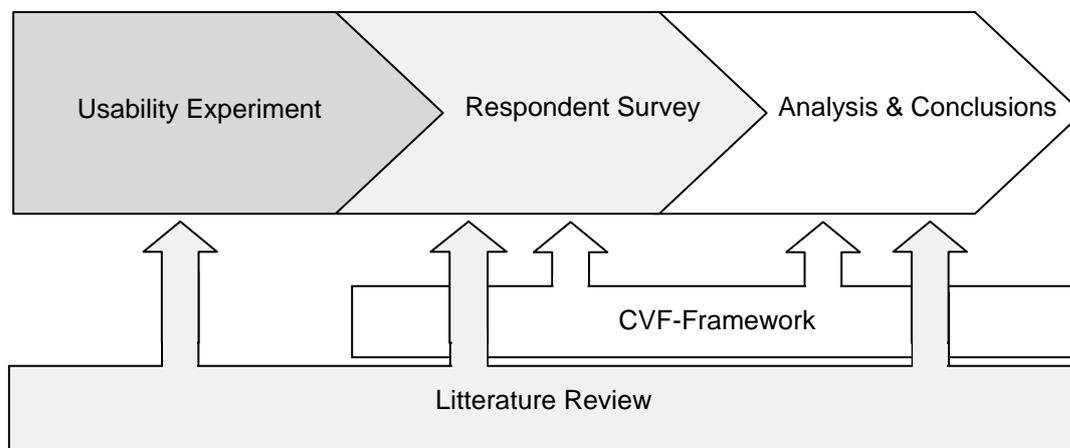


Diagram 2.1 Composed Research Model
(Shih & Huang, 2010; Albert, 2007; Tonnquist, 2009; Misra and Mondal, 2010; Rosenthal, et. al, 2010)

3 APPROACH

3.1 METHODOLOGY

In this study the perceived effectiveness needs to be measured and compared between two different platforms (locally installed PMT and Cloud Computing PMT). A Usability Experiment, with the purpose of giving the participants knowledge about how to perform the common project management tasks is chosen as a part of this study. In the Usability Experiment, the participants will be given guidelines on which project management tasks to perform and in which order. Thus increasing the chances of the participants getting a clear picture of how the software works, how it's used and how effective they perceive it to perform the given project management tasks in. Afterwards the perceived effectiveness needs to be collected, and a questionnaire has been chosen as a form to collect them. Interviews would be possible to choose as a method for gather attitudes, but considering practical issues like asking the participants in the study to take 3-4 hours free to participate in interviews at two different occasions, and travelling across the country to perform interviews, questionnaires were chosen as a method for gathering their responses.

3.2 THE OBJECTS OF STUDY

The object of study for the locally installed PMT is Microsoft Project 2003 and 2007, due to its prominent position as a PMT. Microsoft Project is well known and frequently used both as example in project management literature and in companies as a tool for project managers. The Cloud Computing PMT, ProjectPlace.se, was chosen on the basis that it was a PMT available in Swedish some similar features that are available in Microsoft Project to make it possible to make a comparison of perceived effectiveness. The study is performed in Sweden, on Swedish speaking project managers that makes it a great advantage that the software is in Swedish to make the learning-curve for the participants as low as possible to minimize the effects on the results of the study.

The common project management tasks presented in Chapter 2.2 have been compared with feature available in the chosen platforms. There were only comparable two features that were available on both platforms, *GANTT-charts* and *Histograms*. The study will mainly be focused around those two features, and the participants are instead encouraged to get acquainted with the software.

Table 3.1 Features in Locally Installed PMT vs. Cloud Computing PMT

Software	Initialization analysis	WBS	Define Project Org.	Financial analysis	GANTT charts	Histograms	Economic analysis	Economic summary	Close Report
ProjectPlace.se	Yes	Yes	Yes	-	Yes	Yes	-	-	-
MS Project	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes

(Harrison 1993; Albert, 2007; Tonnquist, 2009)

3.3 USABILITY EXPERIMENT

Usability Experiments serve the purpose of observing human behavior in a controlled environment (Dumas & Loring, 2008; Dumas & Redish, 1999). A controlled environment can range from a silent room with double-sided windows and video-cameras to let the researcher or observer watch the participants perform a predefined task to giving participants guideline and letting them execute the guidelines at a remote location without external supervision (Dumas & Loring, 2008; Dumas & Redish, 1999). For Usability Experiments the degree of control, preparations and supervision is determined of the purpose of the experiment and which data is of interest. To observe participants behaviors when performing a specific task some kind of supervision is needed (Dumas & Loring, 2008; Dumas & Redish, 1999). In this study Usability Experiments are used to give the participants knowledge in specific tools (PMT), and their behavior during the usage of the tools are not part of this study.

In 2.2 Common Project Management Tasks are selected and compared between the two software platforms. Tasks found in both software are the ability to create GANTT-charts and Histograms. To be able to create a GANTT-chart resources and tasks are needed, and to get information in histogram resources needs to be assigned to tasks. In the Usability Experiment the participants are instructed to create tasks, add resources and view the result in a GANTT-chart and look at resource plan or resource usage. The instructions given as a part of the Usability Experiment are:

Table 3.2, Instructions e-mailed to Participants for Usability Experiment Part I & II

Part I of Usability Experiment	Part II of Usability Experiment	Action
1) Open Microsoft Project	1) Log into www.projectplace.se Username: XXYX Password: XXYX	Login
2) Look around in Microsoft Project get acquainted with the tool, and then perform the following:	2) Look around in ProjectPlace.se get acquainted with the tool, and then perform the following:	Orientation in Software
a. Add a resource (resource)	a. Add a new resource (resource)	Resource management
b. Create a task (task)	b. Create a new task (task) and add the resource you created	Task management
c. View the result in the GANTT-schedule	c. View the result in the GANTT-schedule	Task analysis
d. Look at the resource usage (Resource Usage)	d. View the Resource plan	Resource Analysis
3) Answer the questions in the Internet-survey: [SURVEY_LINK]	3) Answer the questions in the Internet survey: [SURVEY_LINK]	Fill out Survey

(Appendix B)

There are differences in the instructions between the two parts, for Part I, the participants are to perform common project management tasks in MS Project, and if they do not have it installed they can login via remote desktop to a server that has MS Project 2003 installed. In the instructions for Part II the participants are to perform similar tasks in ProjectPlace.se, and they will get a shared login. They cannot see each-others names since it is registered in my name.

3.4 QUESTIONNAIRES

Questionnaires are frequently used as a method for collecting empirical data, and in this study I have chosen an online survey tool for collection of data. The tool is called Enalyzer and supplies tools for creating contacts, sending out the survey-email, sending reminders, collecting empirical data and making basic analyzes and reports (Enalyzer, 2011).

For this study I have chosen 3 variables to measure effectiveness, as explained in Chapter 2, *Control, Cooperation and Quality* (Shih & Huang, 2010).

The first variable in this study is *control*, it measures if the software is perceived as efficient when planning, time estimating and controlling a project. Based on Shih and Huang's study appropriate questions have been selected from each of the variables chosen, and wordings have been updated to suit a PMT.

The relationships between the questions from Shih and Huang's study, the tasks to perform in the Usability Experiment and the questions in this study are shown below:

Table 3.3 Shih & Huang's Questions for *Control Technology* Compared to this study

Shih & Huang's Questions	Usability Experiment	Questions in this study
Our software process improvement approach helps to estimate the size of the software to be developed.	Resource Analysis Task Analysis	I find that... ProjectPlace.se / MS Project helps to estimate the size of projects to be executed.
Our software process improvement approach helps to estimate the time and effort required for the development of planned software.	Resource Management Task Management	I find that... ProjectPlace.se / MS Project helps to estimate the time and resources used at the beginning of projects.
Our software process improvement approach helps to plan software development projects.	Resource Management Task Management	I find that... ProjectPlace.se / MS Project helps to estimate time and resources used during project planning.
Our software process improvement approach helps in defining useful milestones for our software development projects.	Task Management	I find that... ProjectPlace.se / MS Project helps to create milestones during project planning.
Our software process improvement approach helps to organize software development projects.	Resource Management	I find that... ProjectPlace.se / MS Project helps to plan a complete software project.
Our software process improvement approach helps to keep our software development projects under control.	Resource Management Task Management Resource Analysis Task Analysis	I find that... ProjectPlace.se / MS Project helps to keep control in a project.
Our software process improvement approach helps to estimate the project risks.	N/A	N/A

The second variable, *Cooperation*, measures perceived effectiveness when using the software to communicate project information, minimizing redundant work etc. Below the relationships between the questions from Shih and Huang's study, the tasks to perform in the Usability Experiment and the questions in this study are shown:

Table 3.4 Shih & Huang's Questions for *Cooperative Technology* Compared to this study

Shih & Huang's Questions	Usability Experiment	Questions in this study
Our software process improvement approach describes a sound way of developing software.	N/A	N/A
Our software process improvement approach forms a useful standard for our software development.	N/A	N/A
Our software process improvement approach reminds me about activities/tasks of software development.	Task Management	I find that... ProjectPlace.se / MS Project reminds me of activities and assignments in a project.
Our software process improvement approach provides a useful list of possible software development activities.	Task Management	I find that... ProjectPlace.se / MS Project gives an overview in a list of project activities.
Our software process improvement approach provides useful guidelines for conducting software development.	N/A	N/A
Our software process improvement approach allows us to learn from our software development experience.	N/A	N/A
Our software process improvement approach defines an ideal process of software development that is useful, even though it is not followed in practice.	N/A	N/A

The last variable, *quality*, measures if the software is perceived as efficient when finishing a project in-time and within budget. The relationships between the questions from Shih and Huang’s study, the tasks to perform in the Usability Experiment and the questions in this study are shown below:

Table 3.5 Shih & Huang’s Questions for *Process Quality* Compared to this study

Shih & Huang’s Questions	Usability Experiment	Questions in this study
Our software process improvement approach helps to improve the degree of agreement among participants in the development process.	Resource Management Task Management	I find that... ProjectPlace.se / MS Project helps to create consensus between participants in a project.
F2. Our software process improvement approach helps to decrease the duplication of efforts during the development process.	Task Management	I find that... ProjectPlace.se / MS Project reduces risks for redundant work during a project.
F3. Our software process improvement approach helps to complete software within budget.	Resource Analysis Task Analysis	I find that... ProjectPlace.se / MS Project helps to finish a project within budget.
F4. Our software process improvement approach helps to complete software within schedule.	Task Analysis	I find that... ProjectPlace.se / MS Project helps to finish a project with the time plan.
F5. Overall, our software process improvement approach improves the quality of the development efforts.	Resource Management Task Management Resource Analysis Task Analysis	I find that... ProjectPlace.se / MS Project increases quality in projects.

The questions in the first part of the study are derived from the questions in Shih and Huang’s study. Presented above are the questions grouped by variables. The questions are the same for both software to make comparison of the results valid and because the features in the Usability Experiment that the participants performed were, as much as possible, equivalent between the platforms. A final control question to get an estimation of the usage of PMT’s in the different companies were added on the first questionnaire and it was

“Choose on a scale of 0-100%:
Within our company ___ % of the project managers use some kind of project management software.”

The choices in the questionnaires are based on a Likert scale with the following choices “Completely agree”, “Partly agree”, “Probably don’t agree”, “Not sure”, “Absolutely don’t agree”.

The only difference between part I and part II of the questionnaire is that it’s for ProjectPlace.se (Part I) or for MS Project (Part II), and the control question regarding how many percent of the project managers that use a PMT, which is included in Part I.

3.5 THE INFORMANTS

The informants, that work as project managers with varying experiences both as project managers and of the software in the Usability Experiment. Key informants are chosen from different age groups, genders and companies to minimize problems encountered using key informants (Thorburn, et. al., 1991).

I choose eight informants from five different companies; the informants were in the age span from 30 to 40+ and divided between men and female. They worked at different management levels from Technical Project Manager to CEO, and at companies of different sizes. Most of the companies were in the IT sector, with 20 – 8000 employees with bases in Sweden, Nordics or Global. They are my current or former colleagues and supervisors and it is a blind study so they do not know who is participating in the study.

The informants have been chosen from different age groups, companies and experience levels to diversify the risks of not being able to generalize to project managers as a segment (as discussed in 1.5 Research limitations).

Of the eight informants six answered and the two non-responsive were from Company B, multinational medical manufacturing company. The six responding informants were 3 female and 3 men, from Companies A, B, C, D and E.

Below facts about the responding companies and informants are displayed:

Table 3.6, Profiles of Responding Organizations

Characteristics	Company A: Swedish IT Consultant Company.	Company B: Multinational Medical Manufacturing Company.	Company C: Nordic IT Consultant Company.	Company D: Nordic IT Consultant Company.	Company E: Nordic IT Consultant Company.
Company Base	Sweden based.	Multinational company with offices in USA, Europe and Asia.	Multinational consultant company with offices in Europe and Asia.	Nordic based.	Nordic based.
No. Employees	Approx. 20 employees	Approx. 8000 employees	Approx. 1700 employees.	Approx 4500 employees.	Approx 250 employees.
No. Informants	1	4	1	1	1
Age Groups	40+	40+	30+	45+	45+
Gender	Female	Male & Female	Female	Male	Male
Informant Position	CEO	Team Leaders	Technical Project Manager	Sales Manager	Head of Software Engineering
Experience Level	5+	5+	1	8+	8+
Previous Experience with MS Project	No	Yes	Yes	Yes	Yes
Degree of PMT usage	80%	80%, 50%	10%	90%	85%

3.6 PRACTICAL APPROACH

The study was performed by first contacting possible participants with an informal e-mail, after a positive response the names of participants were saved. A couple of weeks before the study started a formal e-mail was sent to the participants to remind them that they were positive to participating in a study and that it would start in the coming couple of weeks (Appendix A-1). The first part of the study started by sending out an e-mail containing guidelines for the Usability Experiment, and a link to an online survey tool containing the questionnaire (Appendix B-1).

In the first part of the Usability Experiment six of the participants answered the questionnaire, one declined, and one did not answer. The participant that declined was because they had too much work and could not find the time to participate. The one that never answered, I found out later, had changed jobs and worked at another company and never received the e-mail about the Usability Experiment. They were both from Company B.

I started the second part of the Usability Experiment after receiving the answers on the first and waiting for the last participant for an appropriate time. Another e-mail was sent out, to all the responding participants, with instructions for part two of the Usability Experiment and a link to part two of the survey was included (Appendix B-2). The first part of the Usability Experiment was to perform common project management tasks in Microsoft Project and the first questionnaire contained questions regarding the perceived effectiveness when performing those tasks. The second part of the Usability Experiment was to perform common project management tasks in ProjectPlace.se and part two of the questionnaire was questions about perceived effectiveness when executing those tasks.

The data was collected using an online survey-tool to send out the e-mails with instructions and links to the survey. In the survey-tool I could monitor status on the participants, if they had answered, if they started the survey or declined. I could also read through all their answers, create reports and make basic analyses (Enalyzer, 2011).

The original plan was to start the Usability Experiments and send out the surveys and with one week for the participants to complete the first part and then start the second part. That did not go according to plan, since the participants did not answer in time. I sent automated reminder e-mails and then e-mail them in person, several times, to get the last participants to respond. There was a participant that was very late executing Part II of the Usability Experiment, and after an e-mail conversation we found that the e-mail about Part II of the Usability experiment got stuck in the participant's spam-filter. Another participant did not respond to any e-mails altogether, and as mentioned earlier the participant had started to work at another company and did not get any e-mails that I had sent to the participants work-email.

After the last participant had answered the questionnaire I started to analyze the data, and I ran in to some trouble. When I started the study I used a 30-day trial for Analyzer, and since the study took 48 days (1 month and 17 days) to complete my trial-period had run out. I contacted the support and sales of Analyzer in an e-mail. The support department answered me and gave me 30 more days to test Analyzer and the sales department answered me that if I committed to a paid subscription they would give me one more week to test. I did not respond to sales and continued to use the trial that the support department gave me until I had finished analyzing the data.

3.7 QUALITY

Quality can contain several different aspects such as:

- *Construct validity*
 - *External validity*
 - *Reliability*
- (Yin, 2009)

Construct validity contains the actions of identifying correct operational measures for the object being studied (Yin, 2009). In this study the research model is based on a framework and instruments chosen from scientific literature found in Organizational Theory. The CVF-framework is well known and used in several studies, as discussed in Chapter 2, and the instruments comes from Shih & Huang's study (2010) that is uses CVF as a base and adapts instruments to the SPI process that lies closely to the object of interest in this study.

External validity is the task of defining the domain into which the study can be generalized (Yin, 2009). The domain for this study is traditionally installed PMT's and Cloud Computing PMT's that have Swedish as a language. For this study one of each has been chosen to cover the domain, and since the domain is rather limited that should give enough sample-rate for this study.

Reliability indicates that a study can be repeated presenting the same results (Yin, 2009). In this study the *chain of evidence* has been kept by discussion of literature, model selection, adding appendixes with empirical data, questionnaires, e-mails and discussions of the findings based on the literature.

Table 3.7 Quality Factors application in this study

Quality Factors	Applied in this study
Construct validity	- Based on well known CVF-framework - Instruments from published and reviewed study
External validity	- One of each kind of software is chosen to represent a limited domain
Reliability	- Chain of evidence is kept

3.8 LESSONS LEARNED

Lessons learned for the future regarding the creation of variables is to have approximately the same number of questions, if it is suitable for the research questions and data to be collected. Regarding the collection of the empirical data it is a good idea to give participants longer time than one week to respond, and use direct communication for reminders and not rely on automated reminders. Furthermore it is a good idea to ensure that if the empirical data is collected via an online survey tool the tool is reliable and the data will be available as long as it is needed.

4 EMPIRICAL FINDINGS AND ANALYSIS

4.1 FINDINGS

The first part of the study was sent to 8 participants and 6 responded. One of the participants declined due to lack of time, and the other did not respond. As mentioned in Chapter 3 the last participant had changed job and did not receive any e-mails sent to the participants work e-mail. I did not get any auto-respond that the e-mail address was invalid or that the person had changed job.

The six that responded continued to the second part of the study after all participants had answered or declined (or was non-reachable). The findings are based on the variables selected prior to starting the study, as discussed in chapter 2 and 3. From the variables I drew conclusions on perceived effectiveness and made comparisons between the software. The variables selected were:

- ✓ Control – 6 questions
- ✓ Cooperation – 2 questions
- ✓ Quality – 5 questions

The questions were formed positively, and when the participants respond that they completely agree that gives a positive result for that question. The lower down the scale the response was the more negative result for that question.

4.1.1 CONTROL

The variable of control contains measurements for recording the participant’s attitudes regarding effectiveness, through controlling a project with the selected PMT with 6 different questions (Table 4.1). The questions were about *project size, time and resource estimation; milestone creation; project planning and keeping control in a project.*

For *MS Project* the participants had a *high degree of control* (7 of 36 questions Completely Agree, 20 of 36 questions Partly Agree). The 3 participants that felt a very high degree of control came from different companies and were both 40+ with high job positions. The other participants that had a high degree of control came from two different companies at age levels 40/45+ and long experiences as project managers. The participant that was not sure and had a lower feeling of control was 30 years old and had a short experience as project manager and no experience with MS Project.

For *ProjectPlace.se* 1 very positive participant was the same person that was positive about MS Project, and one of the persons with 8+ years of experience. All the other participants were generally positive and the participant with 1 year of management experience that was negative regarding MS Project was more positive regarding ProjectPlace.se. The participants that were “not sure” were both not sure about the milestones planning. They were also unsure about planning of resources and planning a whole software project.

The differences between the participant attitudes could be explained by the CWSP (Compatibility with Software Philosophy) and CWSE (Compatibility with Software Experience) factors described by Gwebu and Wang (2010). Participants with higher levels of experience of MS Project had generally a more positive attitude towards MS Project, whereas participant with a lower level of experience with MS Project was more negative. The same participant was more positive towards ProjectPlace.se. Thus MS Project would probably scores low PEU factors (Perceived Ease of Use).

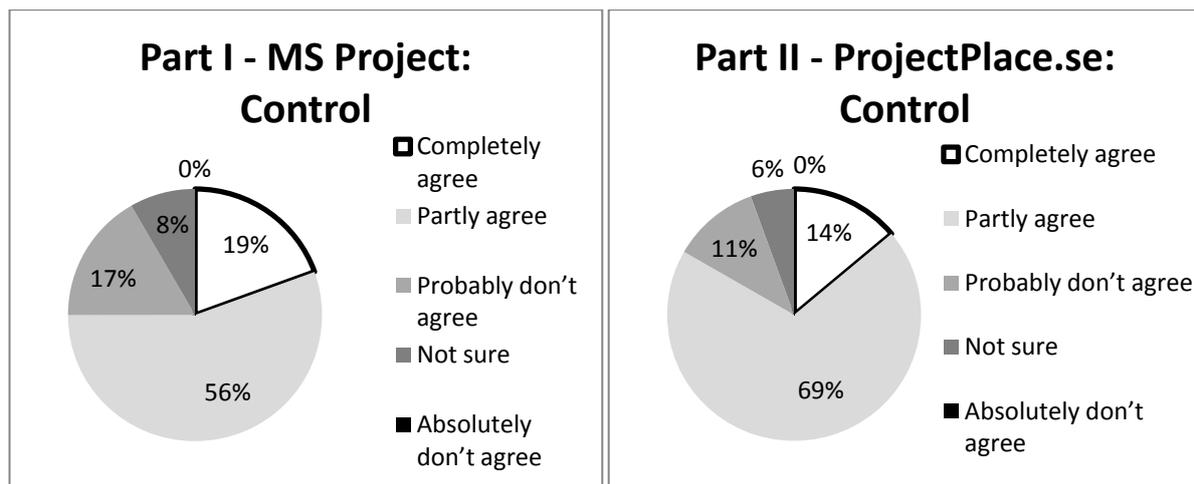


Diagram 4.1, The Control variable in Part I & Part II of the questionnaires (See Appendix D for empirical data)

4.1.2 COOPERATION

The features and possibilities to remind of activities in the project and give an overview of activities to be done were measured in the cooperation variable. The 2 questions were if the software *gave reminders about activities and tasks to execute* and if it was *possible to get a list of project activities*.

In *MS Project* only 1 participant was *very positive*, and she was also positive regarding the degree of control when using *MS Project*. *Three participants* were *positive* regarding the *cooperation* variable and they were all working at different companies but approximately in the same age group and experience levels. The *2 participants* that were *negative* were from different companies and different age groups, and they were both negative about the ability to get reminders about activities and tasks to be performed.

For *ProjectPlace.se* all participants were *very positive*, except for the question regarding *reminders for activities and tasks to be executed in the project*. Half of the participants answered “Not sure” regarding reminders, and the other half gave high scores on that question.

A reason for the very positive informant, that was very positive in all questions in the study, could be similar to the reason that Gwebu and Wang found regarding generally positive FOSS Community members (Gwebu & Wang, 2010). They found with the help of socialization studies, that non-technical FOSS members were generally positive to have a better chance to be voted in as formal members. A parallel could be drawn here since the very positive participant is working within the field of Usability Testing and hence could have a generally positive attitude when participating in a Usability Experiment.

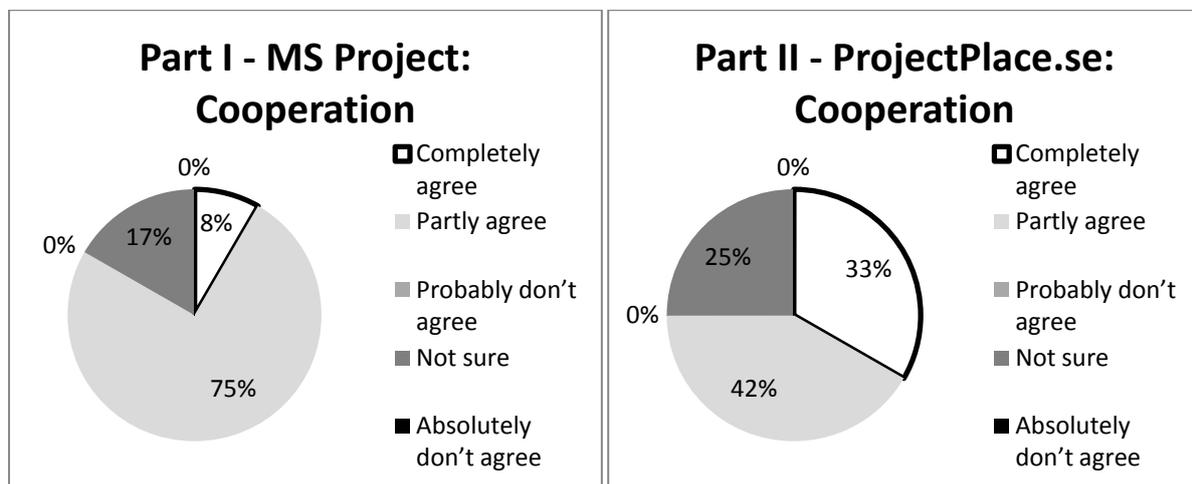


Diagram 4.2, The *Cooperation* variable in Part I & Part II of the questionnaires (See Appendix D for empirical data)

4.1.3 QUALITY

Quality measures whether the software can help in completing the project in-time, within budget, reduce redundant work and other quality factors. The questions contained in the quality variable were if the software helped to create consensus between the project members, reduced redundant work, kept the project within budget and time plan and increased the projects quality.

For *MS Project* none of the participants were very positive regarding the *quality* variable for *MS Project*, and only 1 that responded “*Completely Agree*” on *reduces redundant work*. The participant was the same person that was positive in all the questions. All the participants were mildly positive and some even very negative. Of the participants 2 answered *very negative* on *creating consensus* between the project participants and if the software helped to *finish within the time plan*. The 2 participants answered rather positively on other variables but were in consensus on this. The 2 participants were male and from different companies but in same age groups (40+ and 45+) and approximately same experience levels (5+ and 8+).

For *ProjectPlace.se* the participants were *generally positive regarding quality*, and *very positive regarding creating consensus* between project members and *reducing the risks of redundant work* within the project. There were only 3 participants that were *negative* on 3 different questions regarding if the software helped *creating consensus* between project members, helped *finish project within time plan* and *increased project quality*.

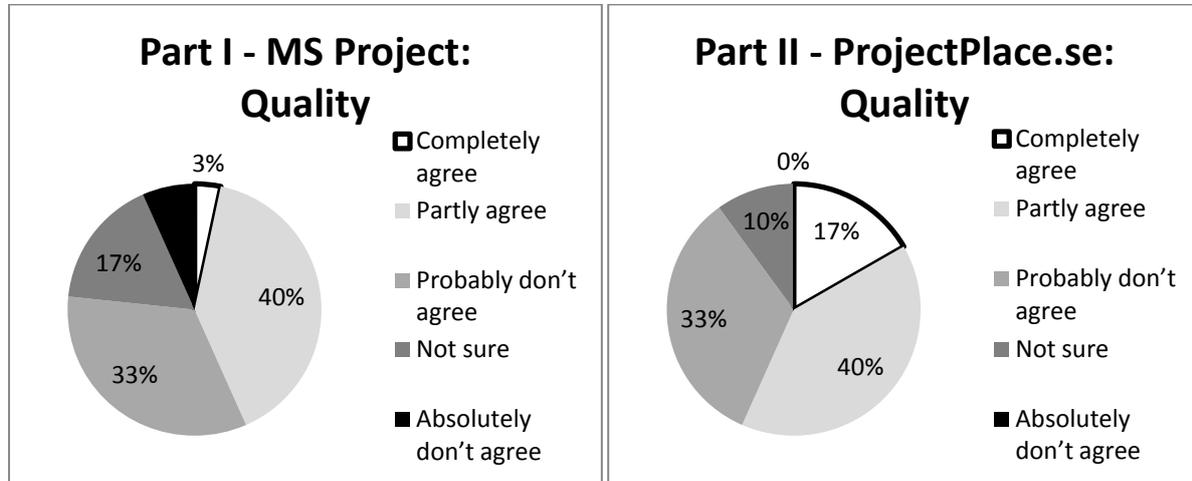


Diagram 4.3, Presenting data from the *Quality* variable in Part I & Part II of the questionnaires (See Appendix D for empirical data)

4.1.4 USAGE OF PMT

The final question on Part I of the questionnaire was to which degree is project management tools used by the project managers in the companies the participants work in. The person participant that was very positive towards MS Project and the person that was a CEO both had 80% usage of PMT's in their companies. The two persons with 8+ years of management experience had between 85% and 90% usage of PMT's in their companies. The person with 1 year of management experience had 10% usage of PMT's in her company, and the last person with 5+ years of experience had 50% usage of PMT's in his company. It was rather interesting that two participants from the same company answered 50% and 80%.

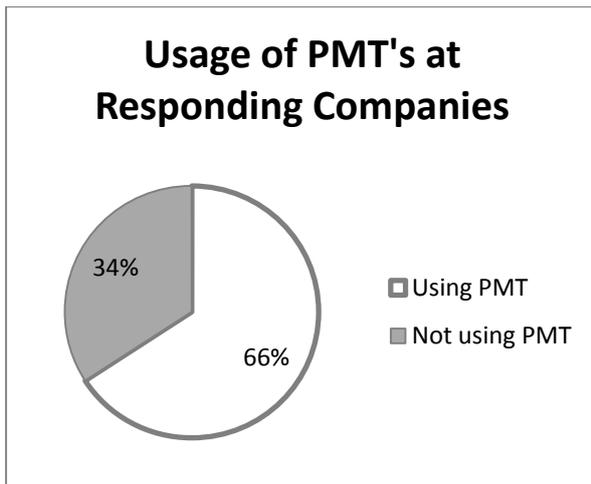


Diagram 4.4, Presenting data of Usage of PMT's from Part I of the questionnaire (See Appendix D for empirical data)

5 CONCLUSIONS

The research question in this study was how effectiveness is perceived when using PMT's performing common Project Management tasks in locally installed software vs. Cloud Computing software solutions that has Swedish as language. The research question will be answered by examining the selected effectiveness factors *control*, *cooperation* and *quality*.

When looking at the *control factor* of effectiveness the empirical data shows that project managers perceive both locally installed and cloud computing PMT's as effective. The empirical data displayed an overall positive attitude towards effective usage of PMT's as a tool for controlling a project for both software in the study. There were only one participant that was generally negative, but that participant had little previous experience of MS Project and answered negatively on all questions in the study regarding MS Project.

When examining the *cooperation* factor of effectiveness Project Managers find both software effective, but with a slightly more positive attitude towards the Cloud Computing PMT.

The conclusions regarding effectiveness and the *quality* factor are that Project Managers find both software effective but a bit more positive regarding Cloud Computing PMT's.

In general project managers find the PMT's in the study as effective as tools for performing common project management tasks, with a slightly more positive attitude towards Cloud Computing. The reasons for the differences in perceived effectiveness between locally installed PMT's and Cloud Computing PMT's would be interested to cover in another study.

APPENDIX A: FORMAL E-MAIL INTRODUCTION

[SWEDISH]

Hejsan,

i höstas visade du intresse att hjälpa mig med min magister uppsats i projektledning genom att delta i ett usability experiment.

Jag är väldigt tacksam för detta, och har ett par frågor:

- har du tillgång till Microsoft Project?
- vilken version?

Ifall du inte har tillgång till Microsoft Project, hittar jag en alternativ lösning.

Instruktioner för usability experimentet kommer att skickas ut under de kommande 2 veckorna, och svarstiden kommer att vara 1 vecka.

Usability experimentet och den medföljande enkäten kommer att ta ungefär mellan 30-45 minuter att genomföra.

I experimentet utför man vanliga projektledningsuppgifter i Microsoft Project och i Projectplace.se, därefter svarar man på frågor i en medföljande enkät.

Ifall du har frågor är du varmt välkommen att höra av dig,
Med vänlig hälsning Lise-Lotte

[ENGLISH]

Hi,

last autumn you were interested in helping me in my Masters Thesis about project management by participating in a Usability Experiment.

For this I am very thankful, and have a couple of questions:

- do you have access to Microsoft Project?
- which version?

If you don't have access to Microsoft Project, I will find an alternative solution.

Instructions for the Usability Experiment will be sent out in the following two weeks, and the time to respond will be 1 week.

The Usability Experiment and the questionnaire will take approximately 30-45 minutes to perform.

In the experiment you will execute common project management tasks in Microsoft Project and in ProjectPlace.se, afterwards you answer questions in the questionnaire that is included.

If you have any questions feel free to contact me,
Best Regards Lise-Lotte

APPENDIX B: USABILITY EXPERIMENT

B1: PART I

[SWEDISH]

Hej [FIRSTNAME] [LASTNAME],

tack för att Ni valt att delta i undersökningen.

För att genomföra Usability Experiment Del 1 utför följande saker i angiven ordning.

(Del 2 skickas ut när enkäten på del 1 är besvarad).

- 1) Öppna Microsoft Project
- 2) Orientera dig i Microsoft Project bekanta dig med verktyget, och utför sedan följande:
 - a. Lägg till en ny resurs (resource)
 - b. Skapa en ny uppgift (task)
 - c. Se resultatet i GANTT-schemat
 - d. Titta på Resurs användning (Resource Usage)
- 3) Besvara frågorna i webb-enkäten: [SURVEY_LINK]

Ni kan även delta i enkäten genom att besöka adressen och fylla i användarnamn och lösenord:

<http://survey.analyzer.com/>

ProjectID: [PROJECT_ID]

Password: [PASSWORD]

Ifall Ni inte önskar att delta i Usability Experimentet och enkäten klicka på följande länk:

[REFUSE_LINK]

Ifall Ni har frågor angående att öppna Microsoft Project filen eller liknande kontakta mig gärna!
Era svar och kontaktinformation avpersonifieras och Ert namn kommer ej att publiceras i uppsatsen.

Tips till att hitta i programmet:

Microsoft Project

- a. Lägg till en ny resurs (resource): Resource Sheet -> Insert -> New Resource
- b. Skapa en ny uppgift (task): Task Usage -> Insert -> New Task
- c. Se resultatet i GANTT-schemat: GANNT Chart
- d. Titta på Resurs användning (Resource Usage): Resource Usage

Ifall ni inte har tillgång till Microsoft Project kan ni logga in via Remote Desktop till följande säkra server som är uppsatt för detta Usability Experimentet med Microsoft Project 2003 installerat:

IP-adress till servern: xxx.yyy.xxx.yyy

Användarnamn: XXYY

Lösen: XXYY

Tack för att Ni deltar,

Mvh Lise-Lotte Thuse

[ENGLISH]

Hi [FIRSTNAME] [LASTNAME],

thank you for choosing to participate in this study.

To perform the Part I of the Usability Experiment perform the tasks in the given order. (Part II is sent when the questionnaire on Part I is answered).

- 1) Open Microsoft Project
- 2) Look around in Microsoft Project get acquainted with the tool, and then perform the following:
 - a. Add a resource (resource)
 - b. Create a task (task)
 - c. View the result in the GANTT-schedule
 - d. Look at the resource usage (Resource Usage)
- 3) Answer the questions in the Internet-survey: [SURVEY_LINK]

You can also participate in the questionnaire by visiting the address and enter username and password:

<http://survey.enalyzer.com/>

ProjectID: [PROJECT_ID]

Password: [PASSWORD]

If you do not wish to participate in the Usability Experiment and questionnaire click the following link:

[REFUSE_LINK]

If you have any questions regarding opening the Microsoft project file or anything else please contact me!

Your answers and contact information will be anonymized and your name will not be published in the thesis.

Help for the software:

Microsoft Project

- a. Add a new resource (resource): Resource Sheet -> Insert -> New Resource
- b. Create a new task (task): Task Usage -> Insert -> New Task
- c. View the result in a GANTT-schedule: GANNT Chart
- d. Look at resource usage (Resource Usage): Resource Usage

If you don't have access to Microsoft Project you can log in with Remote Desktop to the following secure server setup for this Usability Experiment with Microsoft Project 2003 installed:

IP-address to the server: xxx.yyy.xxx.yyy

Username: XYYY

Password: XYYY

Thank you for participating,
Best regards Lise-Lotte

B2: PART II

[SWEDISH]

Hej [FIRSTNAME] [LASTNAME],

tack för att Ni valt att delta i undersökningen.

Undersökningen startar onsdag 13 april, och avslutas onsdag 20 april.

För att genomföra Usability Experiment Del 2 av 2, utför följande saker i angiven ordning.

1) Logga in på www.projectplace.se

Användarnamn: XXYX

Lösenord: XXYX

2) Orientera dig i ProjectPlace.se bekanta dig med verktyget, och utför sedan följande:

- a. Lägg till en ny resurs (resource)
- b. Skapa en ny uppgift (task) och lägg till resursen du skapade
- c. Se resultatet i GANTT-schemat
- d. Titta på Resursplanen

3) Besvara frågorna i webb-enkäten: [SURVEY_LINK]

Ni kan även delta i enkäten genom att besöka adressen och fylla i användarnamn och lösenord:

<http://survey.enalyzer.com/>

ProjectID: [PROJECT_ID]

Password: [PASSWORD]

Ifall Ni inte önskar att delta i Usability Experimentet och enkäten klicka på följande länk:

[REFUSE_LINK]

Ifall Ni har frågor angående att öppna Microsoft Project filen eller liknande kontakta mig gärna!
Era svar och kontaktinformation avpersonifieras och Ert namn kommer ej att publiceras i uppsatsen.

Tips till att hitta i programmet:

ProjectPlace.se

a. Lägg till en ny resurs (resource): Arbetsuppgifter -> Resurser -> Ny resurs (Annan resurs)

b. Skapa en ny uppgift (task): Arbetsuppgifter -> Arbetsplan -> Ikonen som heter "Ny arbetsuppgift" vänster hörn

c. Se resultatet i GANTT-schemat: Arbetsuppgifter -> Arbetsplan -> Välj GANTT-schema som visning

d. Titta på Resurs användning (Resource Usage): Resurser -> Resursplan

Tack för att Ni deltar,

Mvh Lise-Lotte Thuse

[ENGLISH]

Hi [FIRSTNAME] [LASTNAME],

thank you for choosing to participate in this study.

The study starts Wednesday the 13th of April and ends on Wednesday the 20th of April.

To perform Usability Experiment Part II of II, perform the tasks in the given order.

1) Log into www.projectplace.se

Username: XXYX

Password: XXYX

2) Look around in ProjectPlace.se get acquainted with the tool, and then perform the following:

- a. Add a new resource (resource)
- b. Create a new task (task) and add the resource you created
- c. View the result in the GANTT-schedule
- d. View the Resource plan

3) Answer the questions in the Internet survey: [SURVEY_LINK]

You can also participate in the questionnaire by visiting the address and enter username and password:

<http://survey.analyzer.com/>

ProjectID: [PROJECT_ID]

Password: [PASSWORD]

If you do not wish to participate in the Usability Experiment and questionnaire click the following link:

[REFUSE_LINK]

If you have any questions regarding opening the Microsoft project file or anything else please contact me!

Your answers and contact information will be anonymized and your name will not be published in the thesis.

Help for the software:

ProjectPlace.se

- a. Add a resource (resource): Work assignments -> Resources -> New resource (Another resource)
- b. Create a new task (task): Work assignments -> Work Schedule -> The icon called "New work assignment" left corner
- c. View result in GANTT-schedule: Work assignments -> Work Schedule -> Choose GANTT-schedule as view
- d. Look at resource usage (Resource Usage): Resources -> Resource plan

Thank you for participating,

Best regards Lise-Lotte

APPENDIX C: QUESTIONNAIRES

C1: QUESTIONNAIRE FOR PART I

0% 100%

ENKÄTFRÅGOR FÖR DEL 1

Hej,
 tack för att Ni har valt att delta i undersökningen.
 Enkäten tar ungefär 10 min att genomföra.

I enkäten ska Ni gradera 14 st påståenden på en skala ifrån 1 till 5 enligt följande:

- Instämmer helt (5)
- Instämmer delvis (4)
- Instämmer nog inte (3)
- Osäker (2)
- Instämmer absolut inte (1)

Kom ihåg att för att genomföra enkäten behöver Ni ha utfört uppgifterna i Usability Experimentet först.

Skriv ut Paus Hjälp >>

0% 100%

1. Jag anser att...
MS Project underlättar att bedöma storlek på projekt som ska genomföras.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

2. Jag anser att...
MS Project underlättar estimering av tid och resurser vid projektupstart.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

3. Jag anser att...
MS Project underlättar planering av tid och resurser vid projektplanering.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0%
100%

4. Jag anser att...
MS Project underlättar att skapa milstolpar (milestones) vid projektplanering.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

5. Jag anser att...
MS Project underlättar att planera hela mjukvaruprojekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

6. Jag anser att...
MS Project underlättar att hålla kontroll i projekt.

• Instämmer helt (5)	<input type="checkbox"/>
• Instämmer delvis (4)	<input type="checkbox"/>
• Instämmer nog inte (3)	<input type="checkbox"/>
• Osäker (2)	<input type="checkbox"/>
• Instämmer absolut inte (1)	<input type="checkbox"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

7. Jag anser att...
MS Project påminner mig om aktiviteter/uppgifter i projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0% 100%

8. Jag anser att...
MS Project ger en översiktlig lista på projektaktiviteter.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

9. Jag anser att...
MS Project underlättar att få samförstånd mellan deltagare i projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

10. Jag anser att...
MS Project minskar risk för dubbelarbete under projekt genomförande.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

11. Jag anser att...
MS Project hjälper till att avsluta projekt inom projektbudget.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0%
100%

12. Jag anser att...
MS Project hjälper till att avsluta projekt inom tidsramar för projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

13. Jag anser att...
MS Project ökar kvaliteten på projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

14. Välj på en skala av 0-100%:

Inom vårt företag använder ____ % av projektledarna någon form av projekthanteringsmjukvara.

Skriv ut
Paus
Hjälp
>>

C2: QUESTIONNAIRE FOR PART II

0%
100%

ENKÄTFRÅGOR FÖR DEL 2

Hej,
tack för att Ni har valt att delta i undersökningen.
Enkäten tar ungefär 10 min att genomföra.

I enkäten ska Ni gradera 14 st påståenden på en skala ifrån 1 till 5 enligt följande:

- Instämmer helt (5)
- Instämmer delvis (4)
- Instämmer nog inte (3)
- Osäker (2)
- Instämmer absolut inte (1)

Kom ihåg att för att genomföra enkäten behöver Ni ha utfört uppgifterna i Usability Experimentet först som medföljde mailet Ni fick tillsammans med länken till enkäten.

Skriv ut
Paus
Hjälp
>>

0%
100%

1. Jag anser att...
ProjectPlace.se underlättar att bedöma storlek på projekt som ska genomföras.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

2. Jag anser att...
ProjectPlace.se underlättar estimering av tid och resurser vid projektuppsätt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

3. Jag anser att...
ProjectPlace.se underlättar planering av tid och resurser vid projektplanering.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

4. Jag anser att...
ProjectPlace.se underlättar att skapa milstolpar (milestones) vid projektplanering.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

5. Jag anser att...
ProjectPlace.se underlättar att planera hela mjukvaruprojekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

6. Jag anser att...
ProjectPlace.se underlättar att hålla kontroll i projekt.

• Instämmer helt (5)	<input type="checkbox"/>
• Instämmer delvis (4)	<input type="checkbox"/>
• Instämmer nog inte (3)	<input type="checkbox"/>
• Osäker (2)	<input type="checkbox"/>
• Instämmer absolut inte (1)	<input type="checkbox"/>

Skriv ut
Paus
Hjälp
>>

0%
100%

7. Jag anser att...
ProjectPlace.se påminner mig om aktiviteter/uppgifter i projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut
Paus
Hjälp
>>

0% 100%

8. Jag anser att...
ProjectPlace.se ger en översiktlig lista på projektaktiviteter.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

9. Jag anser att...
ProjectPlace.se underlättar att få samförstånd mellan deltagare i projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

10. Jag anser att...
ProjectPlace.se minskar risk för dubbelarbete under projekt genomförande.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

11. Jag anser att...
ProjectPlace.se hjälper till att avsluta projekt inom projektbudget.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

12. Jag anser att...
ProjectPlace.se hjälper till att avsluta projekt inom tidsramar för projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

0% 100%

13. Jag anser att...
ProjectPlace.se ökar kvalitén på projekt.

• Instämmer helt (5)	<input type="radio"/>
• Instämmer delvis (4)	<input type="radio"/>
• Instämmer nog inte (3)	<input type="radio"/>
• Osäker (2)	<input type="radio"/>
• Instämmer absolut inte (1)	<input type="radio"/>

Skriv ut Paus Hjälp >>

APPENDIX D: EMPIRICAL DATA

D1: SURVEY PART I

1: Jag anser att... MS Project underlättar att bedöma storlek på projekt som ska genomföras.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	2
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
2: Jag anser att... MS Project underlättar estimering av tid och resurser vid projektuppstart.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	5
• Instämmer nog inte (3)	1
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
3: Jag anser att... MS Project underlättar planering av tid och resurser vid projektplanering.	Antal
• Instämmer helt (5)	3
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	1
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
4: Jag anser att... MS Project underlättar att skapa milstolpar (milestones) vid projektplanering.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	1
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
5: Jag anser att... MS Project underlättar att planera hela mjukvaruprojekt.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	4
• Instämmer nog inte (3)	1
• Osäker (2)	0
• Instämmer absolut inte (1)	0

Totalt	6
6: Jag anser att... MS Project underlättar att hålla kontroll i projekt.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	0
• Osäker (2)	2
• Instämmer absolut inte (1)	0
Totalt	6
7: Jag anser att... MS Project påminner mig om aktiviteter/uppgifter i projekt.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	0
• Osäker (2)	2
• Instämmer absolut inte (1)	0
Totalt	6
8: Jag anser att... MS Project ger en översiktlig lista på projektaktiviteter.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	6
• Instämmer nog inte (3)	0
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
9: Jag anser att... MS Project underlättar att få samförstånd mellan deltagare i projekt.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	2
• Osäker (2)	1
• Instämmer absolut inte (1)	1
Totalt	6
10: Jag anser att... MS Project minskar risk för dubbelarbete under projekt genomförande.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	2
• Osäker (2)	0
• Instämmer absolut inte (1)	1
Totalt	6

11: Jag anser att... MS Project hjälper till att avsluta projekt inom projektbudget.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	2
• Osäker (2)	2
• Instämmer absolut inte (1)	0
Totalt	6
12: Jag anser att... MS Project hjälper till att avsluta projekt inom tidsramar för projekt.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	3
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
13: Jag anser att... MS Project ökar kvalitén på projekt.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	1
• Osäker (2)	2
• Instämmer absolut inte (1)	0
Totalt	6
14	
Välj på en skala av 0-100%: Inom vårt företag använder ____ % av projektledarna någon form av projekthanteringsmjukvara.	

D2: SURVEY PART II

1: Jag anser att... ProjectPlace.se underlättar att bedöma storlek på projekt som ska genomföras.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	6
• Instämmer nog inte (3)	0
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
2: Jag anser att... ProjectPlace.se underlättar estimering av tid och resurser vid projektuppstart.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	4
• Instämmer nog inte (3)	1
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
3: Jag anser att... ProjectPlace.se underlättar planering av tid och resurser vid projektplanering.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	4
• Instämmer nog inte (3)	0
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
4: Jag anser att... ProjectPlace.se underlättar att skapa milstolpar (milestones) vid projektplanering.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	2
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
5: Jag anser att... ProjectPlace.se underlättar att planera hela mjukvaruprojekt.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	5
• Instämmer nog inte (3)	1
• Osäker (2)	0
• Instämmer absolut inte (1)	0

Totalt	6
6: Jag anser att... ProjectPlace.se underlättar att hålla kontroll i projekt.	Antal
• Instämmer helt (5)	3
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	0
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
7: Jag anser att... ProjectPlace.se påminner mig om aktiviteter/uppgifter i projekt.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	0
• Osäker (2)	3
• Instämmer absolut inte (1)	0
Totalt	6
8: Jag anser att... ProjectPlace.se ger en översiktlig lista på projektaktiviteter.	Antal
• Instämmer helt (5)	3
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	0
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
9: Jag anser att... ProjectPlace.se underlättar att få samförstånd mellan deltagare i projekt.	Antal
• Instämmer helt (5)	2
• Instämmer delvis (4)	2
• Instämmer nog inte (3)	1
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
10: Jag anser att... ProjectPlace.se minskar risk för dubbelarbete under projekt genomförande.	Antal
• Instämmer helt (5)	2
• Instämmer delvis (4)	1
• Instämmer nog inte (3)	3
• Osäker (2)	0
• Instämmer absolut inte (1)	0

11: Jag anser att... ProjectPlace.se hjälper till att avsluta projekt inom projektbudget.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	1
• Instämmer nog inte (3)	4
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6
12: Jag anser att... ProjectPlace.se hjälper till att avsluta projekt inom tidsramar för projekt.	Antal
• Instämmer helt (5)	0
• Instämmer delvis (4)	5
• Instämmer nog inte (3)	1
• Osäker (2)	0
• Instämmer absolut inte (1)	0
Totalt	6
13: Jag anser att... ProjectPlace.se ökar kvalitén på projekt.	Antal
• Instämmer helt (5)	1
• Instämmer delvis (4)	3
• Instämmer nog inte (3)	1
• Osäker (2)	1
• Instämmer absolut inte (1)	0
Totalt	6

REFERENCES

- Albert L., 2007: *Project management, planning and control: Managing engineering, construction and manufacturing projects to PMI, APM and BSI standards*, Elsevier/Butterworth-Heinemann
- Ali B., Anbari F.: Money W., 2008, Impact of organizational and project factors on acceptance and usage of project management software and perceived project success, *Project Management Journal*, 39(2), pp. 5-33
- Cordeiro T., Damalio D., Pereira N., Endo P., Palhares A., Gonçalves G., Sadok D., Kelner J., Melander B., Souza V., Mångs J.-E.: 2010, Open Source Cloud Computing Platforms, *2010 Ninth International Conference on Grid and Cloud Computing*, pp. 366-371
- Dumas J., Loring B.: 2008, *Moderating Usability Tests Principles and Practices for Interacting*, Burlington: Morgan Kaufmann
- Cambridge University. 2011. Cambridge Dictionaries online. [Online] (Updated date not available). Available at: http://dictionary.cambridge.org/dictionary/british/effective_1 [accessed May 14 2011].
- Davis F., Bagozzi R.P., Warshaw P.R.: 1989, User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, *Management Science*, 35(8), pp. 982-1003
- Dumas J., Redish J., 1994, *A Practical Guide to Usability Testing*, Rev. Ed., Portland: Intellect Books
- Enalyzer. 2011. Enalyzer. [Online] (Updated date not available). Available at: <http://www.enalyzer.se/> [accessed May 22 2011].
- Essex D.: 2005, Open-Workbench: Microsoft Project Killer?, *Project Management Institute*, 19(6)
- Jadhav A.S., Sonar R.M.: 2011, Framework for evaluation and selection of the software packages: A hybrid knowledge based system approach, *Journal of Systems and Software*, 84(8), pp. 1394-1407
- Gwebu K.L., Wang J.: 2010, Seeing eye to eye? An exploratory study of free open source software users' perceptions, *Journal of Systems and Software*, 83(11), pp. 2287-2296
- Lawrence K., Lenk P., Quinn R.: 2009, Behavioral complexity in leadership: The psychometric properties of a new instrument to measure behavioral repertoire, *The Leadership Quarterly*, 20(2), pp 87-102

Margea R., Margea C.: 2011, Open Source Approach to Project Management Tools , *Informatica Economica*, 15 (1), pp. 196-206

Martin H.H: 1992, Evaluation methods of standard software with respect to their effectiveness, *International Journal of Production Economics*, 24(3), pp. 249-261

Misra S., Mondal A.: 2011, Identification of a company's suitability for the adoption of cloud computing and modelling its corresponding Return on Investment, *Mathematical and Computer Modeling*, vol. 53, Issues 3-4, pp. 504-521

News.Scotsman.com.2011. Athens counting cost of the Olympics. [Online] (August 3 2005). Available at: <http://news.scotsman.com/athensolympics/Athens-counting-cost-of-the.2648827.jp> [accessed June 5 2011].

Patanakul P., Iewwongcharoen I., Milosevic D.: 2010, An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success, *Journal of General Management* vol. 35 no. 3

Parhizgari A., Gilbert G.: 2004, Measures of organizational effectiveness: private and public sector performance, *Omega*, 32(3), pp. 221-229

Peng J., Zhang X., Lei Z., Zhang B., Zhang W., Li Q.: 2009, Comparison of Several Cloud Computing Platforms, *2009 Second International Symposium on Information Science and Engineering*, pp. 23-27

PMI, 2008, *A Guide to the Project Management Body of Knowledge*, Newtown Square, PA: Project Management Institute

Raymond L., Bergeron F.: 2008, Project management information systems: An empirical study of their impact on project managers and project success, *International Journal of Project Management*, 26(2), pp. 213-220

Rosenthal A., Mork P, Hao Li M.: 2010, Stanford J., Koester D., Reynolds P., Cloud computing: A new business paradigm for biomedical information sharing, *Journal of Biomedical Informatics*, 43 (2), pp. 342-353

Shore B.: 2008, Systematic Biases and Culture in Project Failures, *Project Management Journal*, 39 (4), pp: 5-16

- Shih C-C, Huang S-J: 2010, Exploring the relationship between organizational culture and software process improvement deployment, *Information & Management*, 47 (5-6), pp. 271-281
- Simmhan Y. , van Ingen C., Subramanian G., Li J.: 2010, Bridging the Gap between Desktop and the Cloud for eScience Applications, *2010 IEEE 3rd International Conference on Cloud Computing*, pp. 474-481
- Steers R: 1976, When is an organization effective? A process approach to understanding effectiveness, *Organizational Dynamics*, 5(2), pp 50-63
- SvD Näringsliv. 2011. Varje meter kostar mer än en halv miljon. [Online] (August 25 2010). Available at: http://www.svd.se/naringsliv/varje-meter-kostar-mer-an-en-halv-miljon_5190605.svd [accessed June 5 2011].
- Thorburn M. J, Desai P. and Durkin M.: 1991, A comparison of efficacy of the key informant and community survey methods in the identification of childhood disability in Jamaica, *Annals of Epidemiology*, 1 (3), pp. 255-261
- Tonnquist B.: 2009, *Projektleddning*, 4'th ed., Stockholm: Bonnier Utbildning
- Trafikverket. 2011. The Hallandsås Project. [Online] (March 30 2011). Available at: <http://www.trafikverket.se/Om-Trafikverket/Andra-sprak/English-Engelska/Railway-and-Road/Railway-Construction-Projects/The-Hallandsas-Project/> [accessed June 5 2011].
- Quinn, R. E. and Rohrbaugh, J.: 1983. A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis, *Management Science*, Vol.29, 363-377
- Younge A.J., von Laszewski G., Wang L., Lopez-Alarcon S., Carithers W.: 2010, Efficient Resource Management for Cloud Computing Environments, *International Conference on Green Computing*, pp. 357-364
- Yin R.: 2009, *Case study research: design and methods*, 4'th ed., Sage: Thousand Oaks, CA