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PROJECT MANAGEMENT SOFTWARE AND ITS UTILITIES

Case: JIRA and Microsoft Project

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ABSTRACT

Nowadays, projects are daily initiated in every organization from all corners of the world. From nonprofit projects to multi-million euro projects, without right project management, project failure can be an inevitable result. Therefore, the need for project management software is rapidly increasing, not only in IT-related projects, but also in projects of all other fields. The question is how to utilize project management software in different projects of different purposes to serve the project's progress. In this thesis, the authors focus on answering the mentioned question by researching the theories of project management, together with studying the case of two project management softwares.

This thesis studies the utility of two project management softwares in corresponding cases (JIRA and Microsoft Project 2013). Meanwhile, a list of criteria will be defined, for measuring the software, from available studies.

Deductive research approach is applied to answer the research questions. For data collection, available books and articles were studied to generate the summary for the literature review, while semi-structured interview was used to examine participants' experiences. Then, answers from participants' experiences were compiled and compared to the summarized literature review.

The result displayed how project management softwares were utilized in each case, and how relevant the software was to the generated criteria. These criteria can be considered as guidelines for the selection process of project management software. On the other hand, the result posed its limitations. Thus, the authors recommend more research to be done for the completion of this matter.

Keywords: project, project management, project management software, utility, criteria, JIRA, Microsoft Project 2013

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LIST OF ABBREVIATIONS

IT	Information Technology
UAS	University of Applied Sciences
PMLC	Project Management Life Cycle
PhD	Doctor of Philosophy
NASA	National Aeronautics and Space Administration
US	United States
PERT/CPM	Program Evaluation and Review Technique/Critical Path Method
DoD	Department of Defense
R&D	Research & Development
IPT	Integrated Project Teams
LF	LeapFrog
PSR	Progress Status Report
DB	Database
JQL	JIRA Query Language
SQL	Structured Query Language
CRM	Customer Relationship Management
BIT	Business Information Technology
MP	Microsoft Project
OEM	Original Equipment Manufacturer
MS DOS	Microsoft Disk Operating System
EPM	Enterprise Project Management
PWA	Project Web Application
HP	Hewlett Packard
OLAP	Online Analytical Processing
MSDN	Microsoft Developer Network
ProjOlap	Project OLAP
PDS	Project Data Service
Dll	Dynamic link library
XML	Extensive Markup Language

1   INTRODUCTION

"People have been conducting projects for millennia. The pyramids, the Great Wall of China, and the Roman aqueducts bear witness to the sophistication of some of these projects. For the most part, the method of carrying them out entailed more art than science. It was not until recent times that we began to approach the project management effort systematically and to tip the scales in favor of science over art". (Frame 2002, 1)

In this 21st century, everything is changing and it's changing every day. Technology is improving every day, there are always some new inventions, some new upgrades to the older one. And with these changes, there is a change in the way people work in their daily life, they have new demands. Companies have to do anything they can, to satisfy their customer, because there are many other competitor companies in the market and they would not want to lose their existing customers. The trend has been to try to hold onto the existing customers rather than to look for new customers. The competition has not been to get new customers but not to lose old customers to new companies. Customers' demands are ever changing, so it is not an easy task for companies to cope with the changing demands, it requires planning; planning for the future. This is when companies started to realize how project and project management are important in winning the race against time, while it was seen as an option before, it is now considered to be a must. Companies can no longer rely on learning from their mistakes; there is too much competition in today's market. Once you fall behind, it's difficult to pick up unless you do something totally remarkable, something that other companies have not done.

Schedule slippage, quality flaws and budget overruns are the most familiar symptoms of a project in trouble, and it is very common to have such problems. Improving the success rates of the project have been one of the greatest challenges. Due to project failures, hundreds of billions of dollars are wasted without any real outcome. There is not just one reason for project failure. For example, if a project underestimates the cost required to complete the project, the project cannot be completed with current budget, then bad estimation is cause of

the project failure. But, it cannot be the only reason, or it is too shallow for a sole reason for project failure. There could be many underlying factors, for example, it could be failure in determining the project scope and there could be other underlying factors contributing for the project failure. Decisions are the stepping-stones of progress in a project and the outcome of project is directly proportional to the decisions made. Unfortunately, too many dysfunctional or ineffective decisions making is way too common in addition to issues as political forces, organizational cultural factors and other dynamics negatively influence the way project decisions are made.

"Traditional project management has enabled humans to do some incredible things. The problem is that traditional project management is broken." (Frame 2002, 5) Traditional system had a single-minded focus on a fixed set of tools for dealing with scheduling, budgeting and resource allocation. Moreover, "it limits the project life cycle to a narrow range, from launching a project to closing it out." (Frame 2002, 7) For customer satisfaction, the life cycle should be extended to one more level (Robson 2002); project team should be responsible for the satisfaction of the product even after the delivery of the product. The aim of the new project management system is not to neglect the norms of the traditional project management system, rather, it enhances the traditional approach by bringing it into the line with the new business realities.

The approach towards the customer is changing, and so is the way of working. The traditional tools can still be used to run the project, but for the success of the project, the new more improved approaches should be taken and the most successful companies are taking the most of the ever-growing technology and expertise to manage their project; the technology that helps to plan, organize and manage resources, and develop resources estimates. Scheduling, cost control and budget management, resource allocation, collaboration software, communication, decision-making, quality management and documentation, all are included in the project management software depending upon the software.

This study discusses the importance of new project management practices and also describes the importance of project management software in the project success relating to project manager, project team and the project itself. This study

also contains how particular software is utilized by a particular company and if it is beneficial compared to the standards studied in this paper.

1.Introduction

2.Research Approach

3.Literature review
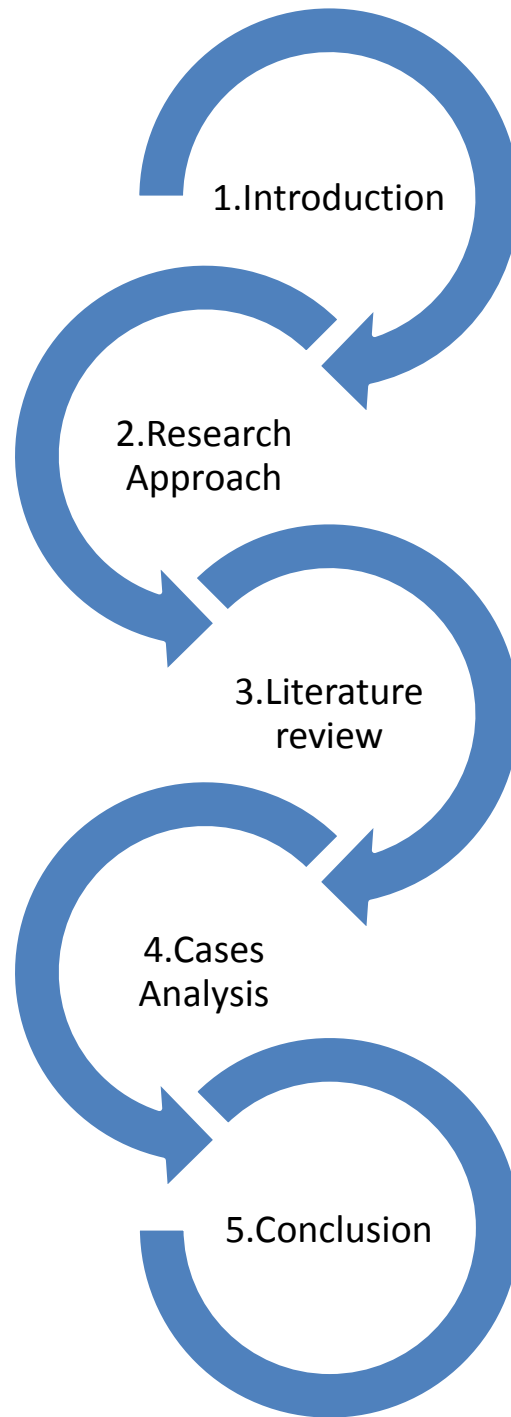
4.Cases Analysis

5.Conclusion

Figure 1: Thesis Structure

2   RESEARCH APPROACH

The following section describes the research problem at hand, as well as the framework of this research. Additionally, methodology used in the research will be explained together with the chosen strategy to address the research's problem. Data collecting and analyzing process will also be clarified to strengthen the reliability and validity of the research, which will be presented at the end of this section.

2.1   Research Problem

The objective of this study is to research the utility of the project management software, how particular project management software is used in a company. The objective of the thesis is to determine the function of project management software. The thesis is created to support the adoption of project management software and the authors try to standardize the requirements of the project management software. To support the research and objectives, the following research questions were identified:

1.   What are the requirements of a project management software?
2.   Do the selected softwares fulfill the requirements?

2.2   Research Framework

The research framework of this study comprises the concepts of project management and management software, concentrated on the literature review part of the thesis. Books and articles were used as materials to generate the literature review. It determines the importance of project management and more importantly, sets the foundation to develop the criteria for a good project management software. Chosen softwares, which are used in two selected cases, were studied; combining with conducting interviews among users of the softwares to produce needed data for the research in later stage.

The actual research starts when the data is collected from the cases. The next step is to analyze, evaluate, as well as categorize the collected data. Finally, the

observations from the literature review part and the study cases will be compiled and compared, which will eventually be the outcome of this research, as well as the answers to the research questions.
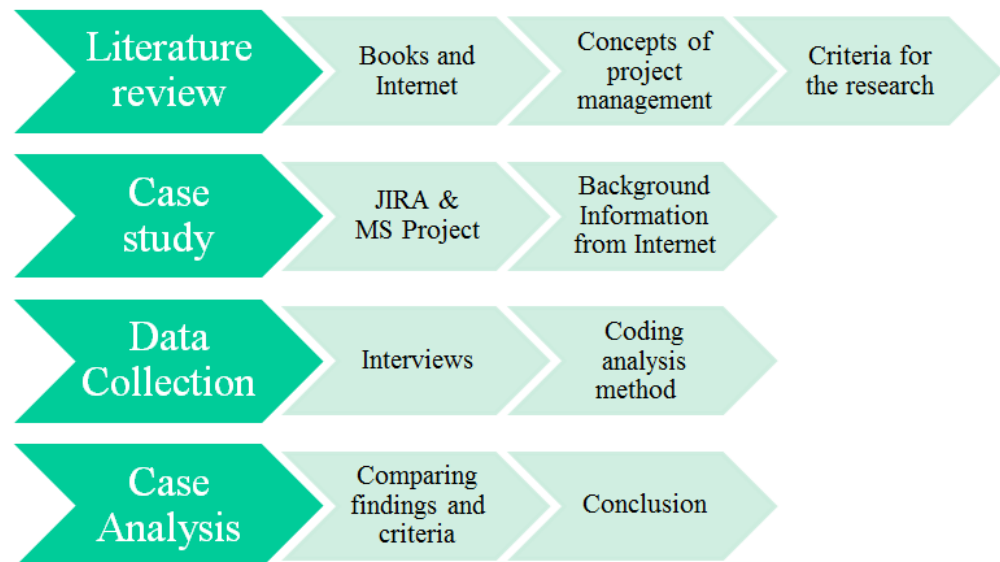
Figure 2: Framework of the research

2.3   Research Method

There are mainly two research methods; deductive approach starts with theories, narrowing them down to hypothesis and then testing the hypothesis, thus, also termed as top-down approach. Inductive, on the other hand, creates new theories or concepts on the basis of specific generalization of facts.

This study is based on the deductive research; the research is done from already defined theories and concepts of project management. The study seeks to find criteria for as good project management software; and the utilities of the chosen softwares which are used in an IT based company, and by BIT students of Lahti University of Applied Sciences. Basically, literature review is considered to provide the requirements for this research.

This research is based on the qualitative research method. Qualitative research provides in-depth study of a particular subject which, in this case is about project management software. Since, the authors are only collecting data from two

particular cases, so the result are supposed to satisfy only for the specified context. The research is mainly based on observation and analysis from the employees and fellow students' comments.

2.4 Research Strategy

Case study was defined by (Robson 2002, 178) as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence". The main goal of case study is to explore a decision or a set of decisions, why they were taken, how the implementation was, and what the result was (Silverman 2000, Yin 2003). Therefore, the authors carefully adopt case study as the main research strategy in this writing.

2.5 Data Collection

In order to address the research problem, the authors chose the combination of semi-structured interviews and open-ended question to examine the participants' experiences with the software throughout the time. These interviews serve as the way for the authors to get to know the softwares in use, as well as their influence.

The criteria extracted from the literature review concerning the factors that determine a good project management software are the foundation for the writers to create the semi-structured interview. Open- ended questions were included in the interview to encourage the participants to freely define and describe the situation they experience, as well as to express and reveal their feeling (Silverman 2000, Yin 2003). A company was contacted by the authors for their acceptance and support involving the research. Meanwhile, students of the mentioned program were also contacted via email and messenger to give their opinion on the softwares.

2.6   Data Analysis

The collected data was analyzed by coding analysis method. The pointers to actual data were formed by the criteria already generated based on the literature review, as part of the coding process. The process initiates with descriptive coding, in which phrases, words, and sentences gathered from the interview transcripts are labeled using relevant words or phrases (Miles, Huberman 1994).

The interviews were conducted. The important and significant contents were marked from the text. Then those highlighted findings were categorized and compiled to compare with the criteria, to determine whether those criteria were fulfilled or not. From those comparisons, the conclusion to the cases studies was drawn out.

2.7   Reliability and Validity

"Reliability can be thought of as consistency" (Research Rundowns - Intruments, Validity, Reliability 2009). It is the extent to which the research findings stay consistently over time. It also means that data collection techniques or analysis will generate the same results in various trials. Meanwhile, validity is the level to which the accuracy of the research's instruments designed to reach; or how they measure what they are supposed to measure and perform as they are directed to perform likewise (Research Rundowns - Intruments, Validity, Reliability 2009, Yin 2003, Saunders, Lewis, Thornhill 2009, 257). The reliability and validity of this research stand at:

- The chosen softwares are implemented and used regularly in both cases.
- The interviewees were carefully selected by the experience they have already had with the softwares. Additionally, they have taken in projects of different sizes, using the softwares. Thus, they would be able provide the needed information with their insights for conducting the research.
- The interview questions were formed based on the determined criteria from the literature review.

3   LITERATURE REVIEW

This chapter presents background information on project management and project management software, as well as their history. Moreover, this section serves as the basis for the research, and provides the criteria to evaluate the studied cases in later stages.

3.1   Theories and Basics of the Project and Project Management

"A sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification" (Wysocki 2003, 3) is said to be a project. It often gets misinterpreted with the term operation, an operation is also a sequence of activities to achieve a goal or purpose but operation is referred to the work done repeatedly while project is often a one- time task. As mentioned by Wysocki (2003), a project has specific definition with specific task to complete within a limited amount of time. There could be various reasons for a company to initiate a project, it may be due to market change, technological breakthrough, organizational need or even some legal obligations. For example, a local bank may want to initiate a project if they would want to establish a new branch according to the customer or market demand. Then, the project for this company could be to establish a branch in Pohjois Haaga, Helsinki by May 2015 for certain amount of costs value. All project must be managed so that it is controlled throughout the process of its completion and to keep it under control, five independent constraints have to be in balance which are - "scope, quality, cost, time and resources" (Wysocki 2003, 7). A change in one of these would result in the change of the others, thus, for a project to be successful; a project manager must keep in mind that these five constraints must be in balance throughout the lifetime of the project. In addition, project manager must be prepared for any change so that there is no negative impact on the project completion.
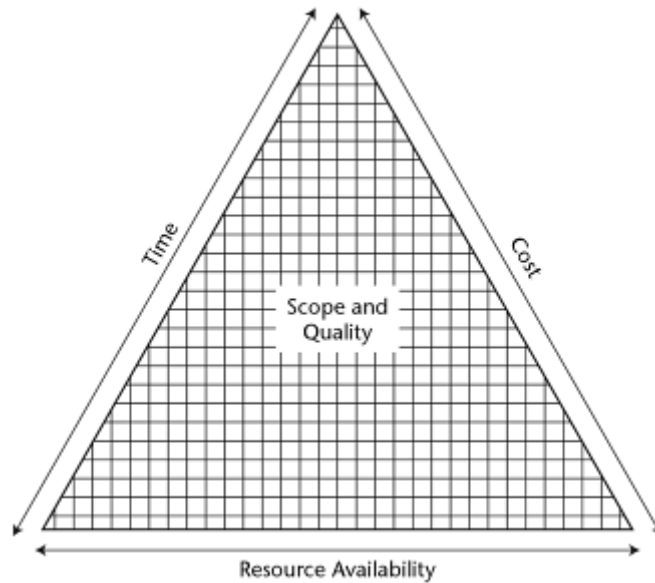
Figure 3: Scope Triangle

The figure above tells us the dependencies of the five constraints and how they affect each other. The arrows indicate change in all direction when there is a change in one constraint. Project plan describes the balance in these constraints before the beginning of the project but the change is bound to arrive once the project starts. The project manager controls resource utilization and work schedules. Management controls cost and resource level. The client controls scope, quality and delivery dates. Scope, quality, and delivery dates suggest a hierarchy for the project manager as solutions to accommodate the changes are sought. (Wysocki 2011)

Project Management is defined as "The application of knowledge, skills, tools and techniques to project activities to meet the project requirements" (Project Management Institute 2014). Project Management is an approach to get the desired result with current resources and efficient involvement of the client. The project manager is responsible for meeting those requirements. According to Wysocki (2011), project management is not a "one size fits all" approach but it is a "common sense approach" which means it must be able to adapt to the changing conditions of the project conditions. Every project management process has to go through a certain process which is often named as Project Management Life Cycle

(PMLC). It starts with scoping process before planning, launching and controlling process consecutively before finally the project is closed. All of the processes in PMLC must be covered at least once, and could be repeated many times before the project is closed depending upon different approaches.
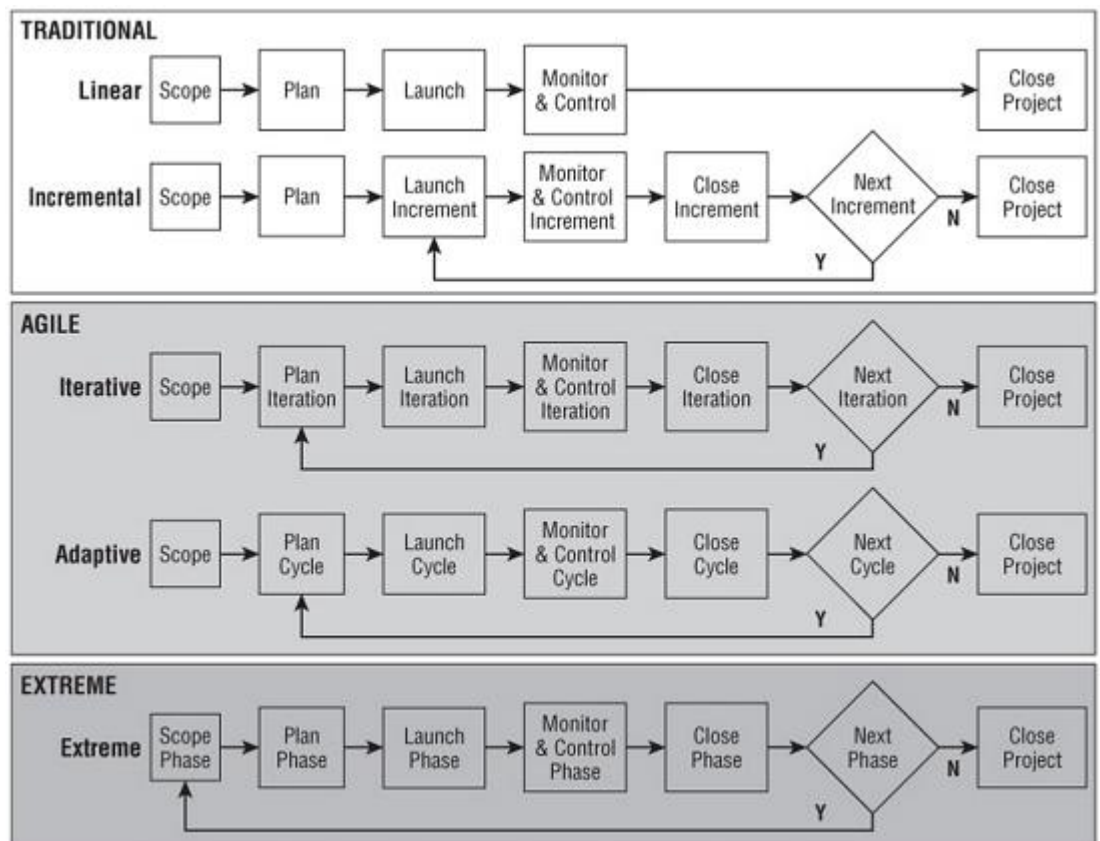
Figure 4: PMLC Model

The figure above describes different kind of PMLC models, from the older traditional approaches to the extreme of the approaches. From the figure, it can be seen that traditional approach have a well-defined project requirements whereas agile has loop of processes until the desired result is obtained. In agile approach, the project requirements are well defined but the actual process to produce those requirements is not that obvious. Extreme approaches in the other hands don't have clearly defined goals, thus making the whole life cycle much unstructured. Something new is always known in each phase of the extreme approach, finally

providing the output that is sensible to the business or is called as successful. Extreme PMLC are very risky in a way that the result obtained may not deliver acceptable business values.

There are many tools, techniques, and knowledge areas related specifically to the project management and the project team must get familiarized with it. They have to be familiar with project life cycle phases, project management processes, knowledge areas related to the project management and standards, practices or regulations related to the project management. In addition, they should be able to identify the environment they are working in, which may relate to the cultural, social, international or political issues. For example, a team working in foreign country must get used to the working ways of that particular country and must also be aware of the laws and regulations regarding the working areas, working schedules, employee rights. In addition project management team need to have general knowledge and skills related to the management itself in general and also the skills to interact within the team, motivate each other and work in a cooperative way to achieve a common goal which is the success of the project. In short, The Project Management Institute has also stated that, "effective project management requires that the project management team understand and use knowledge and skills from at least five areas of expertise:

• The project Management Body of Knowledge

• Application area knowledge, standards, and regulations

• Understanding the project environment

• General management knowledge and skills

• Interpersonal skills"

(Institute 2004, 12)

3.2   History of Project Management

Project Management has been practiced ever since, thousands of years ago since the Egyptian era, although, it has been just few decades back since the organizations have started to use this idea of project management in a systematic

way. In the past, the principles of project management have been used by the large engineering and construction companies to manage large budget, schedule driven projects. Organizations like NASA and Department of Defense started using those principles since the 1960s. While it was only in 1980 when the manufacturing and software development sectors started to adopt and implement the project management practices. By the 1990s, the project management theories, tools and techniques were widely received by different industries and organizations. (Carayannis, Elias, Young-Hoon, Anbari, Frank 2005, 1) Knowingly or unknowingly, people have been using the concept of project management since the early days but the people who have been keeping records about their project work, success and failures regarding their project, shared their results which have set the bases for the project management. The ideas regarding project management has been ever evolving but still it can be divided into 3 different time periods.

3.2.1   1945 – 1960

During the 1940s, line managers functioned as project managers and used the concept of over-the fence management to manage projects. Each line manager, wearing the hat of a project manager, would perform the work necessitated by his or her line organization and, when that was completed would throw the "ball" over the fence in hope that someone would catch it. (Kerzner, Project Management: A Systems Approach to Planning, Scheduling, and Controlling 2006) This clearly describes the situation of that time where line manager were just responsible for their own particular task and were more than eager to set the responsibility to others. "Line manager would wash their hands of any responsibility for the project because the ball was no longer in their yard" (Kerzner, Project Management: A Systems Approach to Planning, Scheduling, and Controlling 2006). So, the project was actually set free for other to grab so that if in case the project fails they can put blame to the one who had the project at that instance. This was relatively manageable for smaller projects but when it came to larger projects, the complexity in knowing which line manager had the hold of the ball was already a time consuming task. So, bigger units like Department of Defense appointed a single project manager capable of handling complex technical issues in the projects like B52 bomber, the Minuteman

Intercontinental Ballistic Missile, and the Polaris submarine. The use of project management was later mandated by National Aeronautics and Space Administration (NASA) for all activities related to the space programs. Project management by the end of 1950s was vastly use in the field of space and defense, and was slowly taking the pace in other areas as well. The government of US practiced the project management in keeping the records of their transaction of money, planning and controlling the way the money was being spent. In this period though, private companies were not so impressed by the project management practices as they saw no practical value in it and there were many misconceptions regarding project management. According to Harold R. Kerzner (2006) in his book some of them were

- Project management is a scheduling tool such as PERT /CPM scheduling.
- Project management applies to large projects only.
- Project management is designed for government projects only.
- Project managers must be engineers and preferably with advanced degrees.
- Project managers need a "command of technology" to be successful.
- Project success is measured in technical terms only.

This period saw the end of World War II and later the start of the Cold War, so most of the project management was used in the process of manufacturing of weapons in large amounts and in shorter period of time. The process had to be planned and executed successfully. This became the base for the project management with a project manager leading the project rather than number of line managers throwing the ball in other's court.

3.2.2   1960 - 1985

During the early 1960s, project management continued to grow but at very slow rate, mainly due to lack of acceptance because there was more unknown than known. The consequences were not proved; there was fear for both managers and executives. Although, aerospace and defense were practicing already the best project management approach, many companies were still using informal project management practices where there was no single project manager, functional managers were termed as project managers but their task was more of a project monitor or a leader.

By the late 1960s, companies started to feel the need of change, using formalized project management process as the size and complexity of their activities started to increase and informal process was no more manageable. The rate was slow, not all industries felt the need of change and rightly so, as companies with simple tasks had no advantage of practicing the new practices over the traditional ones. The advantages of project management were not completely recognizable. There were issues with control over the projects as the middle managers occupied the power positions over the upper level managers.

Project management started to became a necessity to most of the companies due to advancement in technology field, more money was used in Research and Development field, there was more information available and project life cycles were shortened. "By 1970, the environment began to change rapidly. Companies in aerospace, defense and construction pioneered the implementation of project management, and other industries soon followed, some with great reluctance of project management, and other industries soon followed, some with great reluctance. NASA and DoD "forced" subcontractors into accepting project management." (Kerzner, Project Management: A Systems Approach to Planning, Scheduling, and Controlling 2013) The change was imminent, middle managers started to recognize that the traditional informal approach no longer could handle the rapidly growing need of the organization and they had to convince the upper level managers to adapt to the new practices.

The main breakthrough in this period was the appointment of project manager. As the project management practices started to handle R&D unit, there was need to assign a person with certain responsibility. There were too many decisions to be taken and it would take a lot of time if had to be processed and resolved at the top of organization through regular line hierarchy. Thus, project manager were provided with power to plan and control the whole project and take the total project accountability. Without it, project management executives had to handle multiple task of working both as an executive and a project manager. With project management, executives adapted easily to the changing environment, they had better understanding of the customer problems, responsibilities were clearer, decision making process was disciplined.

Project management started to evolve; best practices were learned from the success and failures of the practices. Private industries started to learn from their

successes while the government learnt from their failures. The best practices that came out of the government were

- Use of life-cycle phases
- Standardization and consistency
- Use of templates
- Providing military personnel in project management positions with extended tours of duty at the same location
- Use of integrated project teams (IPTs)
- Control of contractor-generated scope changes
- Use of earned value measurement

(Kerzner, Project Management: A Systems Approach to Planning, Scheduling, and Controlling 2013)

To conclude the second period of the project management evolution, there was still disbelief about the advantages of the project management in early times. The executives were not willing to accept the new techniques and practices of the project management. The change in technology, finally, forced the companies to practice the formal project management approach as there was huge evolution in industries making it difficult to control the process with informal approach. At the end of this period private as well as government publicized their best practice which holds the base for the modern project management practices for later era.

3.2.3   1985 – 2014

By the 1990s, companies realized that project management was not a necessity anymore, it was a must. Now, virtually every companies and industry utilizes the best practices of project management. The gradual increase in use of project management could be seen in different eras, but at this time, it is not about adapting the new project management but it is more about the speed at which it can be done, and the speed at which the company adopts and implements the best practices of the project management.

The decision of project management is taken by executives but the recognition of it is made by the lower and middle level managers who are actually working on the project. Harold R. Kerzner (2013) has stated six driving forces leading to the need for project management as "Capital projects, Customer expectations,

Competitiveness, Executive understanding, new project development, Efficiency and effectiveness". Capital projects are examples of manufacturing companies where the project is huge or there are simultaneous project going on, which makes executives realize how cash and workers should be handled. Customer expectation could be the driving force in the companies where they sell their projects or services. In this case, the solution provided to the customer is never complete so there need to exist a superior project management practice because they are not selling the products but actually selling project management expertise. Competitiveness could be a driven factor when companies get into trouble in market related to cost or quality of their products, or even internally when people realize that outsourcing is more beneficial in time and cost for the company. Project management system could be a necessity to the organization where R&D activities are their main projects. Efficiency and Effectiveness could exist with any other driving forces in parallel. It is more important for smaller companies to be competitive in market during high periods and also to assist in determining capacity constraints.
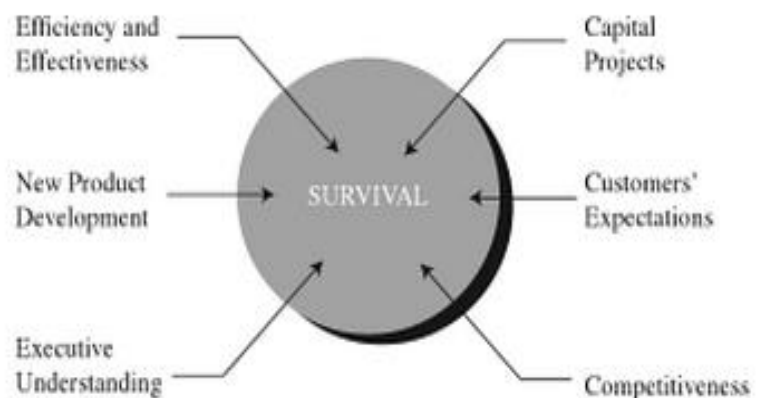
Figure 1-1. The components of survival. Source: Reprinted from H. Kerzner, In Search of Excellence in Project Management, Hoboken, NJ: Wiley, 1998, p. 51.

Figure 5: The components of survival

The above figure shows how the driven forces are inter-related for the survival of the organization.

By the 1990s, companies already noticed the differences, which project management could make into their organization, there was no question regarding the advantages of project management but the question remained about how to achieve those benefits. The cost required for implementing project management was an additional expense to the company and this cost would be cut off by the profits of the organization with proper training and education.

During the early 20th century, companies utilized the best practices of project management; there was more understanding and acceptance among all levels of senior managers rather than the executives themselves. Some companies made fact-based decisions rather than hopeful decisions with the help of project management tools. There was a certain roadmap for a project to follow from start to finish in a systematic way. With the help of project management, the goals and aim of the project were set empowering the team members to make them happen.

The table below shows the brief history of best practices of project management:

Table 1: History of Project Management

	1945-1960	1960-1985	1985-
Customer focus	Minimum Profit driven policies	Profit driven policies	Customer focused policy more advantaged over profit driven
Standardization of Practices	Over-the-fence management	Wider use and implementation of project management due to market change	Project management became a must Standards were formed officially
Market	War and postwar economies	Economic Development of International Market	New markets with change in politics Computer and e-driven markets

3.3   Project Management Software

Although project management has been practiced for a long time now, it was not long ago when project management software was used for the first time. Early days of project management software was limited to the use in big mainframe computers and was used only in large projects. They had their own limitation in their capabilities and were also difficult to use. It could do the basic fundamentals of project management like planning, monitoring, controlling the project but as time and technology changed, the software got better. The larger and more complex the project, the greater will be the accrued benefits (Kimmons, Loweree 1989). These computer aided project management tools are capable of processing

the large amount of information; they are capable of adjusting quickly to the changing project plans even at the execution phase. They are programmed so that they are capable of generating status reports for various levels of management and also providing possible alternative scenarios. As Kimmons quotes "You should not be a slave to the system!" There are much available project management software but the chosen one should work for you to facilitate your work and you, as a project manager, should have a clear understanding about it and also have a clear understanding about the project requirements, project team and senior requirements.

"A 2006 survey of 753 project and program managers was conducted to rate several project management tools. Respondents were asked to rate tools on a scale of 1-5(low to high) based on the extent of their use and the potential of the tools to help improve project success. "Super tools" were defined as those that had high use and high potential for improving project success. These super tools included software for task scheduling (such as project management software), scope statements, requirements analyses, and lessons- learned reports." (Schwalbe 2013, 12)

3.4   Company Needs

Each project in a company is different from others and the application of project management differs with different projects, so every company develops its own policies and procedures for project execution. Kimmons in his book, states that the project management is most frequently used by one or two groups; first group are those performing the work and the second those overseeing the work (operator). Although, these two groups may have different reasons to use the software, it is essential that they get the maximum out of the computer aided project management to achieve maximum out of the project. Both the groups have common needs from a project management software, although, the output may be different for different groups.

The first important aspect in completion for a project is its schedule. Scheduling programs calculate the amount of time a project will take to complete, provided with the activities to be performed, length of each activity and the relationships

between the activities. This is more beneficial when the projects are larger, as there may be lots of changes during the project, and with the help of these programs, it becomes easier to see the overall change in project once a parameter is changed. Besides its basic benefits, scheduling can also help to check the alternative methods, numerous activities can be tried and the most advantageous can be selected. Some scheduling programs also offer resource management, which enables to evaluate resource requirements as well as to determine the changes brought by hiring additional labor or acquiring additional equipment or resources. On the other hand, project manager are able to analyze his estimation of the project with the real progress of the project team and any uncertainty in the project could be solved without any delays. In case of delays, he can check at the consequences and study recovery plans or any alternatives if possible.

Then, there are database programs. Database programs enable everybody involved in the project to keep the historical record regarding the time, cost and resources of the project and also analyze the future estimation for similar projects. "Storing the data in easily retrievable form increases the organization's ability to produce a rapid and accurate estimate (Kimmons, Loweree 1989). Accounting records through the conventional way could be time consuming and prone to mistakes; the database programs enables to retrieve data quickly and project manager could track the records related to the invoiced bills and paid costs.

Cost-estimation is another beneficial tool for project. Computer-aided cost estimation is more accurate than manual, if correct data is inputted. In addition, a handout can always be generated, just to analyze how the estimation was planned.

Once the project begins, these computerized tools can manage and track the progress of the project. This information can be passed to various members of the team from the manager to the project team member and any change in the process can easily be determined by the people working with the project, so that proper action could be taken immediately. The manager can track the work packages under the budget or are over estimated and thus bringing in suitable changes and completing the job with profit.

With the aid of software, the summary of the project could be extracted as a handout with ease and in very little time and also in neat and concise format. If the

computer tools are used and with the latest printing facilities, summary reports are easy to develop and those reports could be in different formats whether it be graphs and charts or visual presentations.

3.5   Requirements of a Project Management Software

In conclusion, after studying the materials related to project management and project management software, the authors present the summary of requirements for a project management software in this section. These requirements also act as the criteria for this thesis, and set up the basis for evaluation of the chosen softwares in the next stage.

 Kimmons has discussed and analyzed the capability of computer aided project management to fulfill the needs of project management from the view point of project manager, the project itself, the project team and the senior management.

Project manager manages different projects in different style. In some cases, the details of project are highly covered in the system database and are readily accessible all times; the system is expected to process a large amount of data in short time. While, there could be cases where the project details are entered into the system but the project manager does not access it until it is required, providing more freedom for project team to work on their plans. The third style provided by Kimmons explain about the low details into the system database and also low accessing the data, allowing the project team to work on their own without needing them to provide details to the system. And the last style involves highly responsive program capable of providing summary of the project without much details of the project. These are just generalized style and it is in the hand of the project manager and the team to choose whatever style is comfortable to them.

Furthermore, the issues of schedule, cost, physical parameters and visibility must be taken into consideration. The software need to have strong planning and monitoring capabilities if there is lack of input at a planning phase and also if the project is working on a tight budget. Projects are looked differently by different people at various positions. The owner might want to have an overall look of project without getting onto every detail, and also looking at various projects. While the engineer of the project is more concerned with the designing phase of the project and want to have a detail look and build the project. There may be general issues like compatibility with the current system, ability to track different

projects and sub tasks, and also ability to forecast the required labor and resources may stand out for specific projects.

The software is just a medium for project success; it is in the combination of people in a project that decides for the project result. A project team having highly experienced members does not depend much on the software, while if the team members have low project management experience, they need to have program that could provide them details regarding project plan and also are able to track the details. The computer aided project management should act as interface between team members, as there need to be constant interactions between members. The system needs to plan and track the milestones agreed by team members in order that the project proceed as planned. On the other hand, senior management needs the system to provide them with summary information including key schedule deadlines, cost forecasts and corrective action scenarios or records or corrective action taken.

4   CASE ANALYSIS

This section presents two cases in which the research was conducted. It provides more information on the project softwares, which were respectively used in the cases' context, as well as findings from each case.

4.1   Case JIRA

JIRA is the first software which was chosen by the authors to be studied in this thesis. In this part of the chapter, the writers go through the software's features, as well as the experience of its users within the studied company – LeapFrog.

4.1.1   Company Description

The case company, LeapFrog Technologies, was founded in 2010. It is a new but growing software developing company in the market. The main service LF (Leapfrog) started with was on providing mobile technology in the developing countries, but now this company takes many projects from all around the globe.

Leapfrog is an evolving story, it started with 8 members in the beginning of 2012 and now, there are 92 employees serving for this company. Every year they have been able to persuade young talent to join their tent and become part of the LeapFrog's story, and share in their vision of making software relevant to the masses. (LeapFrog technology- About 2014)

The working style of this company is very simple. First they will know about the client company and their users. They'll start wire-framing some basic interface designs to make sure they're on the same page. Then they'll give an estimate and get started building, soliciting feedback week by week to make sure they're painting the picture that's in the client's head. Once the client is happy and the company is done building the app, Leapfroggers will try to break it. They'll do security testing, final acceptance testing, and performance tuning to make sure there are only pleasant surprises for users come launch day. Finally they'll take the product to the cloud; deploy it on a super-scalable architecture with all the fancy server monitoring, support teams, and product analytics in place to make sure the app never goes down. (Leapfrog Technology - Services 2014)

4.1.2   Case JIRA in Use

JIRA is an issue tracking product owned by Atlassian. It provides project management functions with bug tracking and issue tracking supporting functions. The first of it was developed back in 2002 and in recent time, companies from more than 122 countries uses JIRA as a project management tool. With its very easy usability features, many customers use it to capture and organize issues, assign and follow team activity. JIRA also supports bug tracking functionality, with its simple importer, it imports issues into JIRA and tracks and destroys the bugs.

JIRA comes with different packages with different prices. It characterizes its packages mainly in three categories; for projects (issue tracking), for development (issue tracking and agile project management), for service desk (issue tracking and service requests). They all have different features depending upon the needs and requirements of the project and the client companies. In addition, it also provides cloud hosting service.

Interviewees in this case were a senior programmer and a designer. They both started to work in this company since summer 2013. They started as trainee in this company, after successfully completing the selection process. After few months of work, they chose to be in programming and design department respectively

4.1.3   JIRA – Characteristic

This part describes the characteristics of the software JIRA and the way they have been utilized in a company. The main source of the provided information has been through the interviews; online documents are studied to provide deeper information about the characteristics. Among many utilities provided by the software, few of them are discussed in the following sub-chapters in accordance with the interviews.

4.1.3.1   Project Planning

JIRA supports agile project planning. In a company like Leapfrog, the people and teams working on the project change with time and ideas; i.e. new deadlines pop up every time. JIRA is flexible software so that it helps manage deliverables, keep productivity high, manage the backlogs and plan sprints making it easy to

visualize the project workflow. Project manager is responsible for planning the project which are handed to different departments. The flexibility of JIRA supports the manager by synchronizing the works from different departments in a single project file.

4.1.3.2   Multi-user Interface

Almost all the project managing software these days provide multiple user interface. JIRA is designed such that the issues must be assigned to a single individual to prevent it from getting over looked. In the other hand, it is also possible to create a group as a single user where the group will include multiple users. JIRA has a dashboard where unassigned issues can be posted to all the members and the interested member can take the task. In the case company, there are different sections of expertise People having similar knowledge base work together so JIRA provides the option of assigning all the issues related to the certain subject to certain group of people. Moreover, JIRA can be accessed from anywhere with a smooth internet service with some exception.

"We have a chat system named Hip-chat in which we have different rooms for separate projects and we communicate through in that room. We can even communicate one to one and also with other project rooms. We can also tag people in the room and also there is sms notification provided by hipchat itself." (Interviewee, LeapFrog 2014)

" Yes, we can login to our system except for some API which are white listed to the office IP address only for which we use VPN to connect to the office network." (Interviewee, LeapFrog 2014)

4.1.3.3   Scheduling

JIRA has a very detailed scheduling feature, which is to say that it allows to define the time as detailed as possible counting from seconds to months. It can be managed so that the tasks needed to be done each day or each week or even each month can be defined; thus making people aware of the time spent on a project. Different tests are needed to be carried out at the end of the certain period of time,

which are planned in the beginning in the project planning phase and with the scheduling feature, it is possible just to mark the time in some certain interval of time; for example: each 2 weeks or each week or once in two days. With an extra scheduler plug-in, it is even possible to view the information in the customized way; as there are many columns of information in the plan, it is possible just to hide some of the columns of information and just view the needed column if needed. The interview supports the fact that JIRA is capable of supporting wide range of schedule. Projects in the company can last as short as a month while their current project is scheduled to be completed in three years' time.

"Small project takes up to 1 month and Large projects with currently running with more than a 3 year." (Interviewee, LeapFrog 2014)

4.1.3.4   Tracking

Tracking is as important a feature as the scheduling. Tracking can be a part of scheduling as tracking a project makes it possible to finish a project as scheduled. With many people working on different many projects in an entire organizations, deadlines pop up every now and then. Flexible project management software lets you manage deliverables, keep productivity high, and highlight blockers as they arise. In the case company, project manager is responsible for sending an automated Project Status Report (PSR) daily, just to let know the project members of that particular project about the progress of the project. As already mentioned in the scheduling section about the wide range of projects being conducted in the company, these daily reports comes real handy.

"We have an automated Daily PSR (Project Status Report) sent by Project Manager which give us the overview of the task being handled by project members." (Interviewee, LeapFrog 2014)

4.1.3.5   Backup and Document Management

In general, project management software is neither required to have the features of a document management system nor a backup system. In this case, an add-on named Documents let managing and storing documents or files in the project

level. In addition, the features allows to link documents to the JIRA issues, send email notifications about the attached files, set permissions related to the viewing or editing of the file, create sub-folders, create files in hierarchical order, searching documents option. Whereas, the backup of the project depends upon the requirement of the project and more importantly, the client.

"In our project, our client handles themselves regarding DB Backup since they have good knowledge base of it." (Interviewee, LeapFrog 2014)

4.1.3.6   Resource Allocation

For a company like Leapfrog, the resources mainly are the computers, the software they use and the employee themselves. They can easily allocate the tasks to different people; assign the permissions about the issues they are working on, the files they have shared. As for Leapfrog, they use Hip-chat as the main resource through which they tag people and assign them tasks.

4.1.3.7   Search Tools

JIRA provides simple, advanced and quick search options. There are large numbers of processes going on in a project, there are many times that you want to look for a particular issue and work on it. Simple search provides option to include some query which may include the title, date of issue, or other custom fields to navigate and track the issue. In other hand, advanced tool help you do some JQL query, very like SQL queries to look for the desired result; whereas the quick search tools provides information with minimal typing and/or jump to the issues.

4.1.3.8   Customer Management

Each product is considered as an each project in the software companies as in the case company itself. For cases like this, where the sale of each product is a project that needs to be established, tracked and closed, customer management becomes a valuable addition over the standard capabilities. Although, JIRA does not directly support the customer managing tools, there are ways to add custom field where the information related to the customers could be integrated with the project. By doing so, customers are able to take part in the development process and also provide with an idea or a help to the developers. In the case company,

customers often contact the developers when the situation requires. Although, let's not get confused this with Customer Relationship Management (CRM), JIRA has yet to develop itself as a CRM tool.

4.1.3.9 Versioning

Versions are different points created in the project to help in scheduling and organizing different releases. For any company developing software, it is very much important to have different versions of the software, as at different points there are different changes coming in the software. And, with the aid of versioning functionalities, it is easier to create road map report(view on upcoming versions) and change log report(review of the released versions).In JIRA, the versions can be added, released, rescheduled(dates),edit, delete, archive or merge with other versions. The programmers in the company marks the version of the project after each successful phase in the development of a software. It helps for the programmers if there is any time when change is needed in the developing phase.
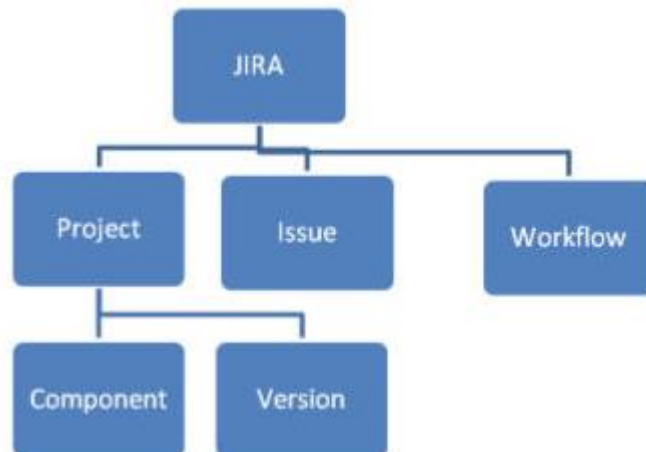

Figure 6: JIRA Characteristics

4.1.4 Learning JIRA

JIRA comes with free tutorial videos and step by step walk-through. In the case company, employees had a brief workshop about JIRA for few weeks and

confluence and with the daily use and practice; they were able to learn themselves in general. Tutorial documents were provided at the beginning of the But, as the real work started, they started to learn the use of JIRA through practice and guidance of the senior employees. The basics of JIRA were lectured in those workshops, while they go further information regarding different forms of reports in JIRA. Many of the projects in Leapfrog are worked in agile method so the focus was on creating and configuring JIRA Agile boards. Each of the employees is provided with their personal login credential and each time they will need it to get into the system. So, each time they login into the JIRA, it records the working time. So, when they are working from the home or anywhere else than the office, the time could be synchronized to calculate the total amount of time spent on a project.

 "Initially, we had a brief workshop on JIRA and Confluence. Later, learnt by daily use. We use github for our codebase." (Interviewee, LeapFrog 2014)

"Few weeks for the brief usability. For specific project, there were changes after certain time and will have to adjust to the changes."(Interviewee, LeapFrog 2014)
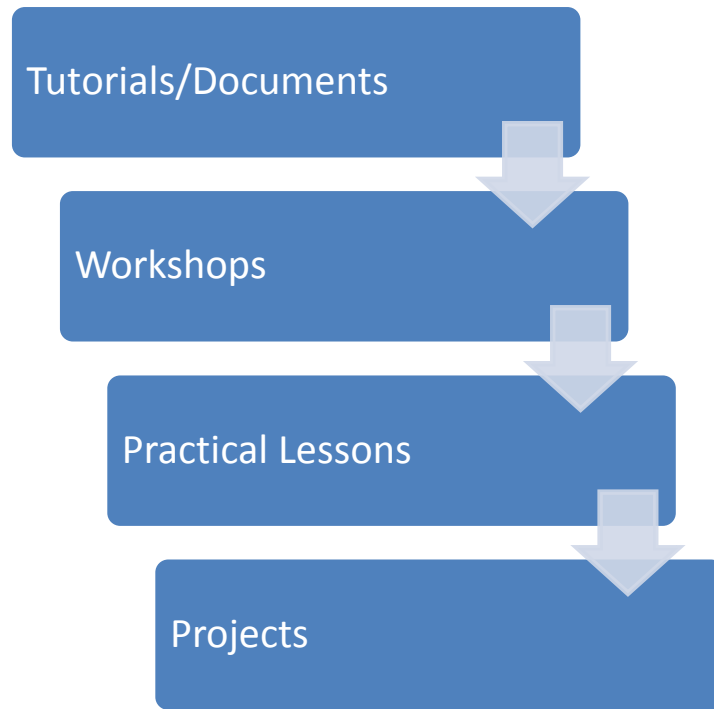
Figure 7 : Learning JIRA

4.1.5   Case Summary

This part of the thesis briefly describes the general use of the project management software and how the case (JIRA in use) fulfils the requirements of the company and also, a brief summary of the literature will be discussed and observe if the software has been able to support the review.

In this thesis, the authors have managed to research the use of JIRA for a single company, but going through the website and studying the materials related to JIRA, it can be utilized in many different ways, with different available plug-ins and many available options of turning on/off many built-in features.

As already mentioned in the analysis part, JIRA in particular tries to solve the entire problem related to project management or in other words provides assistance in completing the project. There are built-in tools that helps manage the project in an effective way. The basic requirement for a project management is the planning and scheduling features, as without a correct plan, it is very difficult to finish a project in time which ultimately results in customer dissatisfaction. JIRA provides support agile planning process, so for the companies like in the case, can get maximum benefit from the use of JIRA.

Scheduling is as important as planning, and the feature of JIRA about the detailed scheduling helps for the team to stay on track with the project plan and complete the project as per scheduled. For the project to be completed in the scheduled time, it is important to track the progress of the project at regular interval of time. The employees in the case company track their project progress daily through an automated status report tools. And, also there are many different ways to take reports out of the work they have done, although, in this company, programmers do not really have to show the reports or present the handouts of the work because project manager can track the work from his own workstation.

 Along with the built-in functions, JIRA comes with many additional plug-in, so that the software could be customized with the needs of the company. In the company Leapfrog, the software is used by different groups of people from the coders to testers to the project manager, and their purpose of using the software is different. Project Manager wants to see everything, all the reports on the daily,

weekly basis, whereas, coders are not looking for reports from last week or month. So, the software could be customized so that it fits to the needs of the different members of the company. The learning process used in the company is learning-by-doing process. So, with each project, people are learning new things about JIRA, since nobody is an expert in the software, everybody helps each other in learning the new tools in JIRA and of course there are online documentation where they can look for the help.

4.2 Case Microsoft Project

Microsoft Project is the second software which was chosen by the authors to be studied in this thesis. In this part of the chapter, the writers go through the software' origin, its evolvement to date, some of its adopted technologies, as well as its latest version – Microsoft Project 2013's utilities; together with reflections on the software gathered from interviews with fellow students at Lahti University of Applied Sciences.

4.2.1 Case Description

Throughout the time at Lahti University of Applied Sciences, the authors have taken part in different group works and projects. During such occasion, the writers have encountered various scenarios and difficulties in controlling the work flow, as well as team performance. Microsoft Project (in this case Microsoft Project 2013) was introduced as an efficient tool to help managing projects.

Microsoft Project was first introduced to BIT students of Lahti University of Applied Sciences during their second year of studies, as a course where students could obtain general ideas about how real-life projects work, and about the tool itself. Following by `series of team work and project work, implemented with the goal to simulate working environment authentically. This part of the study program aims to help students getting familiar with such working scenarios, and being able to utilize applications like Microsoft Project in handling those cases.

By going through all the school projects, as well as a few projects during internship time, the authors have familiarized Microsoft Project as the main software to aid administrating projects. Thus, the Microsoft Project's case will be shared to reflect its user experience under the observation of the writers.

4.2.2 Microsoft Project in General:

Microsoft Project is a project management software, which was developed and is sold by Microsoft. The program is designed to support project managers in setting up plans, assigning resources, monitoring progress, controlling budget, as well as

analyzing workloads. In order to be successful in reaching its target, the software is equipped with powerful tools. User's choices of those tools are numerous; ranging from the ability to create detailed tasks, allocate resources, to generate complicated reports; as well as syncing, viewing and editing the project plan with other software in the Microsoft Office family.

MP is a Windows based application, and a part of Microsoft Office family. However, MP has never been included in any of the Office bundles. Instead, MP has been made available and sold separately for Windows since 1990. Before that, "Project" was an application for MS-DOS, which originally developed with the vision of Ron Bredehoeft, a former software engineer at IBM during the 1980s. Mr. Bredehoef later formed Microsoft Application Services and entered an original equipment manufacturer (OEM) agreement with Microsoft Corporation. The application was introduced and put in use internally at Microsoft as a tool to help manage the projects inside the company. In 1984, the first commercial version of Project was released for MS-DOS. All rights to the software were bought by Microsoft in 1985 along with the introduction of version 2 during the same year, and version 3 in 1986. The 4th version of the software, which was also the final version of it, was released in 1986.

MP was also released for Macintosh in 1991, with continuous development until version 4.0 in 1993. However, in 1994, development of MP for Mac, along with most of Microsoft's Mac applications were stopped. Though a new version of Microsoft Office for Mac was released in 1998, it happened to be the last version which supports Mac. The latter part of the writing will describe how the software has evolved since the release of the 2003 version. (Microsoft Project 2014, Dhawan 2011)

4.2.3   Microsoft Project Evolvement since 2003

2003 marked as the turning point in the timeline of Microsoft Project, as the software started its course of renovation to adapt to the development of technologies. In this part, the authors briefly describe details of that process.

4.2.3.1   2003 - 2007

In 2003, Microsoft Project 2003's introduction was largely criticized by its users for lack of user-friendly attributes. From this point on, Microsoft have put a huge effort to improve the Microsoft Project. The aim of this action is to make the Microsoft Project package become the cornerstone of project planning and managing in any enterprise. The endeavour was recognized with the release of the exceptionally serviceable Microsoft Project 2007, as well as the inception of Microsoft's Enterprise Project Management (EPM) suite, in which SharePoint plays the role of a key element. In addition to that, Project Web App (PWA) was warmly welcomed as an efficient web-based way to view into the project portfolios by the organizations using SharePoint. Furthermore, the other positive features such as Excel Services, which simplifies the publication of Excel workbooks and charts into SharePoint dashboard are also vastly appreciated by the users' community. All in all, Microsoft Project and EPM 2007 proved itself "a worthy, and easier to use, contender against competitors like CA Clarity and HP's Project and Portfolio Management solution" (The History and Evolution of MS Project and Project Server 2013).

4.2.3.2   2007 – 2010

Despite all the much-welcomed improvements in the release of Microsoft Project and EPM 2007, Microsoft recognized that the suite's performance and features could still be upgraded. And in the release of 2010 Microsoft Project and Project Server, a better integration with SharePoint, together with enhancements in other built features were implemented. The progress has generated a "strong momentum for organizations looking toward a more professional and standards-based approach to program, project, and portfolio management" (The History and Evolution of MS Project and Project Server 2013). In this version of the software, Microsoft's biggest improvement was to address the problem of the previous release with the 2007 version's Online Analytical Processing (OLAP) data cubes, in such way that they can reliably refresh against all data fields. Added to that is the automatically generated typical sample reports, which cover a wide range or standard reporting needs, and can be tailored by the users. This new feature enable

the generation of an unlimited range of different tabular and graphical reports, with the ability to be adjusted to accommodate various users' needs for reporting.
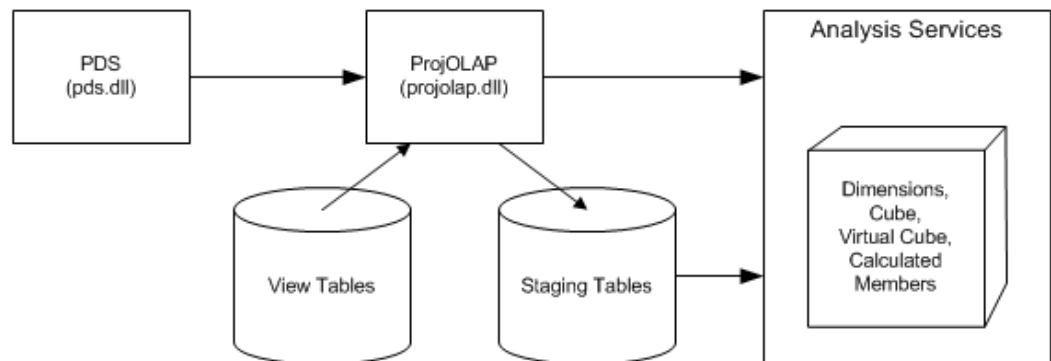

Figure 8: How OLAP Cube Generation Subsystem works

The picture above briefly describes how OLAP technology works within the Microsoft Project. The core of the process lies in ProjOlap.dll (Project's OLAP dynamic link library), in which the process of building an OLAP cube is managed. The data will be fed to this components from PDS.dll (Project data service), where XML-based requests are handled, in order to perform functions and return data. Another source of data for ProjOlap.dll can also be the View Tables from the project database, for example: resource view, task view, calendar view, etc. These feeds of data will then be processed and directly sent to Analysis Services, or staged and stored as Staging Tables queuing to be invoked and transferred to Analysis Services. Finally, Analysis Services handles the processed data, generates and displays the input in visual format such as pivot, tables and charts (Microsfot Project Server Components and Authentication 2002).

On the other hand, bugs were ironed out of Excel Services in this 2010 version of the software. Additionally, new and improved features were also introduced. Some examples can be seen in SharePoint Business Intelligence suite like Visio Services; which, similar to Excel Services, facilitates the integration between Microsoft Visio and Project. The implementation of SQL Server Reporting Services also further stimulated the level of advanced reports design, as well as

the possibility for users that lack SQL scripting skills to utilize the feature. Finally, the Portfolio Management module was integrated into EPM product, instead of being installed as an add-on like before. The module also went through a reconstruction process, and in this version, provided an excellent, optimized and largely serviceable portfolio planning, management for organizations. These developments altogether enhanced the position of Microsoft Project and EPM suite at the top of the chart among another project and portfolio management competitors.
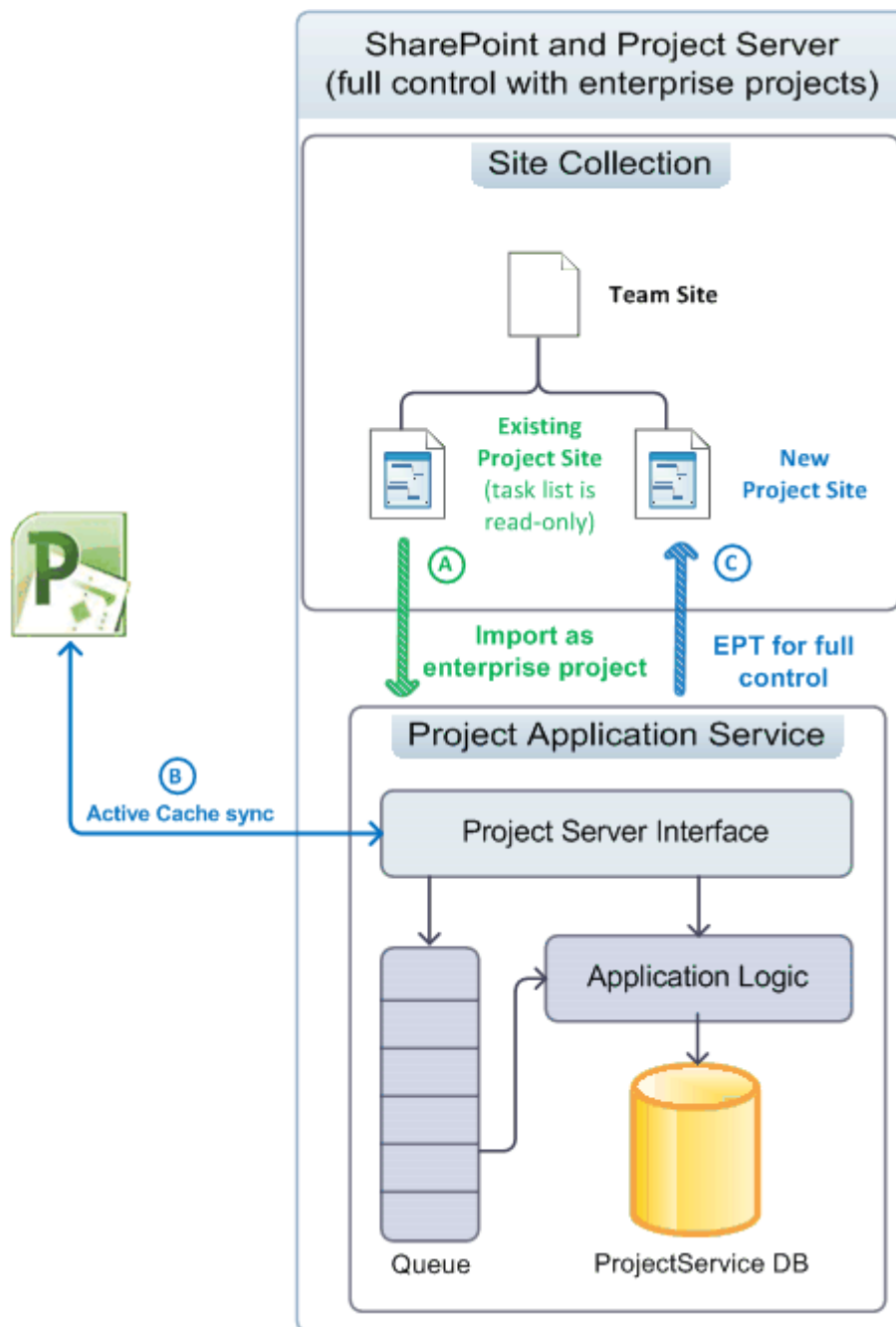

Figure 9: Microsoft Project, Project Server and SharePoint in cooperation

4.2.3.3 Microsoft Project and Project Server 2013

With all the advancements achieved during the previous period, the 2013 release of the software package marked another Microsoft's breakthrough in the rapidly transforming project and portfolio management field. With the introduction of Office 365 and the concentration on cloud-based services, the software were well prepared to the new trend in the world of technology. Moreover, Microsoft kept polishing the OLAP data cubes in the form of "a new, but still Excel-based reporting tool that employs the Open Data (OData) protocol" (The History and Evolution of MS Project and Project Server 2013). On top of everything, Microsoft Project and Project Server 2013 came with improvements in data storage, performance in general, presentation tools, as well as the ever-growing of project templates library. All these factors combined to keep the software suite at the position of a strong candidate for organizations' choice on the market.

Table 2: Timeline of Microsoft Project

Year	Name and note	DOS	Windows	Mac
1984	Version 1	x		
1985	Version 2	x		
1986	Version 3	x		
1990	Version 1		x	
1991	Version 1 for Mac			x
1992	Version 3		x	x
1993	Version 4		x	x
1995	Version 5 - First version with MS Office		x	
1998	Version 6 – First version with office-looking menus		x	
2000	Version 7		x	
2002	Version 8		x	
2003	Version 9 with MS Office		x	
2007	Version 10 still comes with older interface, compared to other Office tools released the same year		x	
2010	Version 11 with updated interface		x	
2013	Version 12		x	

4.2.4 Microsoft Project in Use

"Even though you still must enter a great deal of information into your project schedule, Microsoft Project has ways to make that job easier." (Marmel 2010, 12)

4.2.4.1 Project Templates

The ability to create new project templates, or alter the ready templates from the Office library for later uses is one of the most appreciated features since first introduced in Microsoft Project 2010. With its numerous choices of suitable templates for different type of project, together with an efficient online searching engine appear right after the users starts the software, they can easily find applicable template to start with. Additionally, the option to download, modify and upload these templates to the library transforms each user into a contributor to the common Office Library of Microsoft, in which every member can be benefitted from the shared community. This not only fits into the current trend of an openly sharing world, but also saves time and gives users of Microsoft Project 2013 an easy start in creating plans. The feature is warmly appreciated by the interviewee:

"It helps starting our project plan much faster than before, and with the available templates to be downloaded, we can easily find a suitable one and get a head-start with our projects" (Interviewee 2014)
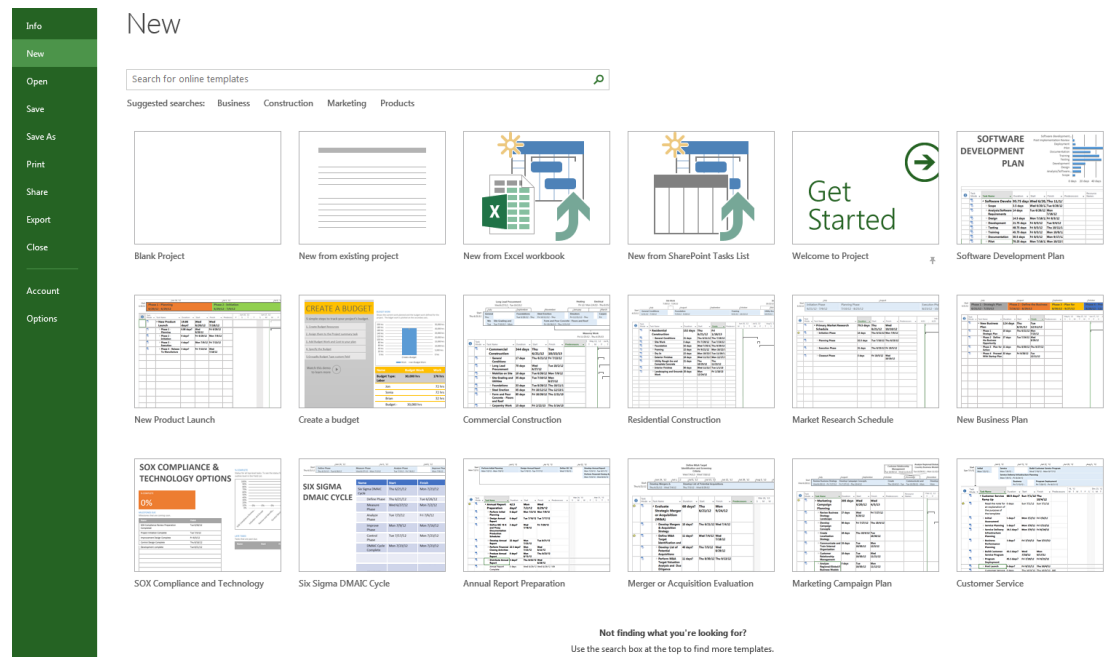
Figure 10: Project Templates

4.2.4.2 Import Existing Task Lists

Integration and synchronization with other software in the popular Microsoft Office suite have always been a strong attribute of Microsoft Project. In Microsoft 2013, users can easily import tasks and schedule from Outlook, Excel spreadsheet, or even existing project files. Likewise, users can create projects and tasks from those software then conveniently import it back to Microsoft Project. In addition to that, with SharePoint as the platform, users can utilize its powerful sharing tools. With which users can use a shared task lists on a SharePoint site and import them into their newly created project plan with Project. Conversely, users can make their work available on SharePoint, and give colleagues the right to view, modify, or update the work; then later the changes can be synchronized back to corresponding users. This feature of Microsoft Project greatly improves collaboration among users of the software. On the other hand, it is reported to also allow new users of the software to create the project plan with similar tools to their favor, then later import the file to Project.

"You also can easily use a Task List on a SharePoint site to collaboratively create a list of tasks for a project — and then import those tasks into Project."
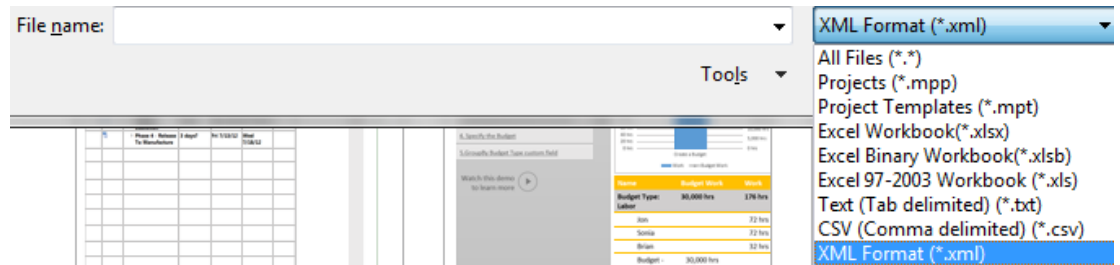(Interviewee 2014)

Figure 11: Importing Tasks

4.2.4.3 Automate Repeated Tasks

Throughout the life of the project, such tasks as meetings or regular reviews can occur repeatedly, and would take time to enter manually. Microsoft Project 2013 anticipated this situation very well, and equipped the software with the function to create repeating tasks. Those repeating tasks will later be automatically duplicated by the software at the appropriate interval of your choice.

"This feature of the software greatly reduced the time needed to enter duplicated tasks, and also is a good way for users to organize those tasks." (Interviewee 2014)

Figure 12: Recurring Task Information

4.2.4.4   Advanced Reporting and Analytical Capabilities

Reporting and analytical capabilities have long been one of the most powerful features of the Microsoft Project series. In the 2013 version of the software, Microsoft implemented a newly improved OLAP data cubes technique, which greatly increase the ability of the software to generate reports and analyses. In combination with possibility to fluidly integrate and connect with other Microsoft Application, it has never been easier for users to produce different types of text and visual reports. With the ability to communicate and exchange data between Microsoft Office software, text reports can be prepared on Project, then be sent together with project data to either Visio or Excel to achieve graphical reports.

"Microsoft Project provides us different options to generate reports, even with graphs and tables. I think it is one of the most useful features of the software. Because it helps us save time and effort, while still be able to provide detailed reports on our project." (Interviewee 2014)
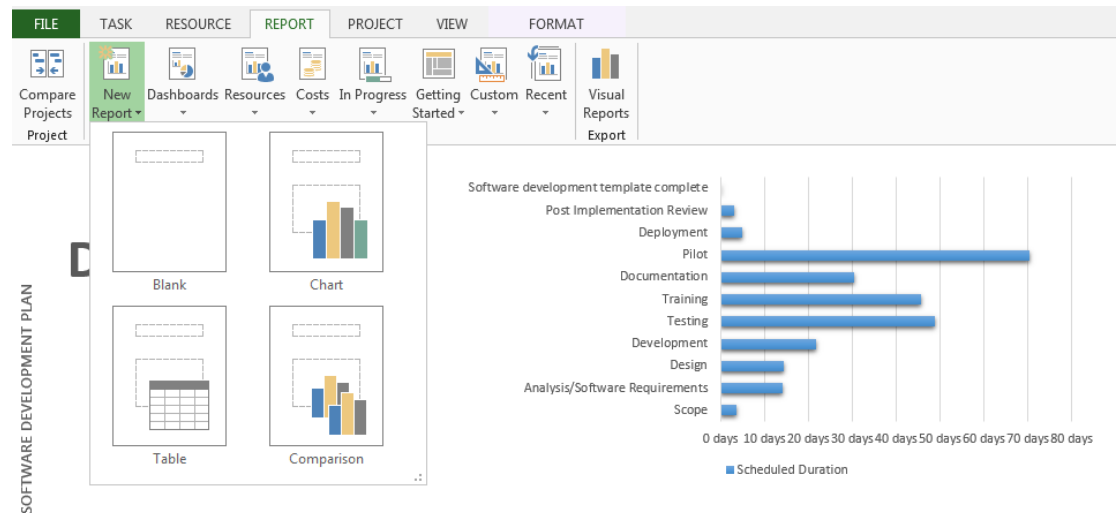
Figure 13: Reporting Task

4.2.4.5 Consolidate Projects

The ability to break the project down into smaller projects using either Work Breakdown Structure, or creating sub-projects, is another effective tool of Microsoft Project. This feature allows users to enter data into the plan gradually. Additionally, by using this method, tracking the progress of the project becomes a less demanding task, resulting in more precise reports on the status of the project. While making the tasks of controlling the projects lighter, individuals who take part in the project can also feel more accountable and involved in the project, as the stressful level of the tasks are reduced by breaking them into minor tasks. Moreover, Work Breakdown Structure possess the ability to generate charts directly from the project plan. This allows users to manage the project with a "top-down" approach, which is also an intuitive way to plan and display the project. Work Breakdown Structure can be created in Microsoft Project by the top-down methodology with the following steps, as suggested by Mark Piscopo in "Creating a Work Breakdown Structure with Microsoft Project" in 2012:

Step 1: Identify and type the final objective of the project into Task Name field.

Step 2: Identify the final deliverables needed to achieve the above objective. Type and indent all sub-deliverables in the Task Name field.

Step 3: Decompose the final deliverables into activities continuously to a level which user can control and monitor the individual tasks

Step 4: Re-evaluate the entire Work Breakdown Structure to make sure the success of the whole project.

Despite the inevitable advantages of the Work Breakdown Structure in managing the project, Microsoft Project still lacks the flexibility in terms of supported project methodology, and agile methodology in particular. This results in the limitation during the process of choosing project methodologies, as well as the reduction of market coverage of the software.
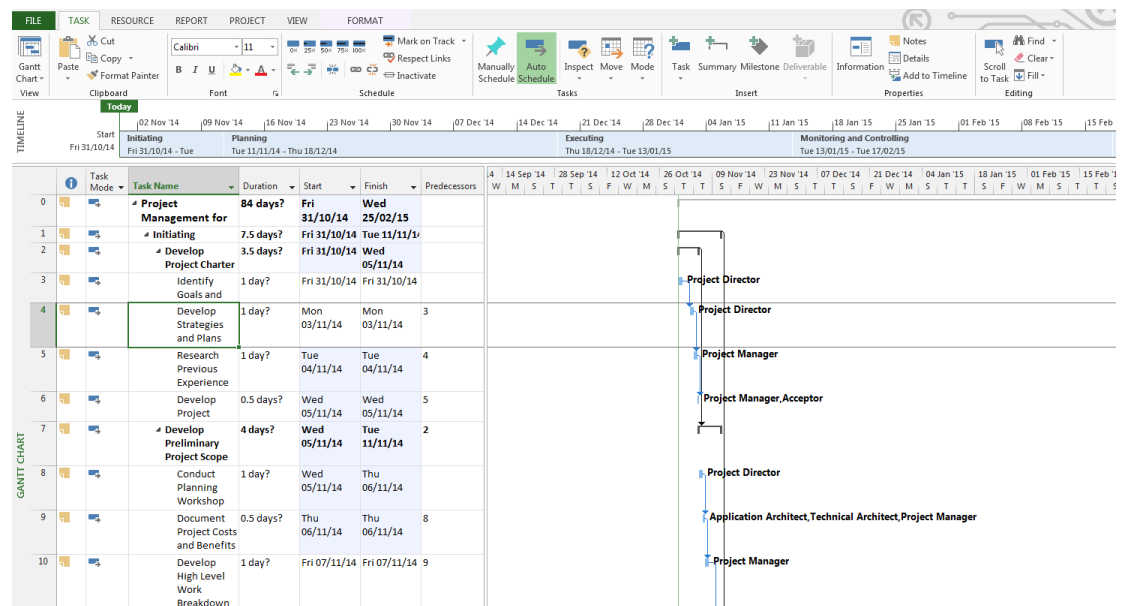

Figure 14: Consolidate Projects

4.2.4.6 Resource Management

The feature that makes Microsoft Project stand out from its competitor is the powerful resource controlling capability. By using this tool, users can flexibly enter individual costs in hourly, weekly, monthly rates, or any type of determined working unit. Furthermore, the ability to compare forecasted budgets to actual results is also another impressive option in the software. Added to that is the Task Inspector tool, which can help users save a great amount of time in "reviewing the entire project to look for resource conflicts or other anomalies." (Microsoft Project Review: Project Management Granddaddy Shows Its Age 2013). Project

managers can also use this tool to look for changes in overall project costs based on the use of alternate resources, and make decisions based on these changes.
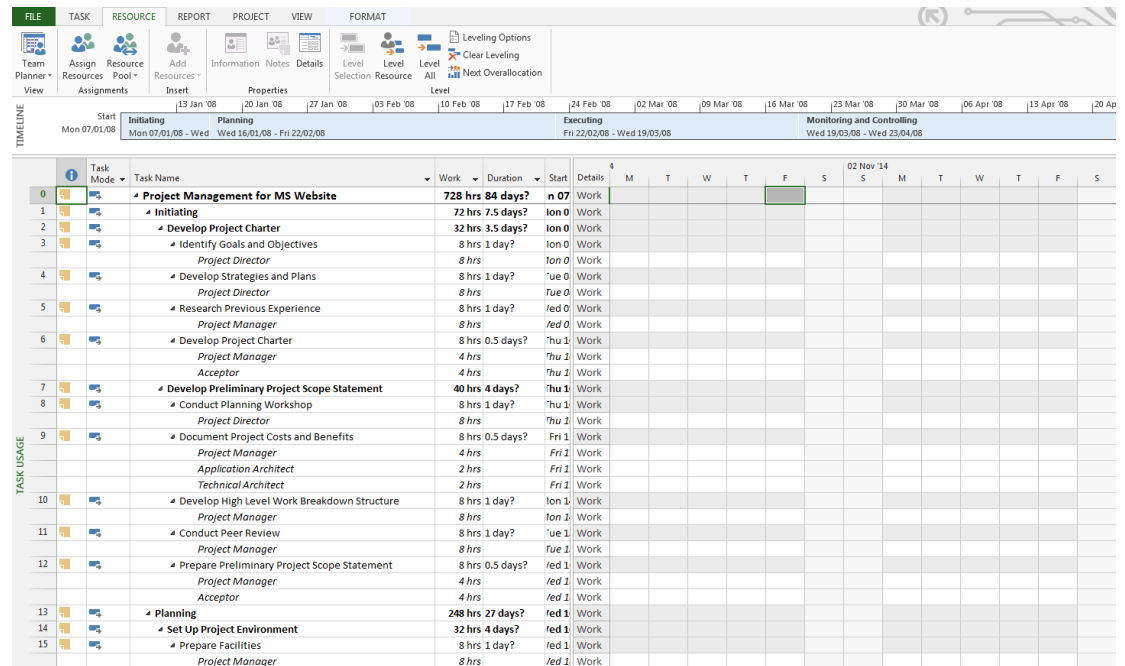

Figure 15: Managing Resource

4.2.4.7   Other Tools

Other than all those tools described above, Microsoft Project 2013 still possesses a great deal of handy capabilities, which the authors have not had chance to test out . Projects comparing is one of those tools. This feature of the software assist users in measuring the project plans in different stages and versions. By retaining various editions of the project plan and using this tool, users can clearly highlight changes that happen in each project plan's version. It provides a useful way to check if the project progresses or deteriorates, and how changes affect the development of the project. Macros is another useful tool for users who have experience with scripting and coding. The feature allows users to take advantage of Microsoft Visual Basic and write macros that help reduce the work load in managing such as automate tasks, or create Work Breakdown Structure. Other than that, by combining Microsoft Project and Project Server 2013 with Microsoft's Enterprise Project Management suite, users can enjoy the possibility of both project management and project portfolio management at the same time.

This can greatly improve the projects performance in organizations that implement the applications.

4.2.5 Learning Microsoft Project

Primarily, the software was taught as part of a 5-ECTs course at Lahti University of Applied Sciences in students' 2nd or 3rd year. It is accumulated of more than 100 hours of lessons, exercises, self-study, and final exam. Within the theory part of this course, students learn the general information about the software itself, as well as how it works. Additionally, real project plans are handed to students to design as practical part of the course. Exercises during lessons are also the tasks for students to complete, and familiarize themselves to the functions of the software. Finally, students need to pass the final exam to be able to get the 5 ECTs for the MP course.

Additionally, students would have further chances to put MP in to use during the later years of studies. As MP is the most common choice for the students while participating in various projects, which are made available by the cooperation between the University of Applied Sciences and local companies. The software is also free to be downloaded from the Microsoft Developer Network (MSDN) for students who registered, along-side with other Microsoft Office software packages.

"Generally, the software is very easy to learn and use. It is also simple to get access to all the projects plans to manage the assigned tasks and projects' progress. Therefore, it helps me to catch up with deadlines, and also to remember the members who share the same tasks with me." (Interviewee 2014)

4.2.6 Case Summary

This part of the thesis briefly describes the development of the Microsoft Project software package over time, as well as the writers' research and observation of how the package and its components perform in actual situations. The software dated back to the 80s with the very first versions released on DOS. It has been going through various changes and improvements since its first Windows version in 1990. Microsoft Project, Project Server and Enterprise Project Management suite have become an important factor in the scene of project and portfolio management software.

By making suitable tweaks, in addition to necessary overhauls to the software package, Microsoft have been succeeding in keeping them at the highest level of project management software. Such progressive features like project templates, automated repetitive tasks, or advanced reporting; together with the ability to integrate and synchronize with other Microsoft applications bring users of the suite comfortable time managing their projects. Additionally, with the efforts from Microsoft to make the software package better year by year, Microsoft Project suite shows in the analysis that it can keep up with the ever-changing world of technology, and satisfy the needs for an intuitive, professional project management tool. The package also demonstrates in the above analysis that it can successfully deal with all the issues a good project management tool supposed to conform as defined earlier in this thesis; in terms of scheduling, scope and requirements analyses, as well as reporting. Therefore, organizations can consider the software package as a strong contender for their choice of utilizing tools in project management.

All in all, Microsoft Project presents an inevitable option of enterprises project management. Even though it lacks the support for different types of project such as agile methodology, its other highly efficient features cannot be denied. The authors strongly recommend using the software as a way to improve and to succeed in project management.

5   CONCLUSION

In this chapter of the thesis, the authors reviews the whole paper. A brief description about the overview of the thesis and the conclusion, that includes the collective summary from the two cases analyzed, is explained in the following sub-chapters.

5.1   Thesis Overview

Chapter 1 presents the background of the thesis which points out the importance of a project management system and how it has been the major element in the progress of the company. This thesis was conducted in order to provide the reader a thorough understanding about the importance of the project management system and the usage of the project management software in running different projects.

Chapter 2 describes the research design of the thesis, as well as data collection and analysis methods. The main purpose of this thesis was to figure out the services for managing projects, provided by two softwares in two distinctive cases. The qualitative approach was used in the case of this thesis with semi- structured interview for the data collection.

Chapter 3 is a literature review about Project Management software. It briefly describes the history of the project management and also defines the ideal project management software. This definition is regarded as the criteria for the research of the thesis.

Chapter 4 is about analyzing the cases. There are two different cases used in different contexts and the main aim of the thesis is to generalize the importance of these softwares in their particular field of research. The research is carried out mainly by studying relevant sources, as well as conducting interviews. The cases are then summarized in order to provide readers with general ideas regarding the research work carried out with the softwares.

5.2   Thesis Summary

The main aims of this study were to find out the requirements and utilities of the project management software. The requirements' part was partly studied from various literatures and also from the interviewees. The main and most important criteria when we start a project is that we complete it in time, with available resources and favorable outcome. As studied in the literature part, the history shows the gradual increase in importance of the project management, and also how people have managed to use the theory of traditional project management approach in the making of the modern project management software.

The history of project management starts from the early 1950s. However, as already described in the review part, the practice of using the computerized software has not flourished until just over a decade ago. It was mainly because of the rapid development in the technology and the software market. These days, these softwares have been a must in any company, not only in the software companies, but also in small or a large companies, everybody needs a hand in managing their projects. Additionally, the softwares have solutions for all kind of businesses or companies. They are able to be customized, so that the same software could be used as a very simple project managing program in a single computer, or a very complex software running throughout the whole company. Just the case in this thesis, the authors have managed to research the use of JIRA for a single company. On the other hand, while going through the website and studying the materials related to the software, the writers found out that, it can be utilized in many different ways, with different available plug-ins, and various available options of turning on/off built-in features.

Basically, the main function of a software is to provide help, and improve the quality of results with less effort than manual ways. A project has different requirements and the aim of the adopted software is to fulfill those requirements effectively in terms of time and cost. In addition, the issues of scheduling, tracking and physical parameters must be considered while adopting the project management software. As already mentioned in the review part, these five constraints of time, cost, resource, scope and quality are inter-related with each other. The main aim of the project management has always been to keep these

constraints in balance from the start to the end of the project. The idea of the project management software has been to help the project managers and the project members to do so, to help manage them involuntarily.

As already mentioned in the analysis part, JIRA in particular tries to solve the entire problem related to project management or at least provides assistance in completing the project. There are built-in tools that help manage the project in an effective way. The basic requirement for project management is the planning and scheduling features, as without a correct plan, it is very difficult to finish a project in time, which ultimately results in customer dissatisfaction. JIRA provides support for agile planning process for companies, like in the case itself, so that they can get maximum benefit from the use of JIRA.

As written in the analysis part, Microsoft Project also successfully deals with all the presented issues for a project management software, while still posing a friendly user-interface. The software is equipped with powerful tools to help users generate detailed project plans. Additionally, all users can monitor and modify those plans if needed. Furthermore, Microsoft Project's users can easily combine the software with other Microsoft Office products, such as Excel or Outlook, to import and export various types of reports. Likewise, users can connect to SharePoint and upload the plan, so that the whole team can be updated. However, the software doesn't support agile project planning. Therefore, the choice of project plan is limited to solely conventional waterfall project model for users. This limits the flexibility most modern projects need in the planning phase.

Despite the limitation above, Microsoft Project shows in the analysis that the software itself is a powerful tool for users to successfully manage projects of different sizes. Combining with the ability to connect with other softwares in the Microsoft Office package, as well as SharePoint; Microsoft Project is one of the inevitable choices for organizations to consider while choosing a project management software.

5.3   Results

In this section, the authors answers to the research questions mentioned earlier in the paper. From the literature review part and also the interviews, the answers to the questions can be answered.

- What are the requirements of a project management software?

From the findings, it is clear that project management software is required to plan the project and support the users throughout, in the process of completing a project. By "support", it means it is able to keep balance of schedule, resources and costs to provide the result with same scope and quality. The software should assist the manager as well as other users according to their requirements, thus needing to be flexible and responsive. In addition, the compatibility issues, tracking other projects and forecasting are also taken into consideration in defining the requirements for a conventional project management software.

- Do the selected softwares fulfill the requirements?

The research was based on two softwares and the chosen cases were different from another. JIRA is used in a software company, while MS Project research was conducted among the students who studied it during their bachelor's degree. On the whole, from the case studies, JIRA is able to fulfill the requirements and can be considered to have all the functionalities, a standard project management software should have, to assist the project team from the planning phase to the closure of the project. In the other hand, MS Project also fulfills the basic requirements to manage the project with its wide range of utilities. But, it is not a recommended software if agile methodology is the way of managing project. Moreover, to get the best out of the Micrsoft Project, it is recommended to have the whole Microsoft Office application package; therefore, high cost to adopt the software package in an enterprise scale can be a drawback to it.

5.4   Limitations and Future Work

This thesis has two limitations, both referring to the small scale of the research conducted. Firstly, only two project management softwares were covered by the study, thus, the findings might not be applicable for all the other project management softwares on the market. Secondly, the chosen softwares haven't been fully tested and experienced by the authors, as well as interviewees, to cover all possible scenarios. Therefore, the findings regarding the utilities of the softwares cannot be guaranteed as definitive for all use cases.

With those limitations stated above, this study on Project Management Software and its utilities can set up the ground work for further research on a larger scale, which may involve a higher number of cases, as well as softwares. Moreover, technologies have rapidly changed and developed, which has resulted in shifting of requirements, and definitions of a good project management software. Thus, the authors recommend more studies on this matter to be conducted.

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APPENDIX

Semi structured interview questions:

Participant's name:

Position:

Software:

Questions:

1. How did you learn the software?
2. How long did you take to learn this software?
3. How do you get in/log in in the software? / What do you require to get into the software?
4. How simple is it for you to access to all the projects after logging in? (
5. How often do you use the software in a day? / Please tell me the situations where the software must be used.
6. Do you track the project progress?
   a. How often? And for what purpose do you track the project?
   b. Is it possible to track other project than your own?
7. How do you communicate with other people working in the same project (via the software)? [may be Forum]
   a. How about people working in different projects? Or Project Manager?
   b. How do you usually contact with other people within your project and other projects?
   c. Are you able to tag people in so that they get noticed? - If yes where do you get the notifications?
8. What is the role of project manager in the context of this software?
9. How many people in average work in a single project?
   a. How long does it take to finish a project? In average if you could tell?
   b. What is the final step when the project finishes? (in the context of the software)
10. Can people do/manage multiple projects at the same time?

11. How do you generate the summary of the project, let's say if needed for a presentation?

12. Are you able to login into the system from outside the company, let's say when you are working at home? If yes, how do you synchronize the work at office and at home?

13. Has there been any instance when the project is not finished in time, how does it affect other pending projects? How does this software react to the change? (if there has been any)

14. How is the backup system of the software?

15. In general, what sort of data do you input in the system?

16. What do you get as output? (Reports, graphs.....)

17. Which are the best features of the software for you?

18. Which features you feel should be added to the software?

19. Which features you feel should be removed to the software?

20. How do you rate the efficiency of the software? (scale)

21. Which features of the software you use the most in general?

22. How could you describe your "dream" project management software?

23. How do you rate the user interface of the software? (scale)

24. How do you rate the importance of the software to the success of the projects?