Guidelines to improve teamwork in software projects

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Abstract

In consulting firms one of the goals is to have the consultants on an assignment with an external client to bring in capital. In some consulting firms, when the consultants are not on an assignment with a client, they work on internal projects until a new assignment arrives. Since most of the team members do not work for more than a few days or weeks on the projects, it leads to a high team member turnover. In projects with such a turnover, problems such as hasty handovers, unclear roles and responsibilities and low-quality documentation may occur.

The purpose of this thesis was to create guidelines to improve teamwork in teams with a high team member turnover. This thesis was based on a case study of a company specializing in information technology and management consulting. To begin to tackle this problem, a literature review was conducted and the data was collected by conducting interviews. The interviews were performed with team members that had been on a project for the longest and shortest period of time in order to identify problems from different perspectives.

Based on the interviews and the literature study, guidelines were created to counteract the problems experienced in this type of volatile teams. The guidelines are categorized in four areas: processes, resources, people and long-term perspective. The areas cover the problems experienced and can be ultimately implemented in all teams with high team member turnover to improve teamwork in software projects.

Keywords: improve teamwork, team member turnover, consulting firms, volatile teams

Abstract

I konsultföretag är ett av målen att konsulterna ska vara på uppdrag hos en extern kund för att dra in pengar. I vissa konsultföretag, när konsulterna inte är hos en extern kund, arbetar de på interna projekt tills dess att ett nytt uppdrag kommer. Eftersom de flesta teammedlemmar inte jobbar i mer än några dagar på dessa interna projekt leder det till en hög omsättning av projektmedlemmar. I projekt med den typen av höga omsättning kan problem uppstå som förhastade överlämningar, otydliga roller och skyldigheter samt lågkvalitativ dokumentation.

Målet med denna uppsats var att skapa riktlinjer för att förbättra lagarbete i teams med hög omsättning av projektmedlemmar. Denna uppsats var baserad på ett fallstudie på ett företag som är specialiserat på informationsteknik och management consulting. För att börja tackla detta problem utfördes en litteraturstudie och data samlades in genom intervjuer. Intervjuerna utfördes med de teammedlemmar som har deltagit i projektet längst respektive kortast tid, för att identifiera problemen utifrån olika perspektiv.

Baserat på intervjuerna och litteraturstudien, skapades riktlinjer för att motverka dessa problem som uppstår i sådana typer av rörliga team. Riktlinjerna kan kategoriseras i fyra områden: processer, resurser, människor och långtids perspektiv. Dessa områden täcker de upplevda problemen och kan implementeras av teams som har hög omsättning av medlemmar för att förbättra arbetet inom teamet i mjukvaruprojekt.

Nyckelord: förbättrat lagarbete, omsättning av projektmedlemmar, konsultföretag, rörliga team

Preface

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Innehållsförteckning

List of tables

1. Introduction

For companies to successfully run their business and reduce expenditures they can hire specialists temporarily. It is becoming more common that companies require certain competences during a certain period of time, but are not willing to pay for the competence permanently. This creates a working environment that is more volatile and many employees are not permanently employed. Therefore, a new kind of company, so called consulting firms, has been established. The companies often specializes in a field, for example information technology, economics, human resources, law or management and provide expert services within that area. Consulting firms maintain their business mainly by clients that pay for their expert services. The main purpose of consulting firms is to recruit a pool of competences and lease them to other companies and organisations for a certain amount of time. Some can stay on for years, others just a few days or hours.

1.1 Background

For consulting firms to fully utilize their employees' competence, the firms strive to engage their employees in work that benefits the company, even when they are not on assignment. They let the consultants work in so called internal development projects that can improve the company directly, for example by creating software they might need or conducting pilot studies for future projects.

The consultants are only a part the project for an unknown amount of time, which varies from a few days to a few weeks. If an assignment with a client becomes available then the consultants has to prioritize this before the internal projects. These types of teams can both gain and lose members every week without more than a day's notice. Because there are many benefits with the internal development projects, more companies start to work in this way.

One of the companies that work in this way is the consulting firm Netlight Consulting AB. This thesis is based on a study with the internal project teams at Netlight, which specialises in information technology and management consulting. The team members of the internal projects are distributed in the projects based on their skills and the project's need for resources. The consultants working for the company's internal development projects must prioritize a new client over their current project. This makes the internal project teams dynamical in aspect of the turnover of team members, since the consultants may at any time get a new assignment. This kind of teams will also be described as volatile teams.

Due to the volatile structure of the internal project teams, there are several obstacles which affects the performance from the team members. Uncertainty in the amount of resources that the team will have access to, e.g team members with appropriate skills leads to planning difficulties. The turnover leads to frequent change of project management methodology which can create a confusion, low quality documentation and uncertainty with respect to roles and responsibilities. As a consequence, the team cannot maintain an optimal performance.

1.2 Problem description

The problem that needs to be solved is the fact that there are currently no clear guidelines to help teams with volatile structure to improve their teamwork. This problem leads to the research question: *what guidelines can be implemented by all software development teams with high team member turnover to improve their teamwork?*

1.3 Purpose

The purpose of this thesis is to create guidelines to improve teamwork in software projects with high team member turnover. The thesis will present these guidelines and how they were shaped.

1.4 Goal

The goal of this study is for consulting firms to improve teamwork in teams with high team member turnover.

1.5 Commissioned work

This study is commissioned work by the consulting firm Netlight AB. Netlight is currently facing some problems in their internal projects due to the volatile teams. They are therefore interested in what can be done to improve teamwork due to the difficulties associated with volatile teams.

1.6 Public welfare, ethics and sustainable development

In a broader perspective, companies with a similar situation can use the guidelines to improve teamwork despite high team member turnover. By improving teamwork, more services and products can be created in a shorter time. This is something that favour companies or organisations that manages teams, which in turn favours the communities that can take part of those products or services.

Sustainable development comprises three aspects: social, economical and ecological (KTH, 2014). To maintain a social sustainable development in project teams, the team members need to have good working conditions and feel satisfaction with their workplace and assignments. Ethics is also important because it directly affects the team culture. Trust is especially important in problem-solving and technical teams (Thompson, 2015, p. 95).

When employees need to work overtime, more electricity is used e.g., in the office and by laptops. Consequently, the ecological aspect of sustainable development is not met. If the efficiency is high enough so that team members do not need to work overtime, the economical aspect of social development is met since economic growth has occurred without extra use of natural resources.

1.7 Methodology and methods

When collecting data there are different methodologies and methods that can be used. The method that should be used depends on the purpose of the study and what to be gained. There are two different ways of conducting a research: inductive and deductive. When using an inductive approach, the first step is to collect data that is relevant to the area of study (O'Reilly 2009). The data is evaluated to find a pattern. Afterwards, a theory that explains the pattern is established. Thus, the inductive method starts with data and ends with a theory, from specific to general (O'Reilly 2009). On the contrary, a deductive method starts with a theory and tests that theory by collecting relevant data. Thus, the steps in the deductive method are reversed with the steps in inductive method (Blackstone 2012).

There are different data collection methods. By using a qualitative method, individual case studies are reviewed in an inductive manner. This is useful for conducting interviews and find patterns, for example in this study to find what bothers team members and what changes they would like to see. Using this approach, data can be gathered that holds high quality for the specific company, but might not be applicable at another company because of different working cultures. By using a quantitative method a deductive approach is applicable. By using collected data the pre-existing hypothesis is confirmed with logical reasoning and objectivity (O'Reilly 2009).

Qualitative methods are subjective while quantitative methods are objective (Murray 2003). To collect data, qualitative methods can have focus groups, in-depth interviews, which makes the result less generalizable (ORAU n.d). The obtained results are in-depth information from a few cases (ORAU n.d). Quantitative methods uses statistic test for analysis with fixed responses option. Type of tests may include surveys, structured interviews and reviews of records or documents for numeric information (ORAU n.d). As opposite to qualitative methods, the result obtained from quantitative methods can be generalized (ORAU n.d). It is useful for getting a deeper understanding for something that can not be gained by a quantitative study, for example to understand human behaviour (Allwood 2004, pp.58).

The difference between induction and deduction is the step of how work is done (Trochim 2006). In deduction, a theory is established and there is a hypothesis (O'Reilly 2009). Through observation, a confirmation is made. In induction, the working steps are opposite to deductive. The work starts from a specific observation and ends with a general theory (O'Reilly 2009). Induction is based on experience and is meant to be done with an open mind so that the theories that form are based solely on the collected data (O'Reilly 2009). In this study the inductive method will be used in combination with a qualitative data collection.

To find relevant cases and theories, a literature study is also performed. It will be based on books and research articles. Relevant literature will be found through databases with relevant keywords and books on the subject of teams. For example Leigh Thompson's 'Making the team' (Thompson 2015), Graham

Yemm's 'Leading your team' (Yemm 2012) and Susan Wheelan's 'Creating effective teams' (Wheelan 2013).

1.8 Delimitations

The study focus on only problems that have arisen due to high team member turnover in the internal project teams at the studied company. These problems are listed under section 1.3.

Some project teams at the studied company are in their termination phase and are therefore not considered in the study. The study is based on teams with planned team member turnover where the members leave the team because they get an assignment with a client, not because they resign from the company.

1.9 Target groups

The thesis is meant to target companies with a similar situation, researchers and academicians within the related area.

1.10 Disposition

The thesis is organized as follows: Chapter 2 reviews the theory of teams and explain how teams are created, how they work and how they are affected by team member turnover. Chapter 3 describes which methods are used to study the internal projects and how to gather information about team member turnover. Chapter 4 describes how the study was performed. Chapter 5 presents the obtained results from interviews and pre-study. Chapter 6 is the discussion of the data collected. The data from interviews are evaluated in context. Possible solutions are discussed in order to evaluate the most prominent ones. Chapter 7 motivates and presents the guidelines. Chapter 8 declares the conclusions of the study and presents future work.

2. Teamwork

This chapter presents the theory behind how teams are created and develop, how they can become productive and how to maintain their knowledge and efficiency even in the long run. First presented is how teams develop in time and how the structure and roles of the team affects their responsibility and performance. Then the focus moves to high performance teams and team members and how it can be maintained. Last knowledge management is presented since it is an important factor to take into consideration in this thesis to understand how volatile teams can work in the long run.

2.1 Team development

Teams are often important for organizations to reach their business goals, especially if the organization is project based. The effectiveness in teamwork can be enhanced by the the team members' commitment. For a high performing team, it is important for them to to understand their development as a unit so that they easier can control the different development stages.

When teams are formed they go through four stages called *forming, storming, norming and performing* (Tuckman & Jensen 1977) called the team development stages. The *forming* phase is the first of the four stages and represents the creation of the team and start of team building. Since each individual wants to be accepted by the rest of the team members they are very careful to create conflict and discussion. To avoid conflicts, the teams focus on things like roles, schedules and organisation. Team members are afraid to argue and stand up for their own opinions. The feelings to other team members are not discussed which makes the forming phase unproductive. There is a tendency for each member to work individually (Tuckman & Jensen 1977).

During the forming stage the members start to judge the other members and put a lot of focus on their own behaviour. Mature team members are often early to adopt a proper behaviour, forming the team after their volition (Tuckman & Jensen 1977). Susan Wheelan, the author of 'Creating Effective Teams' (Wheelan 2013), says the polite behaviour during this stage is due to the members' fear of rejection and not being accepted by the group. Therefore it is important that the leader provide personal safety and direction. The members seldom challenge the leader's decision and by identifying with the leader, the members create cohesion and commitment to the team (Wheelan 2013).

The second stage is called *storming* (Tuckman & Jensen 1977). It is during this phase that the members try to free themselves from their dependence on their leader by challenging procedures and goals. Conflict is inevitable during this process as the members try to find their role in the team. During this time the team's main goal is to develop a unified set of values, goals and procedures.

The conflict that arises as they are trying to perform this task is however important since it creates an environment that allows the members to disagree with each other. This kind of open climate creates trust if the conflict can be

settled successfully and helps to avoid group thinking where members only follow the norms and never questions the group's decisions. It is common that subgroups within the team is created as the members try to take on different roles but in the end of this stage it becomes more clear as to whom has which role, what the team's goals are and the level of involvement from team members increase (Wheelan 2013).

Next comes the stage *norming* (Tuckman & Jensen 1977). If the team manages to work through the problems that occur during the storming phase they are now more open and task oriented instead of focusing on issues of status, power and influence (Wheelan 2013). During the *norming* stage the leader starts to act more as a consultant to the team to help them reach their new and now clear goals. Just like in the beginning the members try to conform but now they also create subgroups which are tolerated. As cooperation becomes more evident the satisfaction among members also increases. Much focus is based on building a structure and processes that will help the team succeed with reaching their goals (Wheelan 2013).

The last stage is *performing* (Tuckman & Jensen 1977) and just as the name suggests, this is when the team starts to work efficiently with high productivity. The members now accept their status in the team and are clear about their goals and roles (Tuckman & Jensen 1977). The task at hand can be solved by team effort and not by individuals. The team spends time defining problems, decisions to be made, planning and communicating. Members are cohesive, cooperative, encourage innovation and expects success. They are delegated assignments that match their abilities and are rewarded by their effort as individual or subgroup. Some of the work gets done during the *norming* stage but the main quality and quantity is achieved during the *performing* stage.

The time needed for the four stages varies between weeks to months. Many project are closed before the team have gone through all the four stages according to research by Wheelan (Wheelan 2013). Many teams only reaches the third phase, norming and never gets to the performing phase (Wheelan 2013).

2.2 Efficiency in teams

According to Yemm (Yemm 2012,) in "Leading Your Team", there are nine elements, which contribute to effective teams, these are presented in *Table 1*.

Table 1. *The nine elements that contribute to effective teams*

Element	Description
Clear purpose or vision	The team knows the purpose of the team and what they are aiming for. This is something many team leaders overlook.
Clear objectives	For the team as whole and for the individual performance.
High standards	High and clear standard of performance contributes to a strong commitment in the team.

Systems and procedures	Working, reporting and implementing processes can improve efficiency and effectiveness.
Clear and open communication	Both formal and informal.
Trust and commitment	Important to respect and be able to work with other team members.
Leadership	The leadership needs to move along with the teams development.
Defined roles and responsibilities	Clear definitions of each members work can reduce duplication of work and avoid confusion in the team.
Sense of identity	It is important for the members of a team to have a sense of belonging.

These nine elements are factors that can actuate individual team members to link together as an unit. To have efficient teams, the cohesion and trust within the team is important. The wellness of each individual is as important as the leadership. Individuals need to feel trusted and respected and the team leader needs to provide clear goals and instructions. The elements represent building blocks that a team needs in order to work efficiently, by defining what block needs improving, it becomes easier for the team to work on their weaknesses. A team that has been established for a while will likely already have control over the different elements, but a newly formed team will need to work hard to reach the same level of maturity.

2.3 Challenges in teams

There are different reasons why teams experience a decrease in productivity and effectiveness. These include personal conflicts, group thinking, communication breakdowns and lack of commitment and must be resolved instantly so that the team does not suffer (Yemm 2012, p. 134). Beyond that Wheelan also mentions conflicts about values, goals and tasks, challenging leaders and authoritative figures, decreased conformity and deviation from group norms. When these challenges occur, some teams might end up entangled in conflicts and other become too stressed out to function and expect the leader to resolve the situation (Wheelan 2013). Neither of these actions will resolve in a positive outcome for the team. Only through their joint efforts at conflict resolution and creation of a joint goal can they create the trust and collaboration needed to become a productive team (Wheelan 2013, p.28).

Some teams might seem harmonic because the team members does not engage in challenges or disagreements, but this might be because they have fallen into group thinking. Group thinking should be considered a threat to the team as it will threaten the team's performance. It can develop in teams that consider themselves strong enough not to make mistakes, ignorant of anyone

who might challenge them and if they feel an internal pressure to conform (Yemm 2012, p. 124).

Thompson (Thompson 2015) found a study from the Kellogg School of Management Executive Program (Thompson 2015, p.34) that shows what leaders find to be the most frustrating aspects of teamwork. Topping the list is: developing and sustaining high motivation; minimizing confusion and coordination problems; fostering creativity and innovation; and developing clear goals (Thompson 2015, p. 34).

2.4 Structure, roles & responsibilities

Teams work more efficient if there are clear roles and responsibilities. In a team with low structure, roles are not formally assigned, as opposed to teams with high structure, where team members have specific roles in the team (Thompson 2015, p.114). When the roles are undetermined the members feel less responsibility for the tasks (Thompson 2015, p. 265). In teams with low structure, the team members take them on based on their competence. They are often quick to determine a person's potential and treat them accordingly. Therefore the "old" team members regard the newcomers as a threat even though the newcomers are more likely to help the team perform ter (Thompson 2015, p. 143-144).

A common error is to blame the leader or the team members when things go wrong in a project, when most of the time it is not caused by individuals lack of a certain skill, but rather the design of the team itself (Thompson 2015, p.29).

2.5 Team member turnover

Team member turnover can be described as a change in team structure and is always a risk, since it affects employee performance and interpersonal dynamics (Thompson p.144). How the turnover is managed is essential for the teamwork.

There are various reasons why teams experience turnover (Vangel 2011). The turnover can be both planned and unplanned. Planned turnover occurs when the team expects a member to work for a specified period of time, for example consultants and substitutes. Unplanned turnover occurs when a team member resigns unexpectedly. That can happen if team members are dissatisfied with their jobs, have bad relationships to colleagues and managers, or get offered another job (Vangel 2011). But turnover can also be experienced when team members consists of temporary replacements, transfers, visitors and consultants, which are all considered as newcomer roles (Thompson 2015, p. 144). The teams at the studied company are experiencing planned turnover since they are aware that the members always must prioritize new assignments with clients above everything else.

Team member turnover can have benefits as well as consequences. There are more benefits in teams that has been formed during a long time, without any exchange of team member. One benefit is that newcomers inspire creativity and innovation (Thompson 2015, p.143). Newcomers also break up group decision pitfalls like group thinking which enhances decision making (Thomp-

son 2015, p. 187). Despite the benefits, whenever there is a newcomer to a team the trust is affected, which is especially important in technical and problem solving teams where each member must feel like they can contribute without being ignored or ridiculed (Thompson 2015, p. 95).

When a team member leaves the team can experience loss of competence, when a new member arrives training might be required. If the new team member happens to be the project manager, a change of leader may lead to changed leadership style. This can cause confusion, dissatisfaction and disengagement, especially when the two leaders have opposite leadership style, e.g. autocratic versus democratic (Thompson 2015 p.303). All of these events can cause a disrupted workflow making the teamwork less optimal.

A new member in the team can break the group cohesion, which can have several consequences such as decreased motivation and commitment. The atmosphere in the team can change, for example if the "old" team members shun the newcomer. If there are many newcomers, the team might need go through the Tuckman's stages of group development (Tuckman & Jensen 1977), which is time consuming and will affect the teamwork. Teams with low structure suffer more from team member turnover than teams with high structure (Thompson 2015, p. 265).

2.6 High performance teams

Teams that reach the performing stage finishes projects faster, produce products of higher quality and generate more revenue than teams that have not reached the same stage (Wheelan 2013, p. 58). The 13 characteristics of a team that has reached this stage are:

1. Members are clear of the team's goals and agree on their own roles.
2. Tasks are appropriate and given to individuals with the matching abilities.
3. The leader has chosen a leadership style that matches the team's development level.
4. The communication style is open and invites all members to participate.
5. The team receives, provides and acts on feedback.
6. The team spends time on defining, planning and discussing problems that must be solved and how they will make decisions.
7. The team uses effective strategies to make decisions, implement solutions and solve problems.
8. Deviance is tolerated when it is done in order to solve the task.
9. The team norms encourage high performance, quality, success and innovation.
10. The earlier created subgroups are integrated into the team.
11. The team consists of the smallest number of members possible in order to accomplish its goals.
12. The team is highly cohesive and cooperative and they have enough time together to create a mature working unit.
13. Conflicts may occur frequently but they are brief and the team has effective strategies to solve them.

Wheelan also present 10 key areas to productivity that are: goals; roles; inter-dependence; leadership; communication and feedback; discussion, decision making and planning; implementation and evaluation; norms and individual differences; structure; and cooperation and conflict management (Wheelan 2013, p. 60). These are presented in *Table 2* with a description of each area.

Table 2. *The 10 key areas to productivity in teams*

Area	Description of area
Goals	The most important factor that affects a high performance team is that the team need to be clear of the objectives of the project.
Roles	The team needs to be organised so that each member can recognize their role in the team and the tasks associated. The roles should be decided based on the ability and skills and the member must agree and accept the assigned roles.
Interdependence	Members need to work together as a unit and in subgroups. Interdependence means that the members are mutually dependent on others.
Leadership	In productive teams, the style of the leadership needs to change to meet the group's needs. If the leader maintains one style of leadership throughout the life of a team, the leader will not facilitate the development of a high performance team.
Communication and feedback	High performance teams allow all members to express their opinions, which enhances productivity because all ideas and suggestions get attention. Members give each other constructive feedback about individual performance.
Discussion, decision-making and planning	Planning on the solutions to the problems is an important part in high performance teams. They determine how decision will be made before attempting to make decisions. Before a final decision is made, the team defines and discusses so that everyone is clear about the issues involved.
Implementation and evaluation	The solutions and decisions that are made by the members are implemented and if successful, develop methods to evaluate the solutions and decisions.
Norms and individual differences	It is difficult for teams to perform at high level if it is not expected. Therefore, norms that encourage high performance, quality and success are established.
Structure	There are three factors that are important to the structure of teams. First, the team contains the smallest

	number of members necessary to accomplish the goals. Second, the members are able to form subgroups in order to get work done. Third, subgroups must be accepted and valued for their contribution to the team
Cooperation and conflict management	High performance team is highly cohesive and the members are cooperative. Without cooperation, success is unlikely. Although the members cooperate, it does not mean conflict never occurs. They have effective conflict management strategies.

It becomes quite clear that the areas that makes a team productive are more or less similiar as the ones that makes a team effective, as presented in *Table 1*, section 2.2. However, these 10 elements are more focused on the processes in teams than those presented in *Table 1*.

2.6.1 High performance team members

For a long time the focus has been on creating effective leaders in order to have effective teams (Wheelan 2013), yet the teams that give the best results are those that are not manager led, but rather self-managing or self-designing teams (Wheelan 2013, p. 69). Focus should instead be on creating effective team members that act according to these 10 key points:

1. Does not blame others for group problems.
2. Encourages the process of goal, role and task clarification.
3. Encourages the adoption of an open communication structure where all member input and feedback is heard.
4. Promotes an appropriate ratio of task and supportive communications.
5. Promotes the use of effective problem-solving and decision-making procedures.
6. Encourages the establishment of norms that support productivity, innovation and freedom of expression.
7. Goes along with norms that promote effectiveness and productivity.
8. Promotes group cohesion and cooperation.
9. Interacts with others outside the group in ways that promote group interaction and cooperation within the larger organisational context.
10. Supports the leader's efforts to facilitate group goal achievement

From the list above, it is noticeable that high performance team members are more important for successful project teams rather than effective leaders. The key factors that contribute to high performance among the team members are engagement and encouragement. Interaction with people outside the team as well as group cohesion will also motivate people to strive for a better work performance.

2.7 Maintaining performance

Not only is it hard and uncommon for teams to reach the fourth stage *performing*, if not handled correctly the team will most likely fall back into old

habits. Wheelan (Wheelan 2013) noticed during her research that most people have experienced the team development stages forming, storming and norming (see section 2.1), but less than one out of four people had been in a performing team (Wheelan 2013, p. 14). Some teams in this stage also tend to get overly confident in the team's abilities to solve problems.

Positive norms in a performing (see section 2.1) team include the team's encouragement towards high performance and quality, their expectations in being successful, their encouragement of innovation and their attention to detail (Wheelan 2013, p. 44-45). In order to maintain the team's high performance three activities can be done: (1) the team gives, receives and take advantage of feedback regarding their effectiveness and productivity. (2) The team evaluates their performance regularly. (3) The team takes the necessary measures to avoid routine and getting stuck in old habits (Wheelan, 2013, p. 51).

Daniel Pink (Pink 2011) wrote in 'Drive' that motivation of the team are affected by three factors, namely autonomy, mastery and purpose (Pink 2011). Autonomy means that the team and the individuals have the power and authority to rule over their own internal processes and decisions (Yemm 2012, p. 112). Teams with higher degree of autonomy also lead to improved productivity, quality, savings and employee morale according to Thompson (Thompson 2015, p.25). Pink (Pink 2011) says that mastery comes from people's level of engagement in their work; he means that their interest will lead to stronger skills. Purpose defines the need that people feel to work on something that they feel are important and can be described as our personal vision (Yemm 2012, p.112).

Maintaining performance is difficult in all teams but it is still possible if the team members are engaged in their work and if encouraging activities are performed in the team.

2.8 Knowledge management

For an organisation to be successful, knowledge management is an area that is important to focus on (Danilidis 2010). To keep valuable knowledge and experience, it is important to implement systems to keep the knowledge within the organisation.

The concept knowledge management was used already in the 1990s to codify (Hagberg M. & Mogefors D. 2011, p.9), store, manage and spread knowledge. Although organisations have realised the importance of knowledge management, many companies still lack an efficient system for knowledge management. one of the reasons in due to lack of knowledge management policy (Hagberg M. & Mogefors D. 2011, p.9). Knowledge is commonly described as explicit, implicit or tacit (KM World 2012). Explicit knowledge (KM World 2012) is information that is set out in tangible form while implicit knowledge (KM World 2012) is set in intangible form but could be made explicit. Knowledge that is difficult to set out in tangible form belongs to tacit knowledge (KM World 2012).

Knowledge transfer is usually categorized in four models: socialization, externalization, combination and internalization. The models are presented in *Table 3*.

Table 3. *The four models of knowledge transfer*

Model	Description of model
Socialization	Known as converting new knowledge through shared experience. It is focused on tacit to tacit linking. Knowledge is created by interactions, observations, discussion and analyzing.
Externalization	Focuses on tacit to explicit knowledge linking. Externalization is driven by metaphor analogy and models.
Combination	A model where knowledge tranforms from explicit to explicit knowledge. It entails categorizing and systematizing explicit information.
Internalization	Creates explicit knowledge by using tacit knowledge and is shared in the organisation. It is related by "learning by doing". It is helpful if knowledge is written on paper or presented in diagrams.

Hansen (Hansen 1999) describes two strategies for spreading and maintaining knowledge in organisations; codification and personalization (Hansen 1999). Codifications mean that the knowledge is transformed to code in for instance illustrations and writing. By using codifications, the knowledge can be stored and become available to others. Personalization means that knowledge is transferred from person to person. The knowledge can be transferred through social networks, coaching programs, meetings and teamwork.

Obstacles with knowledge management include time and motivation (Daniilidis 2010). The time required for using the knowledge management methods need to be considered. According to Fong & Lee (Fong & Lee, 2009), lack of time is the biggest barrier for knowledge transfer. To keep a motivation at the employees, the methods need to be easy to use. The employees also need to see the benefits with using the methods, in order to keep a high motivation. The culture of the company, encourage from leaders and managers as well as collaboration are all factors that will affect how well a knowledge management system works (Fong & Lee, 2009).

2.9 Related work

There is not much research in the area of volatile teams and guidelines to improve the teamwork within such teams. However, the work "Supply chain management of teamwork: six guidelines for success" (Schetach 2014) regard-

ing guidelines provides some knowledge on the area. The work was based on an analysis of the difficulties that could stand in the way of efficient implementation of supply chain management processes.

There are quite a lot of texts written about employee turnover in general and how to prevent it or how it affects the remaining workers. One such text is "Personnel Turnover and Team performance" (Levaine et al 2005). The text presents how the turnover affects the remaining teams performance, which is interesting for the readers of this thesis who wants to understand the problems caused by the turnover.

One relevant article is "The dynamics of entrepreneurial teams" (Ucbasaran et al 2002) which has studied turnover in entrepreneurial teams. They studied both turnover, both voluntary and involuntary, and the processes that some teams used to better manage the turnover and perform better. Another work is "Learning versus Performance in Short-Term Project Teams" (Druskat & Kayes 2000) which presents a highly relevant study in how teams can both learn and perform during short projects.

Knowledge management is also an area relevant for this thesis and the work "Key challenges in the search for the effective management of knowledge in management consulting firms" (Dunford 1997) presents processes and methods used by management consulting firms to maintain their competitive advantage. These involves the documentation method codification which is a common tool for knowledge management and a potential solution for firms with volatile teams.

It is interesting to note that there is in fact almost no literature on the subject of high team member turnover where the turnover is not caused by an employee leaving the company for good. This makes the thesis of this study even more relevant and needed since more companies today are working with volatile teams.

3. Method

This chapter will present the methods used in this study for data collection. The purpose of this chapter is to present the theory behind the methods and why these methods are used in this study. The first section will briefly present the approach for data collection, followed by a section about inductive and deductive methods and qualitative and quantitative methods. The last two parts reviews the confidentiality, reliability and validity of the study and interviews.

3.1 General approach

The study starts with a literature study to attain knowledge about the field in focus and to ask appropriate questions at the interviews. This is followed by interviews to gain information about the specific problems that the teams at the company experiences.

In this study, an inductive qualitative method is used where the results from the interviews are compared to the theories in literature. From this guidelines are created that contributes to improved teamwork. The study is based on a few qualitative interviews and the results are based on these making this study inductive in its research approach.

3.2 Qualitative and quantitative methods

There are several definitions of what qualitative and quantitative methods. According to Murray, "*qualitative methods involve a researcher describing kinds of characteristics of people and events without comparing events in terms of measurements or amounts. Quantitative methods, on the other hand, focus attention on measurements and amounts (more and less, larger and smaller, often and seldom, similar and different) of the characteristics displayed by the people and events that the researcher studies.*" (Murray 2003).

However, researchers are not satisfied with such a simple distinction, leading to other definitions. The definitions of the two methods differ depending on the writer or researcher. Qualitative research (Denzin & Lincoln 1994) studies phenomena in their natural settings. It involves case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts. Qualitative researchers seek to make sense of personal stories and the ways in which they interact (Denzin & Lincoln, 1994, p. 2). A difference in the definition of quantitative methods exists also:

1. *Quantitative research uses numbers and statistical methods. It tends to be based on numerical measurements of specific aspects of phenomena; it abstracts from particular instances to seek general description or to test causal hypotheses; it seeks measurements and analyses that are easily replicable by other researchers. (as cited in* Murray 2003*)*
2. *Quantitative researchers seek explanations and predictions that will generalize to other persons and places. Careful sampling strategies and experimental designs are aspects of quan-*

titative methods aimed at produce generalizable results. In quantitative research, the researcher's role is to observe and measure, and care is taken to keep the researchers from "contaminating" the data through personal involvement with the research subjects. Researchers "objectivity" is of utmost concern. (as cited in Murray 2003).

Based on Denzin and Lincoln's definition, a qualitative research method is deemed to be the most appropriate for this thesis. An interactional method that places more weight on personal experience and detail seems more fitting than a method based on statistics.

3.3 Literature study

A literature study is conducted to get the needed knowledge for the study. The knowledge is obtained from books and research articles regarding the desired field. Since turnover at companies is a common occurrence, there is a wide range of literature that covers the area. This can be seen for example in the Scopus database with the search term 'team member turnover' (Scopus 2015). Not so common however is the type of frequent and planned turnover demonstrated in this study. Since there is an abundance in research articles to choose from, cases that are as similar as possible compared to the situation in the studied company is chosen. As for literature, newly published books that are suitable for the topic are the first choice.

Leigh Thompson (Thompson 2015) wrote "Making the team, a guide for managers" which describes the creation, structure, dynamics and relationships that team consists of (Thompson 2015). This book will be used to gain understanding for what affects a team so that the study at the company will be more gainful. The teams in the study all work in projects so in order to better understand projects the book "Project management" by Harvey Maylor (Maylor 2010) will be used as well. Harvey's book describes what a project is and how to manage it in different forms, what common problems are and how to solve them.

3.4 Field study

In order to gather data about the teams in the study interviews were conducted. The interviews were conducted with the team leaders, the person who had been on the project the longest time and the person who had been there the shortest time. This was done in order to get two different perspectives on problems that arise in teams with high team member turnover.

3.4.1 Interviews

There are three different kinds of interview techniques, structured, unstructured and semi-structured, that is commonly used (Dawson 2009, p.27). Kvale states that qualitative interviews are the key to understanding how subjects experience the world since its only then that they may freely describe their opinions, experiences and activities (Kvale 2007, p.9).

Structured interviews (Fowler & Mangione p.33), also known as standardised interviews is an interview when the questions are prepared beforehand and all of the questions are asked in the same order to the different interview subjects. If an answer is not precise enough the subject is asked to clarify in a way that does not affect the answer. The answers should be recorded and they should only reflect the subject's answers. Furthermore the interviewer should hold a non-judgmental tone and be neutral, not indicating any personal stance on the matter or delivering positive or negative feedback. Structured interviews make it easier to collect the answers since all of the questions are the same. But this kind of technique also comes with two main problems(Fowler & Mangione p.33). The first is that if it is not easy to design the questions according to this structure, then it is not probable that it will be used. The second one is that the interview subjects do not know what is expected from them (Fowler & Mangione p.33).

In an unstructured interview the questions may come in a different order for the different subjects and the questions may be based upon the subjects earlier answers and reactions. Dawson (Dawson 2009) says that this is commonly used in order to make the subject at ease and let them speak freely, the goal is to have as little influence by the interviewer as possible. This type of interview method only works when the goal is to gain qualitative research (Dawson 2009, p.28)

In a semi-structured interview, the interviewer has some prepared questions as well as a sequence of themes to cover. There is openness to change the sequence of themes and question formulation depending on the received answers (Kvale 2007, p.65). The interview method is used to understand the subject's own perspectives and performed almost as an everyday conversation but with a specific approach and technique (Kvale 2007, p.11)

Ethical issues during interviews

During an interview there are several aspects of ethics to consider. The main one that Kvale (Kvale 2007) presents is that the questions should be asked to improve the human situation that is under investigation. Another one is that the situation might affect the subject and cause stress or changes in self-understanding causing the subject to answer differently than in a more comfortable situation. Also the interpretation of the subject's answers and discretion while handling and reporting must be considered so that they are not angled by the interviewer (Kvale 2007, p.24). These factors must be taken into account while constructing, performing and evaluating the interviews so that they are not biased.

Chosen interview method

For the interviews in this study, the semi-structured method will be used. A structured interview would not result in anything new that the interviewers did not already know about. Semi structured helps the subject since the topics and areas of interest are specified while not being too general. The questions must mainly be open in order to get answers other than 'yes' or 'no'. This way

the interviewers can keep the interview on track and find valuable information for the study while asking new questions related to earlier answers.

4. Study

This chapter presents the pre-study and the study performed at Netlight Consulting AB during the spring of 2015 at the Stockholm office. Three different data gathering methods is used; introduction from mentors, informal meetings with the team leads and the interview questions to be used in five semi structured interviews.

4.1 The pre-study

In order to conduct a study of high team member turnover a company which experiences this was chosen. The company is Netlight Consulting AB and they offer services within IT and management consulting in Stockholm, London, Oslo, München, Berlin and Helsinki. The teams that were used for this study all worked with software development in the so-called internal projects, to create products and services for Netlight's internal use. The products and services that were created are not relevant to the study and focus will not be on them, rather the teams and their teamwork. Some of the teams had a member in another country, which they worked with through ICT solutions.

As the study is commissioned work by Netlight Consulting AB, two employees are appointed to act as mentors and give necessary support during the study. To further understand how the teams work meetings are held with the team leads from four different projects. The meetings with the team leads and the mentors are unstructured and informal.

To understand how the internal consultants work in the internal projects, a brief introduction was given regarding the project methodologies used, how the communication with the team members outside Stockholm was etc. This information was received from unstructured and informal meetings with the mentors and team leads. The main purpose with the informal meetings was to get knowledge about what complications and problems could occur due to the volatile team structure so that the interview questions could be created.

4.1.1 Meeting with mentors

The mentors are not currently involved in any of the internal projects but they have both worked with them before and are aware of how the teams work. To get acquainted with the company, introductions and explanations are held by the mentors. Presented is the internal project teams' working methods, company culture and their use of virtual teams. This is done so that the questions created for the semi-structured interviews will be relevant. When the mentors have provided an overview of the working structures, the internal wiki-page Internallight is used to find the information that the internal teams use to operate the internal projects. The information in Internallight involves background and information about the project, information about the progress of a specific projects etc.

4.1.2 Meeting with teamleads

The 4 team leads are all currently working in the internal projects. Some are alone in the project while others are in a team consisting a few individuals with some members in Berlin and Oslo. The team leads present what their projects are about, how they work and some information about their processes and systems. This knowledge is used to create questions for the semi-structured interviews that will be relevant.

4.2 The performed study

The study at the company consists of interviews that are held with five consultants currently working in an internal project team. The different consultants were chosen based on the time they have been a part of the project team.

4.2.1 Interview questions

After knowing how the internal projects work and what problems the company encounters, the interview questions was created. In order to cover a wide area of information the questions were created based on 6 different areas: the consultants' backgrounds; Project difficulties; Productivity and efficiency; Communication; New project member support and; Handover process. The order of the questions in the table does not represent the order of the questions in the actual interviews.

The first column states whether the question is asked to senior (S) or junior (J) members. In total there are 3 senior and 2 junior members. In table 4, it is also marked if the question was asked to a senior member (S), a junior member (J) or to the internal project manager (IPM). The order during the interviews was based on the context since the interviews are semi structured. The questions are showed in *Table 4*. Also presented is the motivation behind each question.

Table 4. *Interview questions*

The consultants' background		
S, J	Q1	Have you been in an internal project team before?
Motivation Q1: To find out if the members have experience in different project teams.		
Project difficulties		
S, J	Q2	What are the most common complications that you experience in the internal project?
Motivation Q2: To find out key and/or occasional problems.		

S	Q3	What are the most common complications when there is a new member in the team?
Motivation Q3: To find out key and/or occasional problems with new members.		
Productivity and efficiency		
S, J	Q4	How long did it take before you felt productive?
Motivation Q4: To find out how much time the members spent doing preparatory work.		
S, J	Q5	Is there any work-related activity that you feel is a waste of time or that could be improved?
Motivation Q5: To find out if some activities or moments can be improved and revised.		
S, J	Q6	Is there any work-related activity that you think is very good?
Motivation Q6: To find out what activities or moments are of great importance for the teams.		
Communication		
S, J	Q7	Did you receive any documentation when you joined the internal project?
Motivation Q7: To find out if the new members received enough material to get started.		
S, J	Q8	Do you feel comfortable contacting earlier members to ask for help?
Motivation Q8: To find out what the norms are regarding communication.		
S	Q9	Do you know where to find help when needed?
Motivation Q9: To find out if the members are aware of what documentation they can use and how to find answers.		
S	Q10	Have you experienced that someone has called you to ask for help about a project that you've left?
Motivation Q10: To find out what the norms are regarding communication.		
New project member support		

S, J	Q11	How were you taken care of as a new team member?
Motivation Q11: To find out what the teams do to introduce new members		
S	Q12	How do you help new team members?
Motivation Q12: To find out what the teams do to introduce new members		
Handover process		
S	Q13	How is the handover handled when someone leaves the project?
Motivation Q13: To find out how the team handle handover processes.		

Most of the questions are asked to all interview subjects. Some questions are especially asked to the senior members. Since one consultant has experience as both an internal project manager and has been working in the internal projects for a longer period of time, the consultant is classified as senior here.

5. Results from data collection

This chapter presents the results received from the study. It involves information received from the mentors, the informal meetings with the team leads and the answers received from the performed interviews.

5.1 Data from the pre-study

This section presents the data collected from the mentors and team leads about what working methods the project team usually uses, company culture and use of virtual teams. This result was obtained in an unstructured and informal way and received over a period of time.

5.1.1 Working methods

Since the company works with delivering software solutions and the teams are agile most employees are familiar with the agile project methods Scrum and Kanban. The internal projects are not only a way for the company to create services and products but also to teach the consultants about these agile project methods. This is especially important for newly hired consultants that might not be familiar with them. The projects seldom follow a Scrum based working method fully; they work with some of the activities that they find relevant for the team. Today each project team uses standup meetings every morning and each week they have a big standup meeting where everybody gets to present themselves, their roles and their projects. The day-to-day standup meeting is sometimes held via Skype if the team has members in other cities as well. They also use a product backlog and sprints as well as revision control and issue tracking system when programming and working with the project's issues.

5.1.2 Company culture

One of the main purposes with the internal projects is that the consultants can learn new skills and develop themselves to become a better consultant. The company has a culture that encourages the consultants to learn new skills on their own as well as get guidance from other consultants that have knowledge within the working area. Therefore, when a new member starts a new project and is uncertain with something, the new member can discuss with the former team member. The contact with previous members is a way of knowledge management by keeping the knowledge within the projects or transferring knowledge to other consultants.

5.1.3 Virtual teams

The company has offices in Stockholm, Munich, Berlin, London, Helsinki and Oslo and the internal project teams often consist of consultants from different cities, creating virtual teams. If team members are distributed across different cities they still perform standup meetings each morning, only they do it with Skype-meetings instead. This solution is used in order to allocate appropriate skills to projects that need them. That way even if the Stockholm office lack team members with a specific skill they might still be able to allocate it by

working with someone for example in Berlin or Oslo. This way of working has proven to work quite well despite the time differences and occasional technical difficulties. There is no point in moving the needed member from one city to another, costing both time and money, since they always has to prioritize potential clients.

The team leads have pointed out that it is hard to build teams with maturity since they have such high turnover of team members. Some teams take months to reach a good working level and having virtual teams does not help the situation. The team members communicate frequently using Skype but it's still harder to create the same kind of group dynamic as with team members that work side by side.

5.2 Data from team leads

Informal meetings with several internal projects' team leads are held to understand how the teamwork and what problems could occur due to the frequent team member turnover. During the meetings, popular working activities from agile project methods are mentioned. This includes daily and weekly stand-up meetings, sprints, product backlog and the role product owner.

The tools that are used for communication are Skype, Slack, Acano and e-mail. The team leads say that the communication between team members works well but the communication with the product owner varies. Some think that the product owner is active and is reachable, some thought opposite.

One of the main problems in the communication was the handover process. All team leads noted that the handovers more often than not lacked information and was too hasty.

The team leads had similar opinions regarding the website used for documentation, Internallight. They think that the user interface was not user-friendly and it is hard to find information in the system.

5.3 Data from interviews

During the study 5 semi structured interviews are conducted with consultants in the internal projects. The questions are presented in Appendix A. The interviews are held with members that had been on the team for the longest and shortest period of time in order to acknowledge and detect problems from different perspectives. The interview subjects have different amounts of experience and some were more senior than others and have worked on many different internal projects, while others were recent graduates from university and completely new to the company. The question that is asked during the interview is written in parentheses, for example question 1 is marked as Q1. The numbering is according to *Table 4* in section 4.2.

5.3.1 The consultants' backgrounds

Four out of five interviewed consultants have been on an internal project more than one time (Q1).

5.3.2 Project difficulties

The most common problem is the bad quality of documentation. Much of the information on the documentation website is not updated and the project team members do not know what is valid for the moment. Another problem, which mostly occur when starting a new internal project is the installation of hardware and software programs. The installation is time-consuming and the consultants often do not know how to set up the programs (Q3).

The frequent turnover contributes to another difficulty for the consultant that takes over someone else's work - understanding of code written by someone else. Some consultants do not comment the code, which causes difficulties to understand what the previous team member was working on and if the solution is complete. In this kind of situation, newcomers do not know if they should keep working on the solution or start working on a new issue. The consultants have a strong commitment to their work. Therefore, they want to contribute with something while being on the project. This means that they try to solve an issue as quick as possible, which leads to the lost of long-term sight. At the end, the implementation does not meet the expectations or the standard of quality (Q2).

5.3.3 Productivity and efficiency

There were many opinions about how much time it takes to become productive and what was needed for productivity. The environment, self-responsibility and atmosphere in the project team drives you to want to accomplish something. It takes approximately 4-5 days to understand most part of the project (Q4). An activity that all interviewed consultants agreed on was effective and contributing was the stand-up meeting because during these meeting, problems that other project groups had experienced could be discussed and other project teams that have the same problem can help each other (Q6). Fortunately, there are no activity that is a waste of time or could be improved (Q5).

5.3.4 Communication

The communication between the team members, both those in Stockholm and those outside Stockholm works well and the consultants working on the internal projects know who to contact in case they need help (Q9). Contacting previous team members for guidance is an opportunity, that some consultants take when needed (Q8). Some of the interviewees have also experienced this (Q10). However, the documentation of solved issues, solutions and ongoing work is of bad quality, which is a problem, especially for those who recently have started working (Q7).

5.3.5 New project member support

The support when a new member starts a project was satisfying for all new team members. The support can be helping the new member install the hardware and software programs needed for the project (Q11), (Q12).

5.3.6 Handover process

It often happens that the consultants leave the project with a short notice. The consequence is that the handover process is not done properly (Q13).

5.4 Compilation of the results

In *Table 5* the percentage of interview subjects that pinpointed certain problems are presented.

Table 5. *Compilation of project experience*

Opinion	Agrees (%)
Low quality documentation	100%
The handovers are too hasty	100%
Installation of software is time consuming	100%
Internallight is not user-friendly	20%
Stand up-meetings is a good work activity	100%
Daily contact with team members at other offices is good*	40%
Contacting an external consultant to ask for help is no problem	100%

* Only mentioned by two consultants, the other three was not asked about this and therefore never spoke of it.

From *Table 5* it is quite clear that the serious problems are low quality documentation, hasty handover and time consuming software and hardware installations. All consultants were asked about what they thought about the documentation service Internallight and everybody thought that it was too bothersome to use in order to find relevant information. Only one consultant mentioned during the interview that the user interface was bad but this was something that was also mentioned by the team leads in the informal interviews.

During the interview the consultants pinpointed the work activities that they found to be helpful. These can be summarized as the "agile touch" to the internal projects and especially the stand up-meetings. The stand-up meetings contributed to cohesion and updates from the other project teams. Teams that encountered similar problems could assist each other to solve the problems.

6. Results and solutions

Four key problem areas will now be presented based on the results in chapter 5. These will be discussed and guidelines will be suggested based on the specific problems that the company experiences combined with the extended background about team performance. At the end of this chapter, other factors that are unique for volatile teams and affect teamwork will be discussed.

6.1 Problems experienced

Many of the problems can be traced to the high team member turnover and can be summarized in 5 key areas: (1) Low quality documentation. (2) Wasting time when installing the development environment. (3) Loss of long-term perspective. (4) Handover processes. (5) Roles and responsibilities. Each area contains one or more solutions. In this part the problems will be described and solutions will be presented and motivated.

6.1.1 Low quality documentation

The company's experienced problems with low quality documentation originate from two main factors: the internal wiki-page Internallight and a lack of documentation.

Internallight

The interviewed consultants all mentioned that the documentation they received was from their internal website, Internallight. They all agreed on that the documentation was of bad quality, was not updated and a lot of information was not longer valid. Most of the interviewers reflected that the documentation had low quality and was rarely updated. Because of the out of date documentation, the team members do not know what is valid at the current time so no one dares to delete or update the information that is already on the website for documentation. There is a general dissatisfaction among the consultants regarding Internallight.

A new documentation service
A suggestion is that the company transfer to another documentation service. The effect will be that the project members have an easier task when it comes to documenting their work. A new service will most likely have a better user interface and up-to-date services that are relevant for a software development team working with agile development methods. Modern services offer tools to plan, track and work more efficiently. The whole project can be organised with schedules, sprints, issues and their respective status, warnings and risks. This will encourage the team members to used the service more often.

A transfer from the old system Internallight would involve a certain amount of work and time spent on introducing the new system to the project members and moving the current data. However, today most consultants spend a lot of time filtering through the outdated and irrelevant information stored in Internallight in search of the relevant material. A switch to the new system may

take time at first, but will favour the project members in the long run. It will also be easier to maintain the data and projects if the used service is maintained regularly and updated as project methods change and new improved methods come along.

Documentation

During the study, it was also noted that there are different habits whether or not code should be commented. Some team members have the habit to document their code while others do not. Because the quality of the code varies, lack of comment of code will cause incomprehension and it will be time consuming when trying to understand code that someone else has written. The interviews also showed that the team members do not document their work and their solution to solve an issue because they are focused on just solving the issues and making progress. This often leads to confusion as to how problems have been solved and what problems actually have been solved since the team members seldom update the product/sprint backlog.

Documenting the work

To improve the bad quality of documentation, one solution is that the team members spend a short amount of time at the end of the day to comment their code and their work. It is especially important that the consultants have the habit to comment their code.

Since everyone has different coding styles and it is more or less guaranteed that another developer will take over the work, commenting the code will make it easier for someone else to understand it and will spare the developer a lot of time. An expectation of improved documentation of both the code and the work will make it easier for new members to understand what has been done and what need to be done in the future. Documentation is also needed for future maintenance and updates. This is especially important if the internal projects are to be used as a tool for the consultants to learn and develop.

6.1.2 Software installations

All consultants mentioned that the part that takes the most time when starting a new project is the installation of working environments (e.g software). The internal consultants have experienced difficulties when installing the development environment needed for the project. When starting a new project, installing the development environment often takes at least one days work and requires the consultants to actively participate in the installment, making them lose time that could have been spent on learning about the project and their assignments.

Ready-to-go software

There are a few ways to solving this problem. One way is having ready-to-go computers with all the needed software pre-installed so that the consultants do not have to waste time when joining the project. Their first day they get a computer with all the needed software already installed. When they finish on the project they simply leave it behind for the next member. Another solution is having a script that runs the installation without input from the user. Using either of these solutions, the consultant can focus on getting to know the project in the mean time, not managing the installation process.

Having pre-installed computers with the needed software would increase the internal projects' overall costs. During some periods when many consultants work on the internal projects there may not be enough computers to go around and they might still have to use their own.

Writing a script to install the software that is used most often would involve some work. It could however turn out to be more efficient in the end than having each new project member spend time on looking around in Internallight for the installation guides that may or may not be out of date.

Both solutions would mean more time for the new project members to get acquainted with the project and get to work. If the project members work more efficiently and produce more during the time they work internally, it might just be cheaper anyway.

6.1.3 Loss of long-term perspective

When team members know that they will start a new assignment, they try to solve the remaining issues as fast as possible. It is often done by changing their way of solving the problem in order to make it within the timeframe. This can however lead to solutions that are less optimal but faster to implement. Consequently, a solution that is not optimal and may not work in the long run is implemented - the consultant loses their far sight. The code the developers are writing may also not be efficient. The problem with this is that the issues will have solutions with bad quality or the solutions are not the most optimal. In the end, the service might not work as it was thought and since the services the consultants are developing is guaranteed to be used for a long time, the services has to be sustainable.

Focus on quality rather than quantity

An expectation is that the team members focus on creating qualitative solutions that will work in the long run rather than temporary solutions created because of a time limit. This will lead to more effective systems that might require less maintenance/updates in the future. This shows also how important proper documentation is. If the current team member does not have the time to finish the implementation, someone else can easily take over the work.

6.1.4 Handover processes

A common opinion was that the handover process was not handled properly due to the short notices when receiving new assignments. This leads to problems when a new member takes over the work. For example, it makes it hard to keep working on started solutions that is not well documented due to the hastily handover.

Improved communication

Many problems associated with hastily handover can automatically be solved when the documentation is done properly. Good and informative information will help the project members during the handover process. During the interview it was suggested that one possibility for future work is to research whether or not the communication with the sell-department could be improved.

That way, if the consultants know several days before that they have a new client, they have more time to start the handover process. If they have more time to finish their own work the risk of leaving unfinished tasks and unsolved issues is smaller.

6.1.5 Roles and responsibility

Some supporting roles, such as the product owner, sometimes seem unaware of the responsibilities associated with their roles. Sometimes, the supporting roles are unreachable which causes a frustration and confusion among the team members. When the supporting roles outside the development team are not active in the project or aware of the project specifications, it will prevent the project team from performing since they are at some level dependent on the supporting roles. The occurrence of this problem may depend on the fact that supporting roles have not received clear instructions or that they simply have too much to do and do not have the time to perform their duties.

Clarify supporting roles

A suggestion to solve this is that before choosing the person for the role an evaluation should be done to make sure that the person actually has the time to play the part. It is also necessary to inform that person about the responsibilities that comes with the role and where the documentation about the project and the roles can be found.

6.2 Other factors

Although the project teams experience a high turnover of members, the factors that affect the team are different compared to traditional project teams. For example, when there are newcomers in the team, the rest of the team will not see the newcomer as a threat because the consultants' performances are not evaluated based on their work in the project. The internal projects will never reach maturity and be able to go through the stages of team development (see section 2.1) as traditional projects, due to the constant turnover.

The members of the project are clear on the goals of the project work but their highest priority is to get a new assignment. Therefore, they may not be so focused on the internal project work due to distractions with attending interviews and updating their resumes. When the internal consultants reach lower numbers it also becomes harder for the internal project manager to place the consultants in projects that match their wishes. These factors might make it harder to maintain a high motivation and performance since the internal projects are not the consultant's main occupation.

7. Guidelines

This chapter presents the motivation behind the guidelines and why they are needed, the actual guidelines and a summary of them. An evaluation of the guidelines is presented as well in order to assess their relevance and possibility of being conducted.

7.1 Motivation for the guidelines

Based on the problems described in 6.1 and 6.2, four categories can be defined: processes, resource, people and long-term perspective. These categories all represent an area where guidelines can be introduced to improve teamwork.

7.1.1 Processes

The way the documentation and handovers are handled contribute a great deal to the team's success which is why they are also the main areas that needs to be reviewed. The following sections provide general guidelines for both.

Documentation process

To encourage the team members to document, a user friendly and non-complicated documentation process is essential. A system supporting the documentation process is needed combined with assigning a pre-determined period of time to document and commenting. By scheduling the time to document, a habit to document and comment can be created among the internal consultants, which benefits their work as a consultant at future assignments. The pre-determined time should be revised from time to time based on the opinions from the team members.

Handover process

To do an efficient and proper handover, it will be necessary to define a handover process. The process should include
- Background about the project
- Handover of all available documentation
  - Unsolved issues with clear descriptions
  - Currently working issues with clear descriptions
  - Issues solved
- Inform the stakeholders and supporting roles
- Handover of the working project (to a person or put on hold)
- Make sure that no resource is tied up unnecessarily when the project is put on hold

To get newcomers started, a suggestion could be to assign time for education and training, for example while installing the working environment, they can visit websites or watch videos to get a quick and effective introduction to the working methods and skills that is necessary in the projects.

7.1.2 Resources

Generally teams with high team member turnover needs to have just-in-time availability of the resources necessary to conduct their work. This is important since even short delays will have a big impact on the amount of work the team members manages to do before they move on. Resources in this sense includes for example IT, a workplace, documentation and other necessities that the team needs to work.

At Netlight one of the main complaints from the consultants was that they spent valuable time on installments rather than getting to work. In order to speed up the process of joining a new project, the new member needs some sort of support.

Because of the company's problem with lack of IT-resources the guideline regarding resources presented in this thesis is adapted to fit Netlight's needs. The company should ensure that they have just-in-time availability of supporting hardware and software. This could be a script that runs the installation automatically or computers that already have the needed software installed.

7.1.3 People

Most of the internal consultants that have been on an internal project before are aware of the complexity of the situation where team members drops out with a short notice, leaving the newcomer with many questions. It is therefore important that the consultants working on the projects show a great deal of consideration towards each other.

It has to be made clear to everyone that the situation is quite complex and that is precisely why good documentation is needed. This goes for the project members as well as for supporting roles.

7.1.4 Long-term perspective

To improve the team's work they need to start focusing on quality rather than quantity. This can be done by commenting the code and documenting their overall work. In order to actually improve the quality of the code being written there are two increasingly popular techniques that can be of use: pair programming and test driven development.

Pair programming is when two programmers work on the same code, one doing the coding and one reviewing what is being written. This offers two points of views and lessens the minor mistakes like syntax errors, which lowers the debugging time. It also makes it easier to get on with the coding since the programmers does not get stuck as easily on minor problems. There is however a risk of the two programmers socializing instead of working. Another potential risk is that the programmers are on very different levels, which lead to, that one person does all of the coding, teaching the other person. This could however be a good thing since the internal projects at Netlight Consulting also

have the purpose of educating the consultants. Pair programming could be a good way to share and manage knowledge.

Test driven development is when basic tests are created and the absolute minimum amount of code needed to pass the tests are created. Then the tests are redone to be more demanding and the code is adapted to match the new test, it takes more time to get started and slows down development. This method helps the programmer understand modular design as well as provide clarity during the implementation process. Test driven development create a safety net and makes it easier to rewrite code.

7.2 Summary of guidelines

The guidelines will be presented in the four categories: processes, resources, people and long-term perspective.

Processes

- Define and establish a user friendly and non complicated documentation process
    - o   Establish a system supporting the documentation process
    - o   Assign a pre-determined period of time to document and commenting
    - o   Document the work
    - o   Comment the code
    - o   Revise the pre-determined period of time to document and comment
- Define & establish a handover process
- Assign time for education and training for newcomers

Resources

- Ensure just-in-time availability of supporting hardware and software

People

- Ensure that the involved people are aware of the complexity of the situation
- Clarify supporting roles

Long-term perspective
- Focus on quality rather than quantity
    - o   Implement pair programming
    - o   Implement test driven development

7.3 Evaluation of the guidelines

The two mentors at Netlight reviewed the guidelines and provided feedback. They expressed that change of a new documentation may not eliminate all problems associated with lack of documentation. If the consultants do not re-

alise the importance of documentation, no matter what measurements are implemented, the problems will always exist. They did however like the idea of implementing a routine of documenting the work for a short time each day. They also said that test driven development is a very handy tool but will not likely be implemented in all of the projects because of the amount of work it requires. Overall they expressed that the guidelines are relevant for Netlight and bring up interesting questions of what they could try to implement.

8. Conclusion

This thesis presents guidelines for improving teamwork in projects with volatile teams. An expectation of implementing these guidelines is that the teams will work more efficiently.

The study was conducted by first doing a literature review and then a case study at a consulting firm. The case study was performed by holding several semi-structured interviews with the project team members that had different experiences regarding teamwork.

The results showed that there were some problems within the areas processes, resources, people and long-term perspective. Therefore, the guidelines were created to diminish the experienced problems.

8.1 Discussion

In general, the study was successful and some reasonable results were obtained. Some of the results were expected and some problems could have not been discovered without the interviews. However, the study could have been improved with regards to the points discussed below.

8.1.1 Limitations of the study

There are some limitations of the study, which might have affected the results and conclusions. The literature study provided a general background to how teams develop and work. However, the interviews proved to be the main source of information and inspiration in order to create the guidelines. Currently there is very little literature written on the subject, making it hard to find any standardized guidelines for volatile teams.

Before conducting the interview, a basic knowledge about the project was needed. To get this knowledge, some informal meetings were held with the project team leads. Furthermore, the interview questions might have not covered all areas of interest. The consequence is that the result of the study is incomplete. When the study started, the studied company did not have many internal consultants left at the office. This led to that the study contains only 5 semi-structured interviews. To get reliable and valid results, this number of interviews may be insufficient. Since this study only was performed at one company it focused on specific solutions for Netlight.

The choice of a qualitative research method and an inductive approach might have some effects on the results. By using a qualitative method, the study did not give any statistics that could prove the theory or the conclusions in a measurable way. Semi-structured interviews led to different questions during the interview and the information received varies. The interviewers might have also misinterpreted the answers since the answers were not always straightforward. Therefore the results may have been affected by the interviewer's own thoughts.

8.1.2 Quality assurance

One of the team leads that participated during an informal meeting also participated as an interview subject during the study. The informal meeting might have affected the result of the interview.

Neither of the authors of this thesis are involved in Netlight's business in any way other than this study, this lowers the risk of a biased interpretation of the study.

8.2 Future work

Here we present ideas on how to make the study even more comprehensive based on the limitations of this study.

8.2.1 Add quantitative data

Quantitative data involving specific activities or methods would imply a validation for the guidelines

8.2.2 Company specific

In order to create more general guidelines to improve teamwork, the study will have to be performed at more organisations with volatile teams. One possibility is to research if the other departments of the company could affect the teamwork.

8.2.3 Interviews

The study could have been made even more extensive if the interview questions covered a wider range of questions and if more people were to be interviewed. We could have also interviewed the stakeholders of the project, especially the product owner since some communication problems with the product owner were mentioned during the interviews. If we had interviewed the product owner, we might have been able to create some guidelines that could help the team members get in touch with the product owner more easily or get the product owner be more active in the project.

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Appendix A: Interviews and answers

Have you been in an internal project before?
This question was given to junior and senior members
1.   Yes(4)
2.   No (1)

How were you taken care of as a new team member?
This question was given to junior and senior members
1.   Two members discussed previous experience, work more agile as a team, work more with Kanban. Showed me how to set up the environment, it took us one day.
2.   Well. The problem was the deficient documentation on Internallight, all other team members did the software installation long time ago so they couldn't help very much with the installation. The team lead introduced how the system was implemented so far.
3.   (Old member)Review of the system, reference to the documentation. This might be hard if the new team member is not in Stockholm. The second new member help the new member with the installation of software.

Did you receive any documentation when you joined the internal project?
This question was given to all 5 consultants
1.   They showed me Internallight but the site needs to be updated, there are a few tips on how to get started.
2.   Internallight, but it is not updated and the code is not well documented.
3.   Introduction to the project on the Whiteboard, introduction to Internallight, bad quality on the code. I don't think that the code need to be documented but it needs to be understandable.
4.   Internallight
5.   The handover took a half day and it was hard to make sense of the documentation. If a better software was used (e.g. Jira), then the handover would be more effective. It requires a lot of work to understand the project work and the easiest way to understand something is to talk to someone about it.

How long did it take before you felt productive?/ What was needed to become productive?
This question was given to all 5 consultants
1.   The feeling of responsibility, the environment around you drives you to become productive.
2.   2 days, a week to understand most parts of the system.
3.   4-5 days. (3)

What are the most common complications that you experience in the internal project?
This question was given to all 5 consultants

1. We try to solve the issues as quick as possible and lose sight of the long-term goals and the standard of our implementation. At the end, it does not work as expected.
2. The documentation on Internallight is not updated and you do not know what information is still valid. (2)
3. A team member begins implementing something and suddenly that member leaves for assignment. The next person that takes over might not have fully control over it and we might miss release.
4. When you have a code in front of you and you do not know if it is a good solution or not and as a new member, you do not know who to contact.

How do you help new team members?
This question was given only to senior members
1. Help them set up the environment, be there for questions. Everyone helps each other.
2. Review of the system, reference to the documentation. This might be hard if the new team member is not in Stockholm. The second new member help the new member with the installation of software.

What are the most common complications when there is a new member in the team?
This question was given to the senior team members
1. None, we help each other
2. When they do not understand what should be done, they do not have the right competence which leads to difficulties to contribute and they do not dare to test.

How is the handover handled when someone leaves the project?
This question was given to all 5 consultants
1. Not as well as we could do it. You just let the project go if you get a short notice. Sometimes we just release the work done so far because everyone in the team is leaving for assignment.
2. We skip documenting every day because everyone is focused on delivering something. You can notice if someone has just been in for a day and left rapidly.
3. You try to tell everything you know before you leave and update the information in Internallight. Our product owner is active and involved and everyone help each other out.
4. I try to document and comment all issues and work that I've have done.
5. Because of lack of time during handovers the documentation is bad.

Have you experienced that someone has called you to ask for help about a project that you've left?
This question was given to all 5 consultants
1. Yes. (4)
2. No.

Is there any work-related activity that you feel is a waste of time or that could be improved?
This question was given to all 5 consultants
1. No. (5)

Is there any work-related activity that you think is very good?
This question was given to all 5 consultants
1.   The agile feeling in all projects, Stand-up meeting because you know which competence exists in all internal projects, if several groups have similar problems, can discuss and help each other.
2.   Stand up-meeting, meeting with Oslo every morning (2)
3.   Stand up-meetings. (2)

Do you feel comfortable contacting earlier members to ask for help?
This question was given to all 5 consultants
1.   Yes. (5)

Do you know where to find help when needed?
This question was given to all 5 consultants
1.   I can call someone even if they're on an assignment.
2.   The person that left recently, discuss with anyone else that is suitable.
3.   Yes, first to our product owner and then internal project manager.
4.   Yes, first we talk with IT-support. Some confusion usually occurs so things that should not take long such a long time often takes more time than it actually should.
5.   Yes, to the technical manager for the system, then we ask IT, or others in the office that have done it before.

TRITA-ICT-EX-2015:134