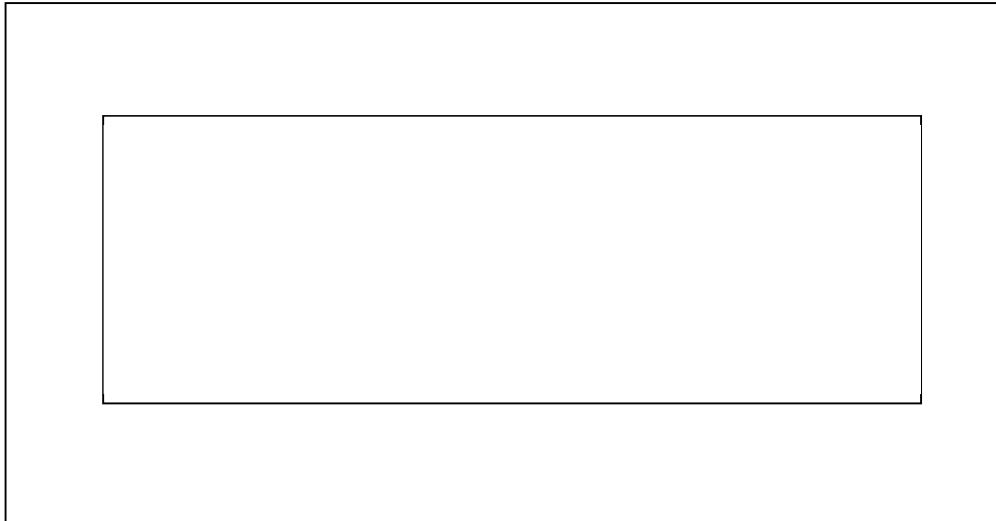




UNIVERSITY OF GOTHENBURG



IMPACTS OF EFFECTIVE COMMUNICATION AND
CUSTOMER COLLABORATION ON INFORMATION
DEVELOPMENT:

A CASE STUDY OF SIGMA KUDOS AB

Bachelor of Science Thesis in Software Engineering and Management

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**IMPACTS OF EFFECTIVE COMMUNICATION AND CUSTOMER COLLABORATION ON
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Abstract

Software and non-software development organizations have increasingly adopted agile because of its good practices. In spite of its success, knowledge of the impacts of agile practices and how it could improve communication and customer collaboration in information development is yet to be well established in most of these organizations. Especially in companies that produces technical documentation (information development). This article presents the results from a study which examined the impact of agile practices on effective communication and customer collaboration within information development teams. The research was carried out as a case study at Sigma Kudos AB. where eight participants within a project were compared from the communication and collaboration perspective. The goal of the study is see the benefits that the practices brings to the organization and their customer.

Keyword: *Information development, communication, collaboration, agile practices*

1. INTRODUCTION

Agile methods have positively changed the approach to software products development (Highsmith and Fowler, 2001) since the creation of the manifesto. The popularity of this methodology has been increasing leading to its implementation by diverse companies of different business structures and size (Dingsøy et al., 2006), (Holström et al., 2006). This is due to the fact that agile provides a collaborative environment in which organizations can both create and respond to change by focusing on adaptability over predictability, individuals and interactions over process and tools and collaboration over contracts negotiation (Highsmith, 2002) among other benefits. Although agile has been mainly implemented in software development, it has been proven it can be implemented in technical documentation (Ruping, 2003).

Extant literature written by authors such as Cockburn (2000) and Highsmith (2002) on agile development has emphasized the importance of effective communication and close customer collaboration as two significant aspects that can boost efficiency in an agile environment. Effective communication can be described in different ways such as; if the information is usefully transmitted. Communication was also described by Malone and Crowston (1994) as a way to manage relationships between producers and consumers. Sharp (2008) described customer collaboration as a way that customers and developers particularly ensure that the system under development is usable and used. Currently, information technology companies struggle to survive in the rapidly changing markets, they have to be more efficient in the way they work in order to increase productivity and customer satisfaction. Therefore many software and hardware companies outsource parts of their developments to other companies and put more time on the vital parts of their business. Most of

these companies such as Ericsson outsource the development of their documentation. This has led to the involvement of information development companies such as Sigma Kudos. Information development companies face problems similar to the ones faced by software development companies such as lack of effective communication and collaboration. These problems could be improved by the use agile principles. Thus our main concern in this study is to find out how agile practices could help to improve communication and customer collaboration in information development.

Agile methods suggest practices for collaboration and interaction within the stakeholders. Thus, in order to investigate and to answer the research question, our framework was designed to focus on understanding effective communication, customer collaboration and how the respective best practices could impact information development. Qualitative data is needed to establish the impacts of this process on agile development (Creswell, 2009). Case method study is one good way of carrying out this research. Qualitative data is gathered from a selected team in an information development company that participated in the research. The data is collected through unstructured interviews, workshop, and observation (Creswell, 2009). The collected data is then coded and analyzed using thematic analysis technique (Braun and Clark, 2006).

The aim of this research is to increase the understanding of how agile practices could be used to improve communication and customer collaboration in information development. The emphases is not on tools recommendations for communication or collaboration nor focuses on the problems alone, rather it's on the positive impacts that the implementation of the practices will have on the development process. This will be a contribution to literature on information development in agile as well as contribution to practical need of team that have been working in non-agile way that needs to communicate and collaborate well in a cross functional team.

The remainder of this paper is organized as follows: we begin with the framework that focuses on the communication and customer collaboration. It is then followed by the method section where we highlight how the research was done and result of the research. Next, is the discussion section, where we will discuss some theoretical relevance of the aspects covered in the framework, practical benefits as well as empirical results of the study. Finally, the paper give a conclusion of the study by pointing out our findings.

2. THEORITICAL FRAMEWORK

This section is to introduce our theoretical framework. It gives an understanding on how agile practices can be used to address communication and customer collaboration problems faced by information development companies. Using the vast literature available in the field of agile we will show how agile practices could be used to enhance better communication and collaboration in an information development team. The practices are derived from Scrum (Schwaber and Beedle, 2002), XP (Beck, 1999) and other agile methods. Agile Software Development incorporates proven software engineering techniques, but without the overhead of traditional methodologies (Highsmith, 2002).

Agile Manifesto is a formal documentation of four key values to guide software developer towards iterative and people-centric way of working (Bell et al., 2001). Keeping code simple, regular testing and regular delivering of functional bits of the application are focus of the agile software development. Waterfall approach is document-driven, heavyweight software development processes. Thus, Agile Manifesto was created as an alternative to the problems with waterfall approach. The four core values of the Agile Manifesto Highsmith and Fowler (2001) emphasize:

- *Individuals and interactions over processes and tools*: Development team cannot depend on tools alone while neglecting the importance of effective communication.
- *Working software over comprehensive documentation*: At the end of the process, if product is not functional then documentations cannot complement the purpose.
- *Customer collaboration over contract negotiation*: Negotiations are important, but in development where requirements are constantly changing will need the customer to be fully involved in the development to help solve the change that comes with time.
- *Responding to change over following a plan*: This is an integral aspect of agile statement of values. Where there is effective communication and customer collaboration, responding to change becomes much easier.

The manifesto is very important because it defines practical attitude and recommendations that developers and organization should adopt. Thus, agile software developers need to be aware of why and how they are conducting their operations and think of long term objectives. The manifesto is so far a clear guide

of what software development should contain. These guides from the manifesto could also be applied to information development.

In agile software development, customers are considered to be one part of the development team. Close customer collaboration is a key concept in incremental delivery to prioritize the tasks to be developed first (Sommerville, 2007). It appears that in information development, customer collaboration is even more important, since the information developers need to get inputs from the customer to meet the expected standard of the documents. In software development or team based development, communication is one of the major problems recognized (Herbsleb et al., 1995). Good communication and close collaboration play a great role to deliver the right information at the right time and at reasonable quality standard.

The following sub-sections highlights communication, customer collaboration in agile development as well as their respective best practices as recommended in agile principles. Figure 1 shows a summary of some selected best practices that can improve these key processes. The practices with the red asterisk (*) will improve communication and customer collaboration will be improved by those practice with green asterisk (*).

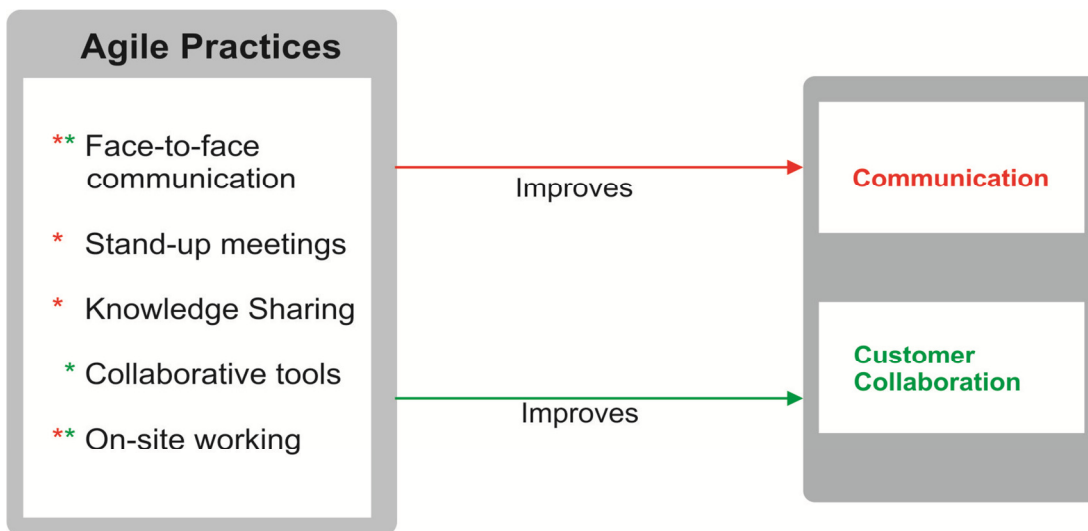


Figure 1 Theoretical framework overview

Communication in information development

Communication is a key element to achieve a good result in information development. Good communication is said to be when information is exchanged between two or more participants clearly (Cockburn, 2000) using mail, speech, signal, and behavior. However, good communication is a key to achieve team goals, frequent and open communication can also highlight the hidden weaknesses that individuals have. As a result, team members can avoid open communication to avoid social interactions, hide their communication deficiency, and cover their poor presentation skills (Conboy et al., 2011).

In software organizations, team result is believed to be more valuable than individual success (Moe et al., 2009). Effective communication determines the success rate or failure of product development that requires teamwork, and the business itself (Frese and Sauter, 2003). When team members establish an open-minded communication, and ask questions rather than making undue assumptions; knowledge is shared (Barnlund, 1959; Marquart, 1955), issues are discussed and resolved and solutions to problems are developed (Shaw, 1976). Team commitment, goal, motivation, and collaboration are factors that can affect the team result (Conboy et al., 2011). In addition, effective communication can also be caused by the surroundings (Cockburn, 2000). That is to say, how the team members are physically located—are they sitting in an open office where they can see each other easily or are they sitting in different rooms. Cockburn argues that sitting in different room or floor affects the individual's energy to communicate. He argues further that, face to face communication is favorable than calling or sending an email. In face to face communication a person can interrupt the speaker for clarification. The speaker is also given a chance to change strategy according to the audience reaction.

Agile practices on communication in information development

Good communication is essential in all the production phases of any product. Developers, operations staff and management must communicate to develop the product successfully (Reis, 2011). However knowing what to communicate (Conboy et al., 2011) and how to communicate is a challenge that any team working on a product need to overcome. Cockburn (2000) contends in his book that perfect communication is impossible. There are good practices that can improve communication. Cockburn (2000) describes various modes of communication that people may choose to apply when working together. These are face to face, emails, live chats etc. Certain modes are best in certain situations. For example when the immediacy of feedback is important face to face communication would suit better than documentation.

Face-to-face communication

An agile colocated team will find face-to-face communication most effective, especially if it is complemented with collaborative boards such as; Scrum board (Cockburn, 2000) where the team puts their work load, current tasks, progress status and other necessary information on the board. However face-to-face cannot replace the use of documentations as a communication mode particularly when the team is partially dependent on documents such as design and analysis documents to produce the product. Hoda et al., (2010) argues that face-to-face is the most efficient way to communication and effective method of conveying information to and within development teams. On the other hand, if the information exchanged needs to be referred to sometime in the future, then email is suitable (Carmel and Agarwal 2001; Damian and Zowghi 2002).

Scrum stand up meetings

Another practice that enhances better communication is the use of Scrum. Scrum is a term borrowed from rugby. It means a team of eight rugby players working tightly as a team. Everyone in the team acts together with everyone else to move the ball down the field. Each member has a well-defined role and the team focuses on the same goals (Rising and Janoff, 1998). Scrum practices such as daily scrum meetings help teams working together communicate effectively by discussing progress and problems on daily basis. In scrum the issue of accountability and authority management is simplified (Schwaber, 2004). At the daily meeting any slip is immediately obvious to anyone (Rising and Janoff, 1998). The meeting is ideally 15 minutes long where the team members basically answer three questions in a stand up meeting:

- What did you do since last meeting?
- What are you doing today?
- What is standing in your way?

Knowledge sharing

One out of many reasons that can hold back team members from communicating is lack of knowledge and poor social skills (Conboy et al., 2011). Language has also been one of the barriers that prevent developers to communicate in multi-cultural team (Layman et al., 2006). To spread knowledge among the team members working in pair is recommended (Conboy et al., 2011). Organizational culture can also influence the team's willingness to support one another. That is to say, if the company's culture encourages teamwork rather than individuality, the tendency of competing against each other will be reduced and sharing of knowledge will therefore be enhanced and thus, the team will communicate better.

Customer Collaboration in information development

Customer collaboration is another important value of agile methodologies (Highsmith, 2002). Information development teams could benefit and improve their relation (Korkala et al., 2010)

with the customer by involving a knowledgeable, dedicated, representative and empowered customer (Lohan et al., 2005). Effective customer involvement (Kautz, 2009) builds trust between the customer and the company (Rising, 2002). Information development companies would benefit from such a customer as the quality of the document developed, depends on the input that the developers get from the customer. Involving the customer actively in collaborative decision making is a characteristic of agile development (Nerur et al., 2005). Customers are not always sure what they really want therefore establishing good relationship through socializing instead of focusing only on the transaction is crucial. Agile methodology encourages customer involvement in areas such as planning, prioritizing, reviewing, and providing feedback. In Scrum, the customer is an important part of the process (Hoda et al., 2010), (Schwaber and Beedle, 2002).

Agile practices on customer collaboration in information development

Collaborative work environment is crucial for promoting innovation, creativity, and productivity among knowledge workers (Adler et al., 2011). They argue that in order to develop innovative and technically sophisticated products, some collaborative strategies must be applied, such as creating collaborative infrastructure. Another strategy is to work onsite with the customer (Cockburn, 2000). The following subsections highlight these strategies and why they are important.

Creating collaborative infrastructure:

Since there is an intersection of common goals when people work collaboratively (Foster & Lloyd, 2007), and individuals are involved on more than one project team at a time. Having a good collaborative tools will help team to Prioritize tasks and meet deadline. Responsibilities in a collaborative community are shared amongst members. Tools such as boards, Kanban or SCRUM boards and daily stand-ups are

important for collaboration. There are online Kanban boards that global team and customers can use to follow progress in real time as complementary to physical board for collocated teams.

In a collaborative environment, information is transferred among team members in a simple and flexible manner, when people talk about everyone's contributions using Scrum (Schwaber and Beedle, 2002). This is possible because the team members see what others are doing. Thus, "management has a fairly accurate notion of individual reputations, enough to help them select people for new and interesting projects" as argued by Adler et.al (2011). So it is better to have the customer involved even though there is a tool in place to collaborate, instead of giving full authority to a manager that relates to the customer alone, and not knowing what the developers are doing.

Onsite-working

Working on customer site is a good practice for developing better collaboration. This means that developers has to be at the same site (Cockburn, 2000) as the customer, and adjust to change as it comes. Onsite working will help developers to be more familiarized with the assignments and gets prompt updates of changes.

Having the information developers to work closer to the customer will improve collaboration. However, how the team members are physically located affects their communication (Cockburn, 2000) which in turn affects the collaboration. Working at the customer's site requires that the developer understands what the customer's requirements are without wasting time (Harvey, 2004) and the customer must show motivation and be involved at all time (Abrahamsson et al., 2002).

3. RESEARCH METHOD

The research approach used to conduct this study is a case study. The primary data is collected mainly based on unstructured interviews and

literature reviews. The data gathered from unstructured interview and literature review are complemented using other data collection techniques such as—workshop and informal chat which was noted down in a diary. To analyze the collected data, thematic analysis technique was used (Braun and Clark, 2006).

Case studies are common research methods in several research areas such as: sociology, political science, social work, and psychology Yin (2003) as well as in medical sciences (Somekh and Lewin, 2005). The characteristics of case study research are: understanding the phenomena on its nature (Creswell, 2009), down-to-earth understanding of a case (Somekh and Lewin, 2005) and understanding complex social phenomena (Yin, 2003). Case studies are appropriate when there is a unique or interesting story to be told, and it is often used to provide context to the outcome of the study, offering a more complete picture of what happened in the area of study and why. (Yin, 2009).

The purpose of this research is to explore the impacts agile practices have in improving communication and customer collaboration in an information development team. Working closely with the team and observing them is one good way of getting better insight on the agile practices that can improve communication and collaboration in information development. Thus, the characteristics of the case study approach, makes it a good fit for the nature of our study.

Research Setting

The research is conducted at Sigma Kudos which is a global IT consultant company that has specialized in developing customer product information. Customer product information is a document or a manual that is delivered with a product to the end customers. Sigma Kudos is an IT consultant company that offers consulting services in the areas of information development and engineering services. It provides its services to some of the leading companies in telecommunication and automobile such as Ericsson and Volvo. Currently the company

operates in Sweden, Hungary, China and other places where the main customers are located. Sigma Kudos specializes in information development which is the process of producing the information that accompanies the product and contains information about the product and how the product can be used and configured. The end product of this process is normally a collection of documentation that is known as customer product information (CPI) documents.

problem, research question and to review literature. We started working at the company from week 1 to establish familiarity and build a friendship and trust with the project team that we would work with. Furthermore, we had frequent meetings with the responsible persons at the company and the project manager to discuss limitations that might arise. *Table 3* shows the steps that are performed during study:

Research Process

This study was conducted over a ten week period. The first 2 weeks were to define the

Table 3 Research process steps

Research process	
Steps	Description
Step 1	Develop interview questions and book interviews: The interview questions were aimed to cover the impacts of communication and customer collaboration. Additionally, their current knowledge of agile and their beliefs and current problems were covered. Unstructured questions to be used at the interviews were prepared.
Step 2	Conduct interview: Gather the information from the interviews and informal meetings, record and document them.
Step 3	Conduct a workshop: Materials on agile practices, its benefits and how this could be applied in development was thought to the team that participated. There was a question and answer session where we took note of their concerns and general observation from them.
Step 4	Study and code the data: Study the data over and over again to understand what they are trying to communicate. Then group the similar data accordingly.
Step 5	Analyze the data: The data collected was analyzed using thematic analyses.
Step 6	Discus the data: The data was then discussed the data together with literature.

Data collection

The collected data was qualitative data. The techniques used to collect data were interviews, literature reviews, workshop and informal meetings. Interviews and literature reviews were considered to be a primary data collection source

and the secondary data collection was from workshop and the informal meetings. We interacted with the participating team, had several informal chat with interview while having coffee. We used these informal chatting to cross-check the validity of the interview data given to

us. All the data collected from the field was noted down in a diary.

Participants

The participants of this research were members of a project team that comprised of five information developers and a project manager. Based on the amount of data needed to be collected from the interviews and the engagements of the team member, four team members participated in the interviews. The reason for choosing the interviewees was to get the different perspectives of the developers, the projector manager and the unit managers.

Interviews

We tried to cover the different aspect of the project by interviewing people with different roles. We have interviewed two unit managers, one project manager, one editor and four information developers. The interviewees had a wide range of educational background in computer science, master degree or first degree in mathematics; some of the interviewee has basic knowledge of agile and some have only heard about it. As Creswell (2009) suggested the

interviewees were encouraged to talk freely about their work, this was possible because we assured them of confidentiality of their responses. To maintain validity of the data collected from the interviews, we avoided asking leading questions. Our interview questions were open ended questions that helped identify the themes in the data.

Data Analysis Procedure

Analysis of the qualitative data collected in the study was done by using thematic analysis method. Thematic analysis is a method for identifying, analyzing and reporting patterns (themes) within data (Braun and Clark, 2006). Thematic analysis seeks to identify insights into the activity from the observational data collected. These insights take the form of meaningful themes that occur and re-occur, and whose utility and validity can be sustained from the empirical data (Sharp and Robinson, 2010).

In their paper Braun and Clark (2006) identified six phases that act as guidelines for analyzing data using thematic analysis. We followed these phases:

Table 4 Data analysis procedures in phases

Data analysis procedures	
Phases	Description
Phase 1	To familiarize ourselves with the data collected from interviews and workshop, the recorded interview and workshop data was transcribed. The notes taken during the workshop and during informal meetings with managers and the team members were also read and re-read to get a clear understanding. According to Bird (2005), this phase should be considered a key phase within interpretative qualitative methodology. This is because it is an interpretative act whereby meanings are created, rather than simply a mechanical act of putting spoken sounds on a paper (Braun and Clark, 2006); (Lapadat and Lindsay, 1999).
Phase 2	In this phase initial codes were generated from the transcribed data. Codes refer to the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon. They are used to identify a feature of the data that appears interesting to the researcher analyzing the data (Boyatzis, 1998).
Phase 3	In the next phase we collated themes into candidate themes and gathered all

	data relevant to each theme.
Phase 4	In this phase the themes identified were then reviewed, refined and named appropriately.
Phase 5	In this phase we refined again our themes and identified themes that were actually sub-themes to other themes. These themes were then merged into one and given an appropriate name that reflects the message of the theme.
Phase 6	The final extracts that showed clear major patterns were finalized and related back to literature and research question before being used in our study.

4. EMPIRICAL RESULT

Using the participants' own words, this chapter will describe the experiences of eight anonymous participants at the research site concerning the issues of communication and customer collaboration in information development. They were two unit managers, one project manager, one editor and four information developers. The questions asked during the interview gave the participants the opportunity to express their problems when communicating and collaborating within the team and with the customer. The agile practices that could be applied to address the problems found were then taught to the participants at the workshop session. The expectations and knowledge of agile obviously play out differently for each participant as some of them have no knowledge of agile concepts. This was evident from the interviews and workshop conducted. The participants expressed their individual experiences, level of understanding and uncertainty of agile way of working. There were a few themes that were obvious from the study that shows the need to improve communication and customer collaboration in information development.

This section is organized in sub-section of themes to give the findings on each theme. These are; *communication barriers, customer involvement, and team collaboration.*

Communication barriers

A majority of the participants identified that there are problems currently faced by them when they need to communicate to reach some understanding of input or other work related issues. One of the developers explains that;

"We had technical problems when trying to talk to members in Hungary and China. Sometimes it is hard to understand emails sent by the members in China because of the language barrier but we often call them to clarify".

This problem was clearly seen as an important issue of concern for the team, where language limits their productivity.

The story was distinctly different in teams that work at the main site. Some see location as a factor, just as stated by one this participant;

"Sitting and working at the customer saves me time because if I need to get more information, I walk straight to the technical experts work area and get what I want instantly".

Proximity with the software developers and other cross functional team members is thus believed to be a relief of the barrier. Yet from another perspective, some of the participants believe that the level of technical knowledge of the product influence how they communicate. This was

observed during our research and was identified by one of the interviewees.

“I believe the major barriers in communication are when you are not in the same technical understanding”.

This is to say, when you understand a product better, you can ask the right question and communicate the right things to get the input needed.

Customer involvement

Most requirement input are provided by the customer’s system engineer. When the customers are involved in the development process, production time is well managed. But, this was not always the case for the participants. Just as explained by one of the interviewees on delay in feedback that affects their work progress. When asked – how easy is it to obtain information from the customer. The response was;

“Some System Matter experts (SMEs) have a lot to do and giving feedback for documentation is not prioritized for them. You might send emails several times before you get the answer.”

It is important for the customer to be more responsive to the progress and concerns of the developers especially when it has to do with the products. This will not only make the developers work easier but will even increase the customer’s satisfaction, such that the developers will not have to improvise solution because they could not get feedback from the customer in good time.

Another interviewee also shared an experience of how complex and very important changes in the product information documents are introduced almost close to the delivery days. This is not a regular occurrence, but when this happens it affects all the other documents that are impacted by the very documents that the changes are

introduced to. The interviewee expressed this in his own words;

Sometimes the customer makes some changes in the requirement, like how a configuration of a product should be done. This might be completely different from what we had gathered earlier. When we are not informed of this change at the time the decision was made by them it becomes a bigger problem having to correct this during delivery period.

Customers should endeavor to be active and work closer with the developers, especially when they are not located on the same office premises. This way the information developers are present at every meeting, such that when changes are introduced they can adapt and effect the appropriate changes without delay.

Team collaboration

Collaboration within the information development team as well as with the customers’ developers is sometimes not efficient. A manager of the team stated that

“We currently report our progress in an Excel sheet. I use it to see how the work is progressing and to assign tasks to the team members”

This method of collaboration limits tracking in all teams including the virtual teams abroad and therefore not an effective way to track progress. Furthermore, it was pointed out by another interviewees that;

“Having some kind of a tool that could show who is doing what could help us because it is sometimes embarrassing that several of us spend time contacting technical experts and asking the same question. If I knew my colleagues have already contacted the person and have the information I would ask them instead”

The need for collaboration tools that could improve the situation of the information developers was evident. The team members were in need of tools that can improve the collaboration within the team and with the customer. This will help them track work progress and keep up-time delivery and be more structured in carrying out the duties.

5. DISCUSSION

In this section we discuss the empirical results and the practical relevance of our study.

Communication in information development

Scrum practices such as daily stand-up meetings promote sharing of knowledge and encourage everyone to contribute ideas (Sharp and Robinson, 2010). As mentioned in section 2, scrum meeting is an efficient way of communicating, progress reporting and help team members to reach their goals together. The idea is to synchronize the work of all team members daily and to schedule any meetings that the team needs to progress (Schwaber, 2004). Daily meetings within the information development teams could be a way of helping each other during information gathering and any other task, by exchanging information that might be relevant to the documents during development. Teams could also use these meetings to get the information needed from their colleagues and get to know the technical experts they are working with. This will eliminate the risk of different information developers sending mails to the same technical expert and asking the same question. This was a common problem that was observed in our study.

Good communication or social skills is said to be one key value to work successfully within teams. Thus, frequent communication can highlight weaknesses that results from member's technical disability and poor presentation skills. These problems have been observed by some of the interviewees. Interviews show that good communication both within teams and with the

customer is the driving factor in a successful product development.

Customer collaboration in information development

Customer collaboration over contract negotiation is one of the core values of agile manifesto (Cockburn, 2000). The importance of having a collaborative and knowledgeable customer (Nerur et al., 2005), (Lohan et al., 2010) has been one of the concerns faced by information developers at Sigma Kudos AB. For information development teams, working closely and constantly getting input from the customer is crucial. Ruping (2003) argues that, a close collaboration with the customer is necessary for producing a good specification and other project documents. The team members interviewed in our study clearly experienced the difference of working at their office compared to sitting and working at the customer's site where they could reach the customer easily for inputs needed for their documentation.

Korkala et al., (2010) argues in their study that, the location of the customer is important and weak customer relation may lead to inefficient communication. As cited in Cockburn (2000) and Ruping (2003), one of the follow up recommendations of agile manifesto is that 'business people and developers work together daily throughout the project'. The longer it takes to get information to and from the developers, the more damage will occur to the project.

Agile practices such as scrum, involve the use of boards or walls to show progress and prioritize tasks. It is an efficient way of promoting collaboration and coordination within a team. Sharp and Robinson (2010), stated in their paper that a regularly updated wall, with current and relevant information enhances team collaboration and coordination within an agile team. Our study confirms the need of such tool as information developers experienced difficulties in their collaboration and coordination effort. In the search of a solution to this problem,

the project manager came up with an excel sheet that could help solve the problem. However the excel sheet only added to the load of work and the technical writers did not really understand it. These teams could benefit more using a scrum board or online Kanban board. Some of the developers think that if an effective and efficient tool is provided were customers can follow their tasks and vice versa, it will improve the response to changes during information development.

Empirical Results

Since we have carried out an empirical study, it is important to highlight our findings in respect to the concerns and current challenges. In addition, how our research framework has been used to address and improve these issues is also presented in this section.

Communication barriers

In the previous section, we presented the findings of the research in thematic order having communication barrier as one of the themes. These were the key problem areas that the research address. During the interviews, we identified that the team have good communication skills when it comes to openness. However, some of the most outspoken participants gave some none-work related perspective of what they think about good communication in information development. Thus, they see communication only from the social context rather than work. For example we asked them a question: how do you define good communication? It was clear from our findings that only one of the participants was able to give a clear understanding of what it takes to communicate well. Which was – “Good communication is the ability to convey your thoughts to those who are listening and have those thoughts understood completely also the aim are useful and applicable to the development”. This led them to express their main concerns in regards to communication such as; when to communicate, how to do it in most effective way, what to communicate. They saw technical difficulties as a barrier to communicate with teams abroad, language barriers, technical

knowledge of the product, and not working close enough with the customer as some of the problems they currently faced. Some of them failed to admit that communication with the customer might not be good enough. However, the majority believe that if an effective communication process is in place and followed, their concerns and problems would be resolved.

Our findings showed that factors such as language and not having the same technical understanding, work location can hamper communication. The study established that some agile practices in section 2, such as face-to-face communication, scrum meetings, knowledge sharing, on-site working will improve communication in information development.

Customer involvement

Customer involvement in projects is an important principle of agile methodology. It gives customers the chance to contribute actively to the product development. This will in turn help in minimizing last minute changes and enhances better relation between the customer and the developers. One of the findings of our study is that, developers found collaboration with the customer and information gathering easier when working at the customer's site. Due to fact that the technical experts at the customer side are almost always busy with other things, therefore taking longer time to answer emails. On the other hand developers who spent more time at the customer site could collect the information needed easier and quicker by socializing and visiting the concerned persons at their place of work whenever there is a need.

From our study we can extract that using collaborative tools among the development teams and onsite working can improve customer involvement. As it was highlighted in our framework if the customer and the developer are located in the same place, the communication is affected positively which then reflects directly on the customer involvement. Furthermore, being onsite increases the developers' familiarity of the assignment, developers can be informed about

changes faster through face-to-face communication rather than formal documentation, and onsite working also increases the developers understanding of the customer needs. Since more than one person can be involved in a project, the use of collaborative tool will spread information and knowledge of the product among the developers. Collaborative tools are also used to keep track on time, progress and change in a project.

Team collaboration

One of the main findings of our research was lack of collaboration and knowledge sharing within the information development teams. It was observed that knowledge in the team were sparsely seen among individuals and wastage of time as developers looked for information from the technical experts that could be found within the team if the team members only collaborated better. The need of collaboration tools that could be used to report progress and share knowledge was evident from our interviews.

Agile practices such as use of collaborative boards, scrum meetings and knowledge sharing could be used to adress these problems. The project manager's concern of tracing progress and status could be adresssed by the use of scrum boards where the team members pick task and put all the necessary information about the current task on the board. These could also minimize the embarassment of asking for the same information from the technical experts by different team members and enhance knowledge sharing within the team. As Cockburn (2000) pointed out in his book the use of scrum boards in combination with face to face communication could improve the the teams communication and collaboration.

6. CONCLUSION

Most organizations have adopted agile methods due to its innovative process and possibility of improving the organization's ability to communicate and collaborate more efficiently. However, only a few researches have addressed

the impacts of agile core values on information development.

This paper set out to find out how agile practices can help in improving communication and customer collaboration in information development. We interviewed some members at Sigma Kudos AB to get an understanding for how we can improve communication and customer collaboration. The research showed that agile practices such as; face-to-face communication, Scrum stand up meetings, knowledge sharing, creating collaborative infrastructure, and onsite-working will help improve communication and customer collaboration in information development process. This is because frequent and appropriate communication both within team and with the customers, reduces issues of misunderstanding of requirements or other important information and making assumptions (Barnlund, 1959; Marquart, 1955). On the other hand, customer collaboration will be improved if the information developers could work at the customer's location. We were able to reach to the conclusion that improving communication and customer collaboration through agile practices will bring about, better customer satisfaction.

7. REFERENCES

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