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**Global Software Development: Communication, culture
and trust**

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Abstract: The topic of this master's thesis is global software development, more precisely from the point of view of its effects on communication, culture and trust in multinational development teams. This research was conducted through a questionnaire sent to the employees of Qvantel and the results were analyzed using the qualitative content analysis method. In the answers Qvantel employees raised issues regarding communication, culture and trust caused by language level issues, different cultures and physical distance. These results were similar to other research done in the field of global software development. The results were used to create an overall view of Qvantel's current situation and create suggestions on how to improve on some of the negative findings.

Suomenkielinen tiivistelmä: Tämän gradun aiheena on globaali ohjelmistokehitys ja erityisesti sen vaikutukset kommunikaatioon, kulttuuriin ja luottamuksen luontiin monikansallisissa ja kulttuurisissa kehittäjätiimeissä. Tutkimus toteutettiin kyselytutkimuksena Qvantel-nimisessä globaalissa yrityksessä, jonka tuloksia analysoitiin laadullisen sisältöanalyysi metodin avulla. Vastauksissa Qvantelin työntekijät nostivat esille ongelmia liittyen kommunikointiin, kulttuuriin ja luottamukseen, jotka johtuivat kielellisistä ja kulttuurillisista eroista sekä fyysisestä etäisyydestä. Tulokset vastasivat teemoittain läheisesti muita vastaavanlaisia tutkimuksia globaalin ohjelmistokehityksen alalla. Tulosten pohjalta pystyttiin luomaan kattava kokonaiskuva Qvantelin tilanteesta ja mahdollisista parantamisen kohteista.

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1 Introduction

Majority of the studies done about global software development address the issue of managing collaboration among distributed co-workers (Šmite et al. 2010). Also coordination and communication, requirements engineering and application of agile practices have been popular as research topic. However, there is a lack of studies focusing on collaboration within a single organization as well as collaboration conducted by more than two collaborating partners/cites. As the topics of coordination, communication and setting of requirements have been more popular in research, different managers and architects have been interviewed rather than developers and testers which is reasonable for the goals of the research but limits the viewpoint to certain individuals and positions.

The research question of this thesis is "What issues global software development has caused among Qvantel's employees?" Research on global software development and similar studies done in other companies were surveyed in order to form theoretical background from which to start the planning of the empirical phase of this study. The findings of the literature review were used to create a questionnaire to find out if Qvantel employees would report similar issues regarding global software development. Questionnaire included questions about positive impacts perceived from multicultural teams and how Qvantel employees would improve collaboration, communication and trust in global software development. Answers were also compared to similar studies done previously in this field. Using the previous studies and their findings a proposal was made of ways to alleviate and resolve the issues raised by the Qvantel's employees. This in mind a survey was created to find out Qvantel's employees' thoughts and experiences regarding communication, cultural understanding and trust.

In chapter 2 the three main themes of this thesis: communication, culture and trust, and how they present themselves in corporate environment and in international remote working are introduced. In chapter 3 the research methods used are introduced in more detail. In section 3.5 the questionnaire which was used to map out companies' cultural understanding, communication efficiency and level of trust among employees is introduced. In sections 3.6 and 3.7 answers of the questionnaire are analysed. In chapter 4 the results of this thesis are discussed. Chapter 5 discusses the results in the context of previous research. Chapter 6

presents how the results can be translated into practical actions of improvement. Chapter 7 shortly discusses the reliability of the study and the results.

2 Global Software Development

Global software development (GSD) is a phenomenon that started in the 1970's in a form of contract programming and it refers to software development done in globally distributed teams (Lee et al. 2000). Global software development started to gain momentum in the 1990's due to further development of personal computers. This combined with lack of resources in the countries companies were based at and need to cut production costs gave rise to a huge trend to move software development activities to countries with larger worker pools and/or lower costs. (Karolak 1999; Lee et al. 2000).

However, people working within the global setting, started to realize that global software development has its own unique issues and challenges compared to having employees at a single country and location, which was supported by research conducted within the field (Damian and Moitra 2006; Šmite et al. 2010). These issues include physical distance, language differences, cultural differences, impacts on organizational structure and technical issues when working remotely and over significant distance (Damian and Moitra 2006). In addition issues regarding communication, coordination and control have been reported (Šmite et al. 2010). Numerous issues arising from global software development starting a globally distributed collaboration purely from cost saving motives have been recognized to be very likely to fail, and yet cost savings is the most reported reason to start globally distributed teams (Šmite et al. 2010).

Despite the issues, global software development has become increasingly popular and has become a norm in the software industry (Damian and Moitra 2006). This is due to the benefits that companies can get from becoming global, for example companies can fully utilize the available competence around the world and have a larger pool of professionals to choose from, which means they can also choose to save money by hiring workforce from lower cost countries (Karolak 1999; Carmel and Agarwal 2001; Herbsleb and Moitra 2001; Damian and Moitra 2006). Companies can also set up sites in the client's country, making it easier to communicate with a client, and by having sites around the world they can benefit from round-the-clock development (Damian and Moitra 2006; Herbsleb and Moitra 2001). Innovation, brought on by people from different cultural and educational backgrounds working

together to solve problems is a major positive effect of global software development and can be a valuable resource to the company (Ebert and De Neve 2001).

2.1 Communication

This section focuses on communication. Firstly communication is shortly defined from a more general perspective. Then communication is discussed from the point of view of software development and how communication is different locally and between sites.

The Oxford learner's dictionary defines communication as:

"The activity or process of expressing ideas and feelings or of giving people information. Methods of sending information, especially phones, radio, computers, etc. or roads and railways." (OxfordUniversityPress 2021a)

Communication between humans is a fundamentally cooperative activity and it functions most effectively and effortlessly when those communicating share the same conceptual understanding and they have the same idea of the motives and context of the communication. The most important part of human communication is to create a common ground among those communicating so that everyone understands the concepts, past events and cultural background (Tomasello 2010). The lack of mutual understanding in these key aspects makes communication between people from other cultures and different parts of the world more complicated and prone to misunderstanding. People often use non verbal communication combined with verbal communication (DeVito, O'Rourke, and O'Neill 2000) and when communication happens over distance these nonverbal cues are often missed and can cause misunderstanding of intentions and tone of the conversation.

Communication in global software development setting is unique as it is often done over distance by using phones, video calls, emails and instant messaging. This removes body language and in text based communication also the tone of voice from the communication. Communication in global setting also means that people who have different communication contexts are more likely to communicate with each other. Missing the body language, tone of voice and communication context makes communication in global setting more prone to

issues. In global software development the issues in communication are not only between people but also between different sites and subgroups as well. Different sites and subgroups have their own communication norms for example different communication tools, levels of politeness, rules of how to raise issues and who can do that, giving of feedback, criticising etc. This adds another level of complexity to communication between employees and working over distance and can cause a significant amount of friction between people and affect the job performance. For these reasons companies should promote shared communication practices and remind people to be aware of the different context from which they communicate with one another.

2.2 Culture

In this section culture is defined. First a short definition of culture is proposed and how this term is used in the context of this thesis is discussed. After that culture is explored in the context of software development and in what ways it manifests in working environment.

The word culture is used in many ways in literature as well as in the field of research and often has many different meanings depending on the people using it (Keesing 1974). In common use the word culture is often used to mean the "high culture" such as music, art, literature etc. (Ferraro 2021). In this thesis however the word culture is defined as it is defined by the Oxford English dictionary:

"The customs and beliefs, art, way of life and social organization of particular country or group" (OxfordUniversityPress 2021b)

Culture is something that cannot exist within a single person and is always shared in a social group or society (Ferraro 2021). People usually are affected by a number of different cultures as they often belong to a number of different groups and through them number of different cultural spheres (Kramsch 2011; Hofstede, Hofstede, and Minkov 2005; Avruch 1998). These different cultural spheres are for example family, friends, gender, race, religion, language, workplace, nationality etc.. People can be part of these multiple cultural spheres in varying levels depending on how fully they embrace the norms and values of the given culture. On the other hand if a person rejects the norms and values of a cultural sphere

then they are not a part of it even if they are a part of the social group (Matsumoto, Kudoh, and Takeuchi 1996). For example if a person is against a company's corporate culture they are not considered to be a part of it even though they are an employee of the company.

Work organization is one cultural sphere but within a company there can be different cultural subgroups where employees follow their own culture apart from the corporate culture (Hofstede, Hofstede, and Minkov 2005). As people identify themselves as a part of a social group the downside is they will consider others, who are not, as outsiders and this can cause friction between different groups (Kramsch 2011). In global software development the number of different cultures increase dramatically because employees represent many different languages, religions, nationalities etc. and all of these have their own cultures (Avruch 1998). This increases the chance of misunderstanding between people which can be caused by different ways language is used, what is said, tone, gestures, body language and others (Kramsch 2011). Even if two employees from different parts of the world would speak the same language the chances are they have different cultural norms and values tied to that language which would mean they represent different cultural groups. Even greater misunderstandings are possible if the two employees were to assume the other to fully understand them, not realizing that they are influenced by different language cultures.

2.3 Trust

In this section trust is introduced in general terms and from the context of software development.

The Oxford English dictionary defines trust as:

"The belief that somebody/something is good, sincere, honest, etc. and will not try to harm or trick you. The belief that something is true or correct or that you can rely on it" (OxfordUniversityPress 2021c)

Level of trust in a company and among its employees can have an affect on the company's overall performance (Gambetta et al. 2000). When people trust others or a company they are more likely to cooperate and work efficiently together (Porta et al. 1996). Level of trust

is increased when people have a chance to spend time together (Glaeser et al. 2000). For this reason it is more important for companies to support those employees that rarely work together to gain trust relationships in order to aid the cooperation (Porta et al. 1996).

In global software development the importance of trust is more prominent for the employees that are working over distance with people who are from different cultures, have different language skills and communication practices and might never meet in person. Trust can be promoted in many ways in global software development setting by providing training in different cultures that employees are from, providing language courses to aid more fluent communication and organizing visits between different sites so that people can meet in person (Babar, Verner, and Nguyen 2007). Communication and culture in global software development discussed in previous sections are important parts of the formation and maintenance of trust and should be addressed first in order to improve trust relations. An important part of trust is also the belief and knowledge that other members of the team possess the competence and know-how to perform the tasks assigned to them (McHugh, Conboy, and Lang 2011; Babar, Verner, and Nguyen 2007). This can be difficult in global software development because employees cannot see each other work and are not fully aware of the situations in the other sites which can lead to misconception that others are not working or don't know what they are doing etc.

3 Research Strategy and Research Method

In this chapter the research strategy and research method are introduced, and research ethics is discussed.

3.1 Case study

Case study is an empirical inquiry which examines a contemporary phenomenon in its real-life context using multiple sources of data (Yin 1981a). Evidence is needed from multiple sources when the boundaries between phenomenon and context are not clearly evident (Yin 1981b).

In their systematic review of studies done in the field of global software development Šmite et al. (2010) reported that 34 out of 56 studies were case studies, nine were surveys, five interviews and 8 controlled experiments. For this reason case study research method was the first to be considered as the research method for this thesis. Other research methods such as experiment, literature review etc. were briefly considered but they did not match the nature of the research and the source of data.

Experiments are used to create a controlled environment where the effects of independent variables on the dependent variables are observed and measured. This could have been used more to categorize different type of employees and what kind of situations and interactions they find challenging and what way they choose to behave in different situations. This type of experiments could be the next step in this research but an experiment would have been ill suited for to purely collect data on employees' experiences in every day working life.

Literature review is a method where scholarly sources from a given topic are collected and surveyed. This method results in a summary of the research done on the topic, what are the methods and theories used as well as possible areas that have little to no research done on them. This was done at the beginning of this thesis to build the theoretical background but previous research done in similar setups would not provide information specific to the company selected for this study.

Case study is the preferred research method when "why" and "how" questions are asked about some current phenomenon in real-life context that the researcher has no control over (Yin 2009). There is no preferred data collection method in case studies that must be used, likewise the data can come from many different sources and can be qualitative, quantitative or both (Yin 1981b). Case studies are commonly used for topics like knowledge utilization, community studies and organizational decision-making etc. (Yin 1981a). For these reasons and because the subjects are not controlled and the data is not just statistical, case study suited the needs of this thesis best.

There are four types of case study designs that are the combination of single-case or multiple-case and holistic or embedded cases. Case studies can have either single-case or multiple-cases. A single-case study would for example only use a single company as their source of evidence where as multiple-case would use number of different companies. Single-case is considered to be less complex to implement but multiple-case can provide more reliable findings as the data set is larger and from number of sources. Case study can also be categorised to be either holistic or to have embedded subcases within the main holistic case. For example if the case study was about why a company implemented a new organizational structure, it would be a holistic case, but if the employee information was used as part of the study it would be an embedded case (Yin 2011).

There are three different categories of case studies that are mainly discussed: exploratory, descriptive and explanatory (Yin 1981a). Exploratory case study aims to investigate any phenomenon from a given data that the researcher is interested in (Yin 2011; Zainal 2007) and can be used to form causal conclusions (Yin 1981a). For example if a researcher is conducting an exploratory case study about employees ways to communicate over distance they might ask "Are there tools employees have to communicate over distance?" and "How often they are used?". A pilot study is an example of exploratory case study (Yin 2011; Zainal 2007). Descriptive case studies aim to describe a phenomenon as it presents in the data (Yin 2011; Zainal 2007), for example describing different ways to communicate over distance and how/when those methods are used by the employee. Descriptive case study need to have a descriptive theory behind the study at the start to support the results (Zainal 2007). Explanatory case studies look into the data in more detail in order to explain the phenomenon

found in the data (Yin 2011; Zainal 2007). Researcher can then form a theory based on the data and set out to test it (Zainal 2007). Explanatory case study could for example ask why employees prefer to use a specific tool for communication.

This thesis is conducted in a single company using the data collected from the employees and is therefore a holistic single-case study. It is also a descriptive case study which aims to describe how working in the global software development environment affects the dynamics between employees of Qvantel. The data for this case study was collected through a survey conducted in Qvantel.

3.2 Survey

Case studies are often conducted with interview and majority of the sources used in this thesis used interviews during their case studies. During this thesis research however it was decided to use surveys as means of collecting data. This decision was made in order to give every employee at Qvantel an equal chance to participate in this study and ensure large amounts of answers.

There are many ways surveys are conducted from how the data is collected to how the results are analyzed. In this thesis, survey is defined as a method to collect statistical data that is a numerical or quantitative description of a group of people in some limited aspect. The data is collected by asking people questions and the answers form the data that will be analyzed. Usually, not every person that is part of the group are asked questions but rather some smaller, more manageable subgroup (Fowler Jr 2013).

The main issues to survey research come from sampling, question design and analyzing of the collected data. As it is not possible in most cases to ask all the representatives of a group to participate in the survey a smaller subgroup needs to be selected. How this selection is done can affect the results of the study. For example if a survey meant to find out employees' average income would select more people in their fifties compared to people in their twenties, the results might end up with a much higher average than what it would have been if people had been selected with more care. For this thesis no sampling was done since the survey was sent to all 899 internal employees of Qvantel. This however does not mean there is no

issue with the sample. It is possible that certain groups of people chose not to answer the survey for different reasons. For example not understanding English well enough or being overworked and not having enough time to answer it. Or perhaps they felt like this survey did not concern them, they were afraid their supervisors would think ill of them or they did not trust the survey to be real and just some phishing attempt. Out of 899 employees 126 answered the survey and it is possible that the data collected is not an average representation of the whole company and it is important to keep this in mind when results are analyzed.

Question design is an important part of survey creation and very challenging to do without affecting the way the questions are answered. Poorly worded questions can be misunderstood and answered in different ways causing the data to be unusable. But also asking questions in a certain way can cause people to answer them in the desired way thus causing the data to be misleading and not represent the actual opinion or situation. In the survey done for this master's thesis the questions were iterated through and tested on a few members of the Qvantel staff. The employees the questions were tested on represented different nationalities and language backgrounds in order to make the questions clear to a larger number of people. This however does not conclude that the questions were clear for everyone and that they weren't leading in any way. Also it is important to consider how useful data the questions actually produce. The quality of the questions and the usefulness of the data collected in the survey will be more extensively discussed in chapters 5 and 6.

The collected data can be interpreted in a number of different ways and it is easy to make the data reflect many different outcomes. That is why it is important to stay objective during the analysis. The data from the survey of this thesis was analyzed using the qualitative content analysis. The process and results are discussed further in chapters 5 and 6.

3.3 Qualitative content analysis

Content analysis is a research method that aims to interpret text by going through it systematically and classifying words and sentences, that hold the same meaning, into groups in order to identify different themes or patterns from the given material (Hsieh and Shannon 2005). Content analysis can be done either on qualitative or quantitative data and it can be either

inductive or deductive. Inductive approach is used when there is little to no previous studies on the phenomenon (Elo and Kyngäs 2008). Inductive approach first considers the specific instances which are then used to create more general statements (Chinn and Kramer 1999). Deductive approach is used when it can be conducted on the bases of previous studies and it is used to test an existing theory (Elo and Kyngäs 2008).

Content analysis is started by repeatedly reading through the data in order to form a clear idea of the whole content (Tesch 2013). Then each word is studied individually and the key words that represent key concepts or the main thought in a sentence are highlighted (Miles and Huberman 1994). From this preliminary work initial thought and analysis can be made which help form codes that contain more than just one key concept. These code are sorted into categories based on how they are related to one another. These categories can then be used to create groups of codes that have similar meanings (Patton 2014). Categories can be divided into more detailed subcategories and vice versa (Hsieh and Shannon 2005). Each category, subcategory and code is defined and examples of all these different groups are selected from the data.

After the content analysis is finished and all the data is divided into meaningful categories the emerging theories and other findings are introduced. It is also important to discuss how the results contribute to the area of research and what kind of further research would be needed (Hsieh and Shannon 2005).

During this thesis qualitative content analysis was used to analyse the data collected through the open-ended questions of the survey. The progress of the content analysis and the formation of the categories and subcategories are described in section 5.1. The results of the content analysis are discussed in chapter 6.

3.4 Ethics

This section will shortly go through the possible ethical issues related to doing a questionnaire and handling of the collected data.

It is important to protect peoples privacy when doing questionnaires. Many people would

not like their colleagues knowing how they think about certain things and it is especially important to make sure that the superiors can not find out if the people working for them are criticizing their leadership or way of working. This might jeopardize their position and even get them fired. For these reasons the questionnaire was made so that no personal data was collected from the participants. This way it is not possible to connect people to their answers, protecting their anonymity. Furthermore the automatic summaries of the results, provided by Questback for download, were such that it was not possible to connect answers with each other, so it was not possible to connect the written answers with the age, country and similar more defining information. However the single person answers were available in Questback for the owner of the questionnaire and it was important to keep this information separate and only accessible by limited number of people.

At the beginning of the questionnaire there was a description of the research, use of the data collected through the questionnaire was explained, and a person's consent for the use of the collected data was asked. It was further stressed in the disclaimer that the open-ended questions might be used fully and as they are written (removing all references to places and individuals) it might be possible for someone to recognize the writer afterwards. Also the people who had access to the answers were listed so that people could make an informed decision of whether they would like to participate and what it meant.

During the research process and especially during the qualitative content analysis it is important for the researcher to try and stay impartial to the research. It is very easy to manipulate data to reflect ones own opinions or read the statistics in a way that confirms a researchers pre-existing opinions. The qualitative content analysis in particular is very susceptible to being made to reflect the desired outcome. Peer review is one good way of making sure that the researcher is staying impartial in the analyzing process. Peer-review is also good for identifying when something is presented in a confusing or offensive way which helps to minimize misunderstandings.

3.5 Questions

The questionnaire is divided into five different sections: general, language, personal visits, team dynamics and open-ended questions. The full version of the questionnaire is part of the attachments. Below is a short description of the five main sections of the questionnaire and why they have been chosen.

In the first section employee's general information was asked. This information is used to find out what kind of employees answer the questionnaire, whether an even proportion of employees from different countries, job titles and ages answered or if only some subgroup participated, for example only employees from a specific country. This information can be used to show how generalizable the results of this research are to the Qvantel employees in general.

The language questions are designed to evaluate language level and communication issues between co-workers. Language proficiency is a very important part of employee's day to day work (Oshri, Kotlarsky, and Willcocks 2007). Language skill level will reflect how well the employee will cope with everyday tasks and communication with team members. It is also an important part of making one feel like part of a team. When employees have a high enough language skill level they will be more likely to talk about issues outside of work which creates closer relationships between team members. It is also important to note that even if the general language level is high issues might arise from the way words are interpreted (Holmstrom et al. 2006). There are a number of cultural norms on how things are said, when they are said or if it is acceptable to say them at all. Good communication is also an important part of forming trust relationships between co-workers (Babar, Verner, and Nguyen 2007).

Personal visits have great potential to improve many aspects in team dynamics such as communication, trust and feeling of belonging (Babar, Verner, and Nguyen 2007; Oshri, Kotlarsky, and Willcocks 2007; Holmstrom et al. 2006), and the questions are designed to find out who gets to do these visits within the company, how time is spent during these visits and what kind of affects employees report.

The questions introduced in the team dynamics section intend to find out how well the em-

employees know their team, do they feel part of it and what kind of practices there are within their team to promote team spirit, cultural and common understanding. Good team dynamics is the key to effective collaboration (Oshri, Kotlarsky, and Willcocks 2007; Holmstrom et al. 2006). An employee should be aware which team they belong to and who else is part of that team. They should know the teams communication practices and follow them so that they can be an effective part of the team. It is also important that team members located in different sites feel part of a single team instead of forming their own local sub-team, this could interfere with the entire teams communication, norms and behaviour. This might cause lack of cohesion and team atmosphere as well as resistance to follow common processes (Oshri, Kotlarsky, and Willcocks 2007). Cultural understanding is also a key factor in improving team dynamics and it is important to educate teams so that they will get to know their team members' cultures better (Oshri, Kotlarsky, and Willcocks 2007; Holmstrom et al. 2006).

The goal of the open-ended questions is to get some descriptions of events that have occurred. These events are divided into positive, negative and neutral. And they will help to understand the mindset of the person answering these questions and get more concrete examples of the possible issues.

No research, specifically on how to create questionnaires, was utilized in creation of these questions. The Fowler Jr (2013) was referred to as a general guideline, however the goal of getting as much open ended answers as possible and the need for statistical data of the individual employees to know what kind of employees answered was kept in mind during the creation of the questions. The idea was to try and create questions that weren't leading in any way, that would be understood the same way by all employees and that there would not be too many questions to answer in order to get good quality answers through out the questionnaire.

3.6 Qualitative content analysis for open ended questions

In this section the process of qualitative content analysis on the open-ended questions will be explained as well as the statistical analysis of the other data collected through the ques-

tionnaire.

The questionnaire was sent to 899 employees of Qvantel and 126 people answered.

The open-ended questions were analyzed using qualitative content analyzes. There were four open-ended question in the questionnaire, one on the team dynamics asking for further comments and three regarding the communication, culture and trust asking people to describe situations in regards to these three main themes. The open-ended questions about the communication, culture and trust were divided into positive, negative and neutral and this was done to make it easier to understand the emotional response and importance to the person telling their story. However after reading through the final answers it became clear that the questions were not fully answered in the manner it was indented by the creator of the questionnaire. The answers were more often simply stating facts and more rarely about fully describing situations and events that the employees had experienced. This was no doubt due to the way the questions were phrased and they should have been more clear on what was expected. It is also possible this was due to the fact that people didn't want to write long answers and interviews would have been a better way to collect these anecdotal stories. Nevertheless the answers were good and raised many issues and great points to work with. Also the late addition of the open-ended question at the end of the team dynamics section resulted in many good comments and they were combined with the other open-ended answers to be analyzed.

The formal process of qualitative content analysis was followed as it is described in the section 3.3. After the initial read through keywords were given to sentences to describe their main themes, these could be exact words from the sentence or an over all theme present in the sentence. All sentences received 2-4 keywords each on average. This resulted in 87 different keywords being used. The most used keywords were:

- Different cultures, 39
- Communication norms, 26
- Language Skill, 23
- Team dynamics, 24
- Co-operation, 20

- Learning, 16
- Way of working, 16
- Trust, 15
- Work competence, 13
- Clear communication, 12
- Management, 12
- Distance, 11
- Accents, 10
- Inclusion, 10
- Tools, 10
- Knowledge sharing, 9
- Awareness, 8
- Individual, 8
- Unclear Communication, 8
- Openness, 8

After this answers were divided into groups based on the common keywords. For example all sentences with the keyword "Accents" were moved into a same group but for example sentences with the key word "Different cultures" were divided into a number of groups based on their more descriptive keywords:

- Similar cultures
- Learning
- Trust
- Cultural difference
- Communication norms
- Unclear communication
- Hierarchy
- Humour
- Knowledge sharing
- Co-operation
- F2F vs. online communication

- Openness
- Different ways of thinking
- Language skills
- Accents
- Tools
- Individual
- Team dynamics
- Inclusion
- Time zones / Holidays
- Customer relations
- Way of working
- Responsibility
- Management
- Company
- Relationships
- Awareness
- Site visits
- Working environment
- Mutual understanding

In the next stage the answers in these groups were studied more closely as well as the key words were used to find similarities between these numerous groups. Subcategories with similar themes were brought together under main categories and the subcategories were more well defined and similar themes were combined further together to create a more coherent and well defined subcategories which have clear themes to them. The resulting final categorization were as follows:

- Communication
 - Communication norms
 - Humour
 - Understanding others
 - Knowledge sharing

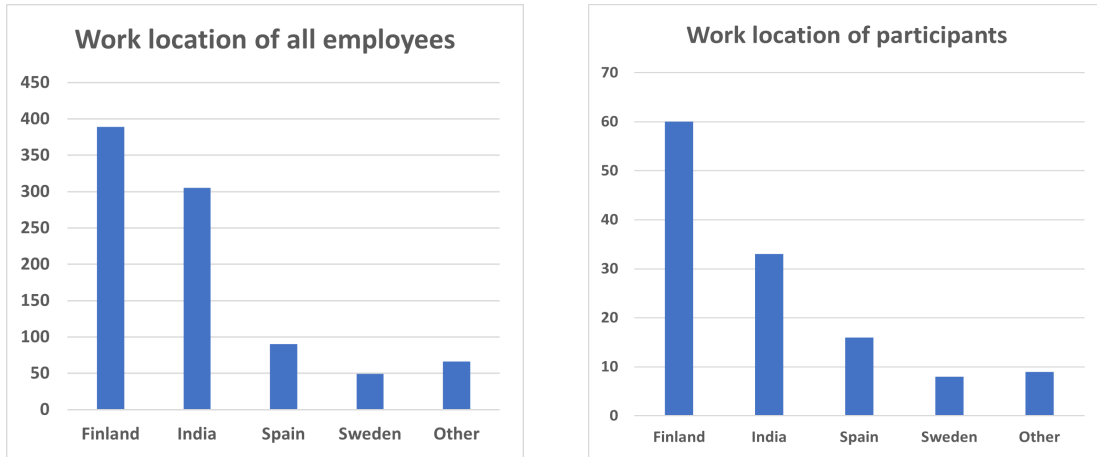
- F2F vs. online communication
- Openness
- Language skill
- Accents
- Team dynamics
 - Communication between team members
 - Co-operation
 - Inclusion
 - Responsibility
 - Management
 - Working environment
- Culture
 - Culture clash
 - Cultural communication norms
 - Hierarchy
 - Different ways of thinking
 - Awareness
- Trust

3.7 Statistical analysis of the data

The questionnaire was sent to all 899 internal employees of Qvantel. There were also around 300 external employees at Qvantel that have short employment contracts and might actually be working for some management company where they are "loaned" from. Decision was made to leave these people out since they usually are working for Qvantel only for a short period of time in single projects so their experience at Qvantel can be very different from that of internals and it would be more representative of their experiences if a separate questionnaire was done only for them.

Out of the 899 people whom the questionnaire was sent to 126 answered it. Figure 1 the left diagram shows all the Qvantel internal employees and their country of residence and the

time of the questionnaire. Figure 1 the right diagram shows the people who answered the questionnaire and their country of residence. The three biggest sites in Qvantel are Finland, India and Spain and that is also reflected in the people who answered the questionnaire.

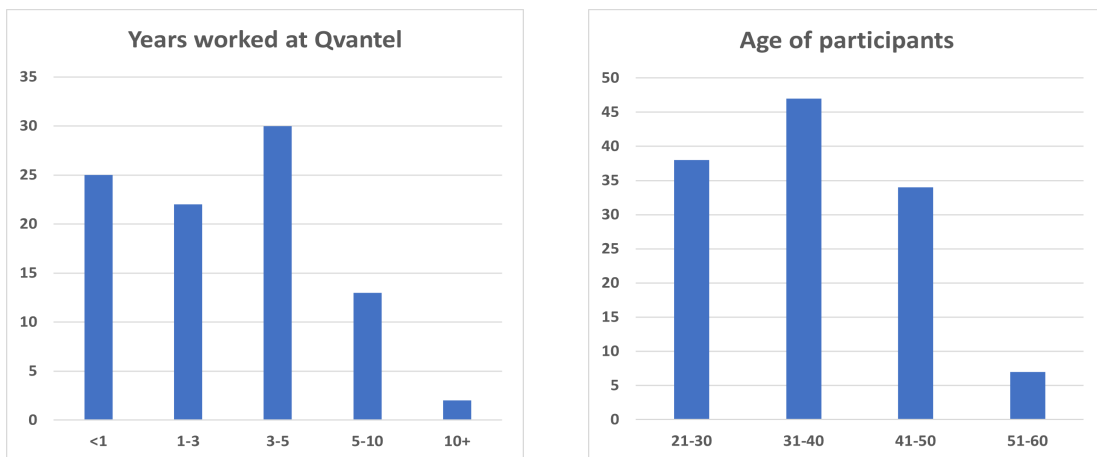


(a) Location of all Qvantel employees

(b) Location of participants

Figure 1: Working location of all the Qvantel employees and participants

Figure 2 left side shows employees' length of employment and the right side shows their age. These graphs show good variation of age groups and length of employments from the people who answered the questionnaire.



(a) Worked at Qvantel

(b) Age of participants

Figure 2: How long participants have worked at Qvantel and their age

Unfortunately it was not possible to get the ages and length of employment of all the Qvantel

employees to compare to these two graphs so that these values could have been compared to data from all the employees of Qvantel. However the people who answered are fairly evenly divided among the data points meaning there is no clear emphasis on a single subgroup of employees at Qvantel which shows that at least from the point of view of age and length of employment the employees are fairly evenly represented.

In the questionnaire employees were also asked their job titles which they wrote themselves in a text field as it was not possible to add all the options because there are so many of them. In the end forty different job titles were reported in total withing these twelve main groups:

- Software developer - 38
- Manager - 20
- Software engineer - 10
- Test engineer - 8
- Architect - 7
- System specialist - 6
- Business analyst - 2
- Expert - 2
- Product Owner, 2
- Consultant - 1
- CTO - 1
- Designer - 1

This further shows that the questionnaire was answered by a varied groups of employees representing many different parts of the Qvantel organization and work descriptions.

Figure 3 on the left shows that 95,2% of employees who answered this questionnaire work with remote teams and the right diagram shows the number of remote teams these employees work with regular bases, where the average is 2-3 remote teams which 53.2% of the employees work with. These two figures show that Qvantel employees who answered this questionnaire are indeed working in a global software development environment and who on average work with more than two remote teams at the same time. Which shows that they have experience in global software development and their answers can be used to find out

and analyze about the possible negative and positive impact of global software development on Qvantel employees. However it is important to note that 4.8% of the people who answered this questionnaire did not work with remote teams at the moment of answering but their answered were not removed from the open-ended section if they had answered them.

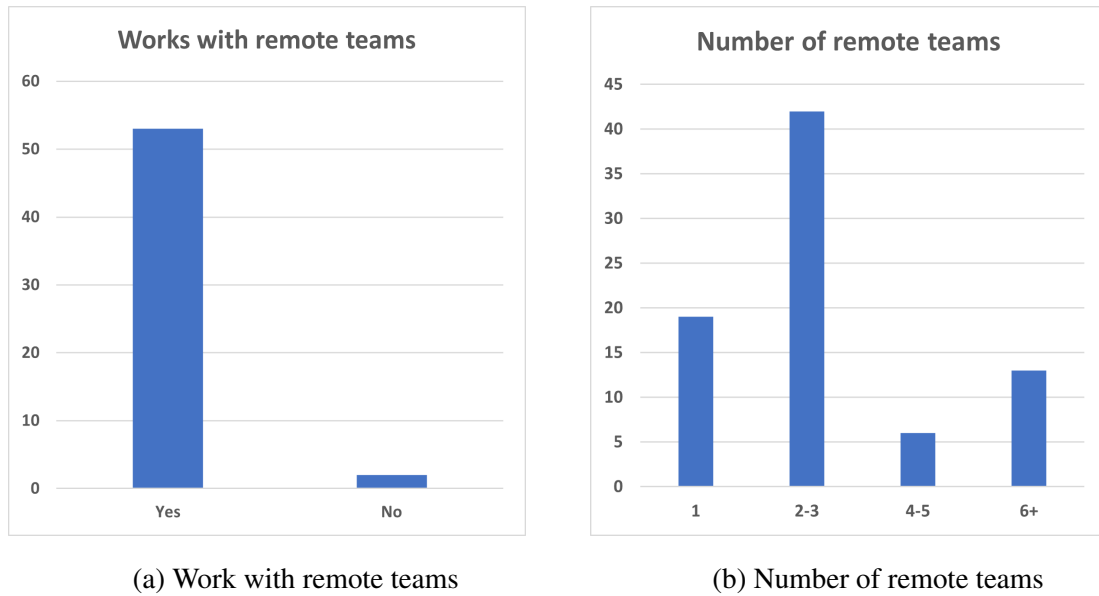


Figure 3: How many employees work with international teams and number of teams they work with

4 Results

4.1 Communication

When Qvantel employees were asked if their team has clear communication practices 35,7% people strongly agreed, 57,1% agreed and 7,1% disagreed. When asked if their team members use the same tools and communicate the same way 43,1% strongly agreed, 44,7% agreed and 12,2% disagreed. In general, employees of Qvantel seem to use the same communication tools within their teams and have good communication practices but there is clearly room for improvement. Especially 12,2% not using the same tools for communication leaves a large number of employees excluded from the team communication and knowledge sharing.

4.1.1 Language skill

Respondents perceived their language skill to be high in general. Speaking skill was reported to be high by 73.8% and medium by 22.2% and this was the only skill category where someone reported their skill level to be poor. Despite this seemingly high level of skill reported in the multiple choice part of the questionnaire in the written answers number of issues related to coworkers' speaking skill was mentioned. Particularly accents and unclear pronunciation was clearly raised as its own issues so much so that it became its own subcategory separate from the general language skill issues.

Despite everyone speaking English on the paper, the other parties may have a strong accent making it difficult to understand what they mean... (Respondent#16)

Writing skills were indeed reported to be higher, compared to the speaking skill, 80.8% reporting their skill to be high and medium by 12%. Listening comprehension was reported to be the highest by 83.3% and medium by 7.9%.

Despite people evaluating their language skill to be high one of the clear themes present in the open-ended section was low language skill and the misunderstandings that arise from it:

When everyone is using English, which is not the native language for anyone, many misunderstandings happen. (Respondent#19)

Usually the not understanding part is because of the other person's language level. (Respondent#39)

Poor pronunciation and heavy accents were separately pointed out as one of the reasons to cause issues in communication and understanding:

English proficiency among Qvantel employees varies a lot, and some nationalities tend to have rather heavy and hard-to-understand accents. (Respondent#2)

Sometime the different accents are hard to understand. (Respondent#37)

4.1.2 Understanding others

When asked how often the person answering the questionnaire has trouble understanding coworkers 57.1% reported to have no issues in understanding their coworkers and 18.3% reported to have issues only monthly or so. These statistics contradict what people reported in the written answers. Issues reported in written answers about understanding were more common because it was not always imputed to low language skill but to a number of other reasons like cultural difference, unclear communication practices, failure to establish a common communication context, different time zones, etc.

Cultural differences within Qvantel often leads to scenarios where things are understood in completely different way. (Respondent#10)

Sometimes it may come up that communication is difficult because one party does not understand precisely what the other is trying to communicate. I suspect it may be difficult to express this in some cultures, and it would be good to be aware of things like these in advance. (Respondent#6)

Since this question was asked under the language section of the questionnaire it could be people didn't think of all these other situations where misunderstandings happen and only

answered from the language point of view and if this question had been under the team dynamics people might have given more varied reasons for misunderstandings.

4.1.3 Remote communication and communication norms

When communicating with remote team members the tools used play a vital role in how smooth and efficient the communication can be.

Communication tools are essential and are getting better all the time. I've been happy with the Teams and Qvantel is using it efficiently in my opinion. That is the main problem in many companies that I've seen. The tools are not available, or they are not used properly. It might be that the communication tools are even seen as a waste of time. Group chats are essential when communicating between sites. Emails and phone calls really are not technologies of today. (Respondent#11)

Just having good communication tools available is not enough to guarantee smooth and inclusive communication between coworkers. It is also important to have team members agree on what tools are used and how communication should happen, furthermore people need to follow these agreements.

No clear agreement/communication/standardization which channels are used as primary tools for each kind of communication needs. (Respondent#30)

Sometimes team members might be aware of existing issues with communication or the tools used but are not ready to change their habits. This resistance to change can be caused, for example, by poor relationship between team members and person trying to affect change or lack of motivation to change old habits.

We sometimes see where we should do changes in communication and in our system, we still continue to do the same things as earlier. (Respondent#5)

Even when everything is working it is good to go through the communication habits with team members regularly to see if something could be done better and to make sure everyone

are still following the agreed methods.

Communication can always be better - it needs "maintenance" all the time, which tends to be forgotten. (Respondent#20)

Employees are not communicating as often with the remote teams members compared to local ones and they are not fully aware what the team members in the remote sites are doing and what kind of issues they have. This lack of awareness results in poor communication context which makes communication more difficult and more prone to misunderstandings.

Very location centric communication. Remote team not included in daily operations. (Respondent#54)

Working with remote teams makes it very difficult to efficiently share knowledge between the teams. We do some efforts, but it seems very insufficient. (Respondent#16)

The distance between remote teams means that it's very unlikely to have spontaneous chats with them, meaning that it's very unlikely to build with them the same kind of acquaintance that you have with colleagues who work on the same site as you do. This, and the fact that you cannot just walk to their desks and ask a question means that you may be reticent to start a discussion with them to solve a problem, and it may therefore take more time to solve that problem than it would have taken if the colleagues had been sitting close to you. We often use text-based communication, but that is very slow medium, and it lacks the ability to explain complex things using a picture. (Respondent#16)

Communication issues can also arise from how people express themselves in writing or verbally. Different writing styles and writing in a hurry can result in incoherent output that others are struggling to understand. In verbal communication fast tempo speech combined with unclear content can have similar effects. This is a difficult topic because it is sometimes hard to notice when ones own communication is unclear and how to improve it, especially when talking about subject without any visual aids to help people listening to understand what is meant.

Some people can present their thoughts simply and clearly. Some are more complex and fill their text/speak with non-relevant issues. I have noted that this is a major issue at least in my team. Especially when the one providing the information is the most senior one and knows the issue upside down. It may be difficult to understand that your message can be unclear to other people. (Respondent#8)

It happens that I get messages where they are formulated in such a hasty manner that I have to ask them to rephrase or puzzle the message together myself. I think it is due to a combination of a stressful culture and lack of language skills. (Respondent#17)

Gaining a mutual communication context is a key into ensuring that team members have the best chance of understanding each other. Everyone having the same idea of what the topic of the conversations is and sharing the same background information on the topic helps to create a strong context.

We have very fruitful discussion in several lunch and dinners table among people from different cultures, which has helped me later in working with them understanding the way they communicate. (Respondent#41)

4.1.4 Face to face meetings

When improving communication between team members located in different sites, having them meet face-to-face is always preferable over virtual meetings. This is not always possible of course and it can be alleviated by at least using cameras during virtual meetings.

I think we should use video a lot more in our online communications. So much of what we express is non-verbal. (Respondent#12)

For both parties, it's of course sub-optimal to communicate over the Internet (esp. via an audio only connection) as it introduces lag and removes all of the body language that would be present if the discussion were done in real life. (Respondent#6)

Qvantel employees reported face-to-face meetings of the remote team members to have number of positive affects on the team dynamics. During face-to-face meetings team members get to know each other better and more personally which helps to create the feeling of team-ness. Face-to-face meetings can also make the communication after the meeting less formal as people get to know each other and agree on common communication practises.

Visiting different locations have given different aspects to our ways of working. Also online communication tends to get smoother after first seeing people face-to-face. (Respondent#36)

We have people on three sites, but currently it all feels like a one team working together, even with the distance. We see each other each summer in a gathering, and that helps with the feeling of 'teamness' a lot. (Respondent#14)

4.2 Team dynamics

Qvantel has a number different sites around the world and on average employees work with 2-3 remote teams on daily bases sharing on average 4-6 hours of mutual working time per day as indicated on a figure 4 .

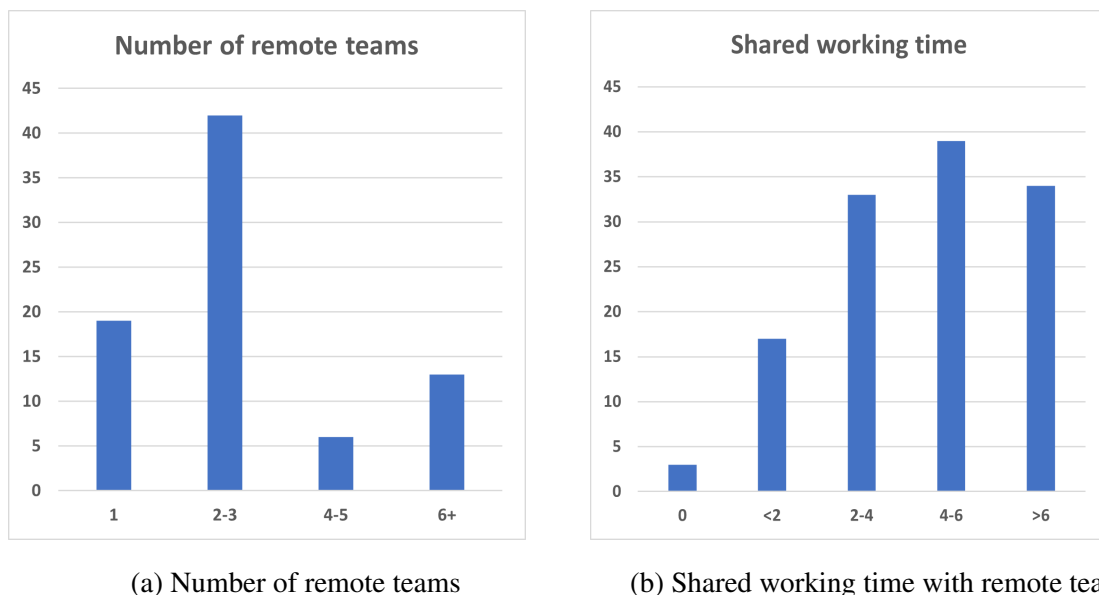


Figure 4: Number of remote teams and shared working time (h) between employees

In the open ended section there were some comments that acknowledged this time zone difference but no one raised this as a significant issue affecting the daily work. This could be due to the fact that 58% of the respondents shared four or more hours of working time with their remote co-workers. It could also be that the work is organized in a way that different sites have different responsibilities and seldom have to interact with one another, this is at least true for some of the employees:

The time difference is compensated by acting in a different part of project. (Respondent#53)

However people did raise issues in different working routines between sites and individuals and how that is actually causing issues. Things like different working day starting and ending times, lunch times, meeting times, etc. is raised as an issues over the time zones and causing people to be unavailable for large amounts of time:

Also sometimes simple things such as the usual time for starting or ending the workday or the usual time for lunch in different cultures can make people unavailable to each other for several hours in the day. (Respondent#16)

Different schedules and lunch times make schedule meetings and calls more difficult. For the same reason, people are not ideally available the same way you would like to. (Respondent#32)

Qvantel employees also noted the importance of the daily meetings and how some people in daily meetings and meetings in general are being left out and don't get a change to voice their opinions and concerns:

I think is a good exercise keep the communication daily, because everybody will adapt to the rest of the team. (Respondent#37)

[Country1] team members are not used to participate actively on meetings and raise doubts. (Respondent#52)

Someone explicitly asking in a meeting female colleagues from [Country1] and [Country2] for their opinion, realizing that it may not be so easy for them to just

give their opinion. And then getting rewarded with by far the best opinions so far in that meeting. (Respondent#12)

Issue of not being heard was also raised in the answers:

Feel like we are not taken into consideration when we have any concerns. (Respondent#40)

Being heard makes team members feel empowered and important part of the team. Even though giving everyone the opportunity can cause issues in communication and requirement setting as people have different opinions on how the work should be done and what is important, therefore finding common ground and mutual understanding can be difficult at times.

Multiple cultural background leads often more versatile solution. Of course decision making need to be sharp, otherwise versatile also means hard to get anything done since there's too many opinions. (Respondent#10)

The challenge is how to form a decision from all the different opinions and view points, that is mutually accepted. Usually this can be solved with long enough conversations where pros and cons of the different approaches can be discussed and the most optimal solution found, but even this usually requires a compromise in some way or another. The ability to make compromises and accept that your opinion or way of working is not optimal for all the members of the team is an important part of teamwork.

Once a decision is made the next step is making sure all the members of the team receive this information as well as fully understand the content and the implications of the decision. This helps to form a mutual understanding within the team on what was agreed, which supports the team as it goes forward.

Dynamics and joint understanding on commitments at team vs. individual level is important. Remember always check everyone has same understanding. (Respondent#34)

Teammates try their best to communicate with each other. We try to use the Teams call for in case of any concerns. One of the teams I work for uses Teams

chat as a main communicator what is extremely helpful to understand the workload and in general 'what is going on'. (Respondent#13)

Establishing good communication and development practices and getting all the team members to follow them as well as getting team members to know each other well will take time and effort but the results are worth the time spent.

The co-operation of the teams has existed so many years that the communication habits are well established. Also many of the strongest experts are in our remote team, which probably helps creating a feeling of equality. (Respondent#33)

I'm writing this in the middle of COVID-19 forced WAH (working at home). I'm proud how well the team works together. We have been working with someone working from other site all the time, and team practices have been built around that. I'm seeing a lot of open and straight communication between people, and things getting actually done. I strongly feel that the effort we've made as team to get to know one another when the times were good are really paying off right now quite handsomely. (Respondent#55)

4.3 Culture

4.3.1 Culture clash

When working in a multicultural team cultural differences and behavioral norms are sure to come up at one point or another. People are rarely familiar with other culture's finer details even if they have been informed on the major cultural differences. Even if one is aware of these differences it can be hard to separate from ones own cultural context to fully try and perceive a situation without it. What is considered polite and welcoming in other countries might be considered very cold, indifferent or insulting in others.

People don't look to be interested in others' lives as much as in some other cultures. (Respondent#31)

I have had some experiences where a co-worker seemed to act very cold and

indifferent, but later learned that the behaviour was considered polite and respectful in the country of origin of the co-worker. (Respondent#21)

[Country1] colleagues are usually very polite as I think that we [Country2] tend to feel colder in that sense. I for example don't always remember to use the word "please" every time I should. (Respondent#46)

When first meeting with the [Country1] team I was puzzled why the men took a step back when I offered hand for a handshake. Later I found out that men do not shake hands with women, which I did not expect in a country relatively close to mine. (Respondent#41)

4.3.2 Cultural communication norms

Different cultures also have different ideas on what is an appropriate way to communicate certain matters, for example what is the appropriate manner to bring up negative matters or whether it is acceptable to question ones manager.

Cultural: [Country1] team members are not used to participate actively on meetings and raise doubts so they contact directly solution manager or other developers to ask questions. (Respondent#52)

A new colleague once asked that are [Country1] people always so open and truthful about problems/issues. (Respondent#50)

I often get "yes" as an answer, even the person from another culture does not mean yes. I don't know how to ask people and leave them safe way to tell me "no, I cannot do that". (Respondent#15)

4.3.3 Hierarchy

Hierarchy and issues related to it was raised by multiple employees of Qvantel in the questionnaire, they described issues in communication, co-operation and development process.

Cultural differences sometimes get in the way of efficient communication (e.g.,

when the need to respect of some form of social hierarchy prevents someone from asking you a question directly and it instead goes through many intermediaries). (Respondent#16)

There have been occasions where a junior or "regular" developer would raise a doubt regarding the solution or design, and the PM (project manager) or SM (solution manager) would not take appropriate action to resolve the situation. Only when a senior developer or architect gets involved and essentially repeats the same doubt, there is a reaction. (Respondent#55)

When working with [Country1] there are some people that I always had to go through the command chain to get my opinion heard before that being basically neglected. Also being a female is clearly a disadvantage when working with them unless you are clearly above them in the hierarchy. (Respondent#41)

4.4 Trust

Questions about trust were purposefully left out of the questionnaire but number of people talked about trust either directly naming it or indirectly. In the open ended section Qvantel employees talk about what kind of behaviour creates trust for them and what impact trust has in the work. Likewise they talked about lack of trust and what causes it.

I think I trust my colleagues to do what they say they are going to do, and most of the time that trust is warranted. (Respondent#46)

As a positive point, the confidence of the [Country1] people. By default, the other person is trusted, for a task, or a requirement (i.e. purchase), which streamlines processes and gives empowerment. (Respondent#9)

I felt valued when given trust to work on new technologies and challenges. (Respondent#31)

In our team there is high trust to other people, communications are mainly clear. All team members are from Nordic countries to the culture is very similar. (Re-

spondent#1)

Trust: high quality of the tasks implemented by [Country1] developers. (Respondent#52)

Lack of trust: competence needs to be proved instead of assumed that there is some by default. (Respondent#29)

In daily meetings, a manager is constantly micromanaging, which creates a feeling of distrust. (Respondent#46)

We trust our country's colleagues but are doubtful of our foreign colleagues. (Respondent#25)

5 Discussion

5.1 Communication

Herbsleb (2007) raised communication as one of the most common issues arising from global software development. Employees are not communicating as often with the remote teams members compared to local ones and they are not fully aware what the team members in the remote sites are doing and what kind of issues they have. This lack of awareness results in poor communication context which makes communication more difficult and more prone to misunderstandings

Issues in understanding were found to be caused by many different reasons, for example cultural differences, poor articulation and formation of sentences, not being aware of what exactly the other one is trying to communicate about etc. Gaining a mutual communication context is a key into ensuring that team members have the best chance of understanding each other. Everyone having the same idea of what the topic of the conversations is and sharing the same background information on the topic helps to create a strong context. The longer people work together the better they learn each others expressions and ways of talking which is also an important part of creating a shared communication context (Bjarnason, Wnuk, and Regnell 2011). For this reason it is important to invest into good communication practices and uphold frequent communication from the very start of the project in order to improve the chance of good overall outcome of the project (Swigger et al. 2004).

It was pointed out by the participants that since many people are not native English speakers they tend to use the words little differently from the words official meaning and from one another leaving a lot of room for interpretation which can lead to misunderstandings. High language skill is important part of good communication as it reduces the change of misunderstandings and it is an important part of forming positive relationships and building of trust between co-workers (Babar, Verner, and Nguyen 2007). Oshri, Kotlarsky, and Willcocks (2007) also reported that language proficiency was an important factor in improving the remote teams communication which in turn improved the feeling of belonging among the team members. However high language skill level doesn't on its own guarantee good and flaw-

less communication as misunderstandings can also be caused by a number of other reasons, like different communication contexts and inadequate tools for communication (Holmstrom et al. 2006).

The importance of communication tools when communicating with remote team members was acknowledged in the answers and yet many also reported issues in having unclear communication practices or insufficient tools. It was also raised by few employees that communication should or could be improved on in their team but this for some reason doesn't happen. On top of that the teams are not communicating the same way with remote team members, and issues in very localized communication was brought up, this localization of the communication leaves the remote team members feeling left out of the communication. Some also reported feeling left outside of the social group, even when working at the same site, due to language barrier or cultural differences. When communicating with remote team members the tools used play an essential role in how smooth and efficient the communication can be. The more difficult the communication the less likely people are to communicate and less communication results in larger gaps in communication, awareness and feeling of "teamness" between sites (Oshri, Kotlarsky, and Willcocks 2007). Tools that allow instant messaging and video calls are preferable over emails and phone calls, emails are slow and hard to follow, phone calls remove facial expressions and other body language from the conversation which can cause misunderstandings of meaning and emphasis (Holmstrom et al. 2006).

Many people pointed out how communicating through instant messages and emails feels insufficient and leaves room for error and slows down the communication. Video calls or even better having people in the same room was reported to be a much more efficient way of communicating with team members and people preferred it over text based communication. Visiting other locations and meeting team members face-to-face was reported to be very beneficial and helped with the communication over distance afterwards, making it smoother and easier to understand. Face-to-face meeting of the remote team members have numerous positive effects on the team dynamics. A study done by Oshri, Kotlarsky, and Willcocks (2007) found that team members got to know each other better and more personally during the face to face meetings which made communication after the meeting less formal and people were

more likely to contact people directly instead of using a manager or some other person as liaison. During the face to face meeting team members also agreed on common communication practises and how development would be conducted. Later on the employees contributed this to be the main reason as to why a following project was so successful and done in time. Over all face-to-face meetings and site visits have been found to improve communication, knowledge sharing and collaboration (Oshri, Kotlarsky, and Willcocks 2007; Cataldo et al. 2007; Hossain, Babar, and Paik 2009; Deshpande et al. 2010).

The Oshri, Kotlarsky, and Willcocks (2007) study also followed another company where people were working from different sites but they did not have face-to-face meetings except in the higher management and they had limited means of communicating over distance, this combined with the fact that the organizational structure of the company had changes number of times in a few years time had caused employees to become less familiar with each other which caused significant differences in the norms, attitudes and behavior within the company. The employees of this company reported issues in cohesion, lack of team atmosphere, tension between sites and resistance to follow processes. Paper by Holmstrom et al. (2006) also reported that higher level employees had good relationship across sites as they traveled between sites and met their colleagues more often where as developers seldom had the chance to meet. This caused issues in formation of trust, feelings of belonging and 'teamness' amongst developers located in different sites.

5.2 Team dynamics

Time zones in general was not considered an issue by Qvantel employees based on the answers rather issues were found in the different daily routines of coworkers. Employees are not available at the same time even at the same site, they start and end the work day at different times as well as lunch and coffee breaks, making it hard to predict when people are available and reducing the common working time. This reduced mutual working time is causing delays in communication and slows down the development process (Holmstrom et al. 2006).

Qvantel employees found daily meetings to be useful in aligning with the remote team mem-

bers and making sure everyone has the same understanding of the situation. As these meetings are online some issues were also raised, people are not communicating as much online as they do face-to-face and it is important to make sure that all team members get an equal chance to voice their opinions and concerns as it is easier to miss out on people when they are not physically present in the room. Cultural differences in how issues are raised and how this might affect communication was also discussed in the answers. Employees suggested keeping in mind that some people might not be able to raise their concerns or say 'no' due to cultural norms and might need more encouragement and support than others. Daily stand-ups increase transparency and visibility of the teams process in projects (McHugh, Conboy, and Lang 2011). Making these meetings mandatory and requiring all members of the team to have an input during these meetings help to increase communication between sites (Hossain, Babar, and Paik 2009). Being heard makes team members feel empowered and like an important part of the team, which in turn encourages team members to follow the agreed communication and development practices (Hossain, Babar, and Paik 2009; Oshri, Kotlarsky, and Willcocks 2007).

Getting number of different people to share their ideas was reported to be beneficial as people with different backgrounds can have different ways of thinking resulting in more versatile solutions. The difficulty of making decisions when there are many different opinions was acknowledged in one of the answers. Having everyone being able to voice their opinions and concerns can cause issues in communication and requirement setting as people have different opinions on how the work should be done and what is important, therefore finding common ground and mutual understanding can be very difficult (Oshri, Kotlarsky, and Willcocks 2007; Hossain, Babar, and Paik 2009; Holmstrom et al. 2006; Bjarnason, Wnuk, and Regnell 2011). Working to improve team communication and having everyone agreeing on the common goals was reported to have positive impact in the team dynamics and development process. This process was said to take time and effort but the benefits were found to be worth it.

5.3 Culture

Many different ways employees are misunderstanding each other due to cultural differences and different behavioral norms were acknowledged in the answers. The first impressions on coworkers from different countries were varied, coworkers were thought to be cold, impolite, sexist or even racist due to misinterpreting their behaviour and way of communicating. Beyond first impressions Qvantel employees found cultural differences to cause issues in communication because people have different ways of communicating and they cannot always trust that the other person feels comfortable enough to say what they actually mean as well as some other issues in communication. In comparison employees who had similar culture to their remote team reported clear and easy communication with the remote team members. Providing cultural training for employees working in global software development setting is an important part of improving the team members collaboration and understanding of others (Babar, Verner, and Nguyen 2007), as well as helps to create a mutual communication context which in turn streamlines communication (Deshpande et al. 2010; Holmstrom et al. 2006). Gender is an important topic to bring up when discussing cultural differences as gender is perceived in different ways in different cultures and can cause friction between team members if not addressed and talked over (Deshpande et al. 2010).

Qvantel employees especially found the hierarchical differences between countries to be troublesome. Employees' reported issues in communication that were caused by coworkers' hierarchical mindset. For example an employee could not directly speak to a person they needed to, because that person would not accept anything they say, and had to speak to the supervisor of that person who then spoke to the desired person and reported back what they said. Or there might be even more people involved in this chain as some respondents described. Issues in development process was also brought up where only senior members of the team would be able to get managers to listen to the issues raised by more junior member. Also issues in team dynamics were contributed to hierarchy when some members of the team seem to feel they are above others based on their behaviour. Number of studies conducted in the global software development setting raised issues in hierarchy and concluded that informal communication and relationships are much more beneficial amongst team members, improving communication, co-operation and streamlining development processes (Hossain,

Babar, and Paik 2009; Oshri, Kotlarsky, and Willcocks 2007; Cataldo et al. 2007). Whereas people who believe in strong hierarchical structure in an organization are more likely to perform poorly in a collaborative programming project, especially if the programming task is time sensitive and required close cooperation (Swigger et al. 2004).

5.4 Trust

Qvantel employees felt trust to be created when coworkers communicate well, do what they promise and produce high quality work. Participants reported that when they are trusted they feel empowered and valued as members of the team. Trust was also contributed to streamline processes, reduce stress, improved team dynamics and communication. According to studies conducted in the field of global software development face-to-face meetings, communication, socialization, accountability, knowledge sharing and feedback all help build trust between people (McHugh, Conboy, and Lang 2011; Moe and Šmite 2008). As well as showing commitment and accountability by delivering what was promised in the agreed timeline (Nicholson and Sahay 2001), learning about team members' culture (Babar, Verner, and Nguyen 2007), and getting to know team members personally and forming friendships with them (Swigger et al. 2004; Holmstrom et al. 2006).

Qvantel employees reported lack of trust to be caused by different cultures, managers controlling behaviour, need to prove one's competence, coworkers not delivering what was agreed or not communicating clearly and in timely manner. Lack of trust can cause issues in; co-operation by making people more interested in their own goals at the expense of the teams', and communication and moral which in turn affect productivity and quality of the development (Moe and Šmite 2008). Lack of trust from the management on the other hand can cause them to start micromanage development process which may cause developers to avoid communication with the manager and become apprehensive of negative feedback (Moe and Šmite 2008).

6 Implications for practice

6.1 Communication

In order to improve communication between sites team members could promote informal communication for example by having virtual get-togethers and coffee breaks where all team members are invited. Taking notice of the silent members of the teams and encouraging them to express their opinions and to be more vocal for example during daily meetings having each member talk one at a time by default instead of generally asking what is going on or if anyone has any issues. Having discussions on how to improve communication by making it more inclusive and easier to understand, having team members think what would be clear communication and how they could improve theirs. All of this combined with the mutually agreed tools and practices help to create a shared communication context which will improve communication and mutual understanding. It would be recommendable for all teams to have a conversation on the teams communication tools and practices in order to find out what is working and what is not and create a new mutually agreed guidelines on communication. Equally important is making sure that the agreed tools and guidelines are then taken into use and the agreement enforced when necessary until the new practises become the norm. This discussion could take place regularly, for example once a year, in order to update the practices to match current needs and to find out what is not working anymore.

In order to find out which individuals are in need of language training, companies could conduct a short English language proficiency test to identify individuals in most need of language lessons and support their language learning, perhaps by giving them the option to use working time for language learning at the beginning so that they can get started. It is of course important to provide all employees the possibility to improve their language level. This can be done through actual language classes with teachers but also by providing a list of different self-learning options. For example a list of web sites providing free language lessons and grammar exercises, vocabulary learning tools like Anki, list of core words used in day to day work, tips and instructions on how to go about improving a language skill, creating group chats for people wishing to learn where people can share ideas and ask for help, etc.

Promoting self-learning and providing clear instructions and easy options to get started can help especially those who are very busy with work and cannot commit to a strict lesson schedule, who are shy or do not want to study in groups because they feel their language skill is too low or too high or simply because some people prefer studying alone.

6.2 Team dynamics

Raised issues concerning different working times could be addressed with formalized lunch, meeting and work times to optimize time that everyone is working but this seems rather restrictive and might cause more issues. Discussion between team members is recommended to find out if and what kind of issues the team is facing regarding shared working time and if it is possible to alleviate some of them.

It is important that everybody is being heard and more people included in the discussions and decision making. It is important to make sure all the team members get equal opportunity to voice their opinions and concerns. Especially when discussing project requirements it is important to do this in a way which leaves team members with a feeling that their opinions have been heard and taken into account. It is recommended to discuss this within the teams and encourage team members to be more vocal but also to make sure that all the team members get equal opportunity to voice their opinions and try and prevent few active individuals taking up all of the meeting time. During these discussion it is good to also address how decisions should be made after all these different opinions so that people won't feel disregarded.

6.3 Culture

Cultural training within company's employees could be used to levitate the many misunderstandings caused by cultural norms and expectations. This training could be done in the company level or on team level where only the cultures represented on the team are discussed in detail. Teams can agree on their own working culture that will be followed by all of the team members. Of course every team already has some kind of a working culture even if one is not ever formally agreed on but by having a formal discussion about it and agreeing on it can help people from different cultural backgrounds accept these new behavioral and com-

munication norms even if they are in direct contradiction with their own. Formally agreeing on a working culture will also bring it to everyone's attention and makes sure everyone knows what the agreed working culture is.

As hierarchy has been found to cause issues in global software development setting, it is recommended for companies to work towards removing hierarchical working structures and guide employees to be more inclusive and accepting towards their coworkers, regardless of their job title, gender, age, ethnicity or educational background etc.. This could be done in the team level where team members could have discussions about their way of working and how they could promote equality and lessen hierarchical communication structure.

6.4 Trust

Improving trust on team level should be started by getting to know the team members better. Having for example a meeting where everyone will introduce themselves and tell about their lives outside the work, where all members of the team will ask questions in turn from the person making the introduction, is a good way to get everyone acquainted with each other in a more informal way. This can be then build on during weekly meetings where everyone will talk about how they are doing in their personal lives and what they have been doing. Open discussions about coworkers, their backgrounds and cultures could help team members understand each other better and get closer to each other. Promoting self-reflection on individual level can help people identify their own behaviour better in relation to others and how they approach situations.

7 Reliability of results

The results of this questionnaire reporting high language skills seems rather contradictory to all the comments in the open ended questions. This could indicate that the respondents overestimate their own abilities, perhaps because they think their own skill level to be higher than it actually is, and they do not recognize their own unclear or poor communication. These results could also be due to there being only four available levels of proficiency as answer options which caused people who were somewhere in the between to evaluate higher rather than lower raising the average. The results of this study could also be caused by the questionnaire being answered mostly by people with high English level and they are referring to other people when they describe these issues, which is plausible since the questionnaire was in English and the rather long explanation at the beginning of the questionnaire might have put off people with lower English level. This could mean that the subset of people who answered this questionnaire might have above average language skill at Qvantel. This could affect the overall outcome making it more representative of a specific subgroup of employees in Qvantel rather than a generalizable representation of the employees. Having all employees answer this questionnaire would certainly have provided more examples and descriptions of positive and negative situations which would have helped to create an even better idea of what is working and what is not. Or randomly selecting people from different teams, job titles and nationalities in a way that all employees would have been evenly represented, would have created more reliable data from the representation perspective. Regardless the overall findings of this research seem to be in line with the findings of other studies done in the global software development setting and therefore they can be trusted to some extent to provide valuable data of the current situation at Qvantel.

A noteworthy point is the fact that this was the first time that I had conducted a qualitative content analysis and as I did it alone without input from other people during the steps of analysis the outcome of the analysis might be biased or it might be missing some important aspects of the source data that I missed. It is possible that since I'm also an employee of Qvantel, my own experiences could have caused me to pay more attention to some answers than others and give them more weight without me even realizing it.

Additional research could be made by using this questionnaire or improved version of it in other companies to see if similar issues would be reported in them as well. As this questionnaire was heavily themed to narrow down the focus to just communication, culture and trust due to the size of this thesis the further studies could be conducted in a more broader terms by not defining any themes in the questionnaire to see if similar topics would then still be brought forward and what kind of other themes would be present in the answers.

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