

# Reaping the rewards of diversity at a high-tech company

A Master's Thesis submitted for the degree of  
“Master of Business Administration”

supervised by  
Dr. Christian Garaus

Thomas Schwaiger, BSc

11716359

## Affidavit

I, **THOMAS SCHWAIGER, BSC**, hereby declare

1. that I am the sole author of the present Master's Thesis, "REAPING THE REWARDS OF DIVERSITY AT A HIGH-TECH COMPANY", 65 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

Vienna, 29.06.2019

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Signature

# Abstract

The aim of this thesis is to better understand the relationship of team diversity and the outcomes a team produces and the resultant performance. This is done in the context of software development teams operating in an agile framework. In particular the focus lies on identifying recommendations for practitioners to make better use of the diverse set of skills on their teams.

The thesis is focused on the research question to identify the necessary strategies to harness a team's diversity to improve performance. This was studied using qualitative research methods of semi-structured interviews at a large international organisation that develops software for technical applications across architecture, engineering, manufacturing and film making.

The findings of the research seem to support findings from prior studies of the diversity performance relationship, although take it deeper into the specific domain of software development. As a result, the thesis provides a number of concrete implementation strategies that practitioners can utilise to help with team cohesion and therefore harness the diverse skill set and points of view on their respective teams that can ultimately lead to increased performance.

The qualitative research uncovered practical strategies, and also helped expand existing models of team process in this context. Further research could look at validating the hypothesised model also to get a better understanding of which elements have the strongest influence and should therefore become an area of focus for practitioners.

Keywords: diversity, inclusion, software development, agile, SCRUM, team learning, team process, team development, leadership

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## List of abbreviations

- PO Product Owner
- QA Quality Assurance
- SDM Software Development Manager
- SM Scrum Master
- UX User Experience (Designer)

# 1 Introduction

The workplace is not as diverse as the surrounding world. In this context, this thesis needs to explore what is meant by diversity, and how teams can realise potential benefits of a more diverse workforce. Diversity has many dimensions ranging from the more obvious such as race and ethnicity, gender and age to the more hidden aspects such as sexual orientation, educational and social backgrounds or even work style preferences. The overall population exhibits a broad range of these characteristics, but when looking at various workplaces, they do not reflect the same level of diversity. Another connected topic is the inclusion of a diverse workforce. Although the lack of diversity, particularly gender diversity, has a long history, the variance is also a result of shifting demographics due to urbanisation and increased social and geographic mobility.

The topic of diversity and inclusion in the workplace is on a steady rise. This is noticeable in literature since ca. 1995 (Google Books Ngram Viewer) shown in Figure 1.

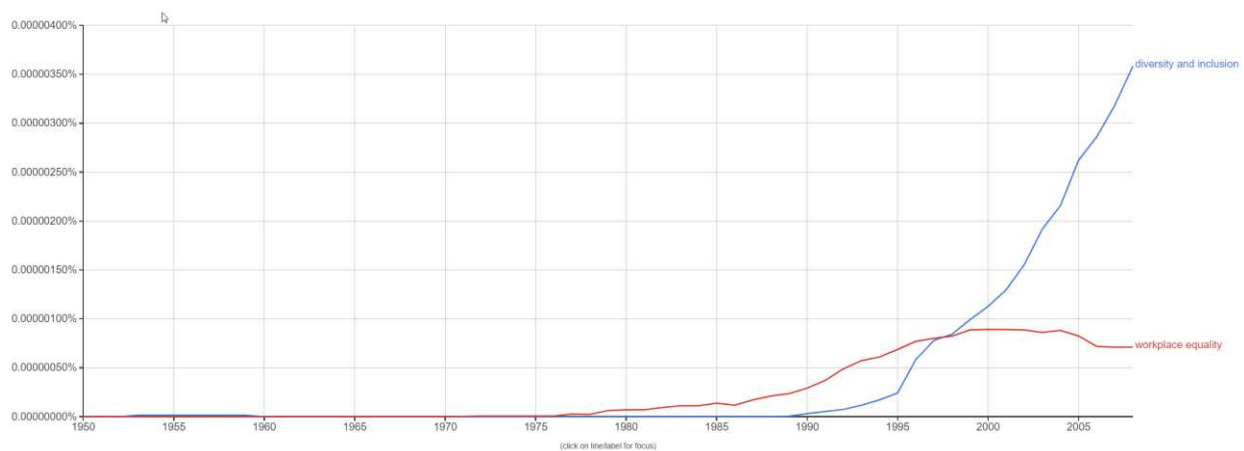


Figure 1 - Google trend for "Diversity and inclusion" & "Workplace equality"

The interest in the subject has multiple roots. Employers in many economies and industries often struggle to fill open positions. The supply side of the workforce can become much more significant if the entire spectrum is included. Employers do not necessarily discriminate, e.g. search for only white males from Ivy League universities. However, the reputation of a company or even industry sends signals to the market that dissuade potential employees from even applying when they



## Chapter 1 - Introduction

do not match the current profile. Well known examples of such industries are in high-tech and banking, both skewed towards white males.

An artificial intelligence algorithm recently exemplified this at Amazon that discriminated against women for tech jobs, most likely based on its training data (The Guardian 2018). It is becoming an image problem for these industries, as they typically offer higher pay and job opportunities, yet seem to be left to a chosen few. In particular, the high tech industry is in the midst of the debate, on the one hand being criticised for low diversity and its „bro culture“, on the other for driving initiatives to increase diversity. The jury is still out on whether this is done to counteract the bad reputation or if there is also economic sense behind it. However, there are increasing amounts of literature that is backed by evidence that demonstrates the value of diversity policies to business beyond doing something for the corporate image. One example is the book 'The Diversity Bonus' by Scott E. Page (2017).

Other fields also demonstrate that maintaining natural diversity is more beneficial to the ecosystem than a purely homogenous environment. In nature, there is the example of forests where once highly diverse forests were cut down and replanted with monocultures of fast-growing spruce for paper and furniture production. Conventional wisdom suggests this might be a good idea as its economical to plant and harvest the same type of tree to achieve economies of scale. However, what was overlooked was the complex ecosystem and interrelations between trees that gave the forest overall higher resilience against diseases and storms (Stephens and Wagner 2007). Another example is the "super chicken experiment" (Heffernan 2015) where again, conventional logic would suggest breeding a group of the highest performing chickens measured by their capacity to produce eggs is a good idea. As it turned out considering just the output perspective was a bad idea, as it also included the dominance factor that resulted in the "alpha chickens" killing the others, eventually leaving only three of the flock alive (Muir 1996).

All the above suggest that diversity makes a difference. Even though the same level of diversity in the workplace compared to real life has not even been reached, people already seem to be getting tired of the debate and efforts as illustrated by Schumpeter (2016) in his Economist article aptly titled "Diversity fatigue". Ethically it is obviously the right thing to do, so the discussion should focus on two central elements: what impact does diversity have on team and organizational performance, and what are the managerial implications in terms of process and

organizational design to make it work, and if there are benefits to be gained how to harness them.

Therefore, this thesis will explore the impact of diversity on performance, and the advantages and disadvantages in order to define strategies to successfully implement diversity policies that do the right thing and benefit both society and enterprise. A brief illustration can be made using software development and the definition of a problem statement that an application should address. Higher diversity will require a more explicit description of the problem that requires a solution. So, while diversity brings different views to the table, and ensures building a solution that also better meets the diverse needs in the market place there is a point when the team needs to stop the discussion and start development. Also, an endless debate can be bad for morale. In the end, there should be concrete guidelines and methodologies that managers can use when leading diverse teams. This may look at hiring strategies (how to compose the ideal team) and ongoing work, i.e. how to help the existing team make the best use of their diversity for optimal performance.

### **1.1 Objective of the thesis**

This thesis aims to investigate the relationship between project team diversity and performance. The objective is to determine which factors and behaviours for both team members and leaders must be present so that any potential benefits of a team with higher diversity can be retained. The findings of the thesis are of interest for theory and managerial practice as they may result in implementation strategies and guidelines. As such the thesis will aim to answer the following research question:

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***RQ1 What strategies are required to harness team diversity for positive influence on performance?***

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### **1.2 Course of investigation**

A literature review will serve as the basis to identify the state of the art in the field and build on its foundations. This investigation will be carried out as a qualitative

analysis derived from interviews with various teams at Autodesk. The goal is to identify the key drivers that may positively influence the relationship between project team diversity and its performance. The semi-structured in-person interviews may also reveal other insights due to the nature of the open conversation as opposed to a closed survey. Given the global distribution of project teams, video calls will be the primary tool for conducting these interviews.

From this qualitative research, the relationship of project team diversity and its performance can be studied, as well as which factors and behaviours can help project teams harness the diversity for better performance. This can result in recommendations to the teams interviewed but may also apply to teams in similar scenarios where the industry and type of work provide sufficient analogies to be relevant.

### **1.3 Structure of the thesis**

The thesis will begin by providing the theoretical context in chapter 2 Theoretical context to elaborate previous work on diversity in the workplace, and its relationship to performance. Chapter 3 Research method will describe in detail the qualitative research design, including the case selection and interview guides. Chapter 4 Findings will elaborate on the results of the qualitative research and lead into the Discussion in chapter 5 and how these findings relate to theoretical context. Chapter 6 will close with the Conclusion and recommendations based on this research and future research suggestions. Interview guidelines that were used can be found in chapter 7 Appendix – Interview guide.

## **2 Theoretical context**

This section provides the theoretical background to answer the research question, by first exploring the construct of diversity and its impact, second what team performance is and how it can be measured, third bringing the two together to discuss the relationship between a team's diversity and its performance, and finally which practical strategies may already exist to harness team diversity for improved performance.

## 2.1 Diversity

Back in 2001, an advertisement by Goldman Sachs in the Working Mothers magazine used the slogan "It's hard to define what diversity is because everyone has an opinion" (Goldman Sachs 2001). It seems almost 20 years on no significant advances have been made, even though the statement is from advertising and not academia. However, diversity can indeed be a broad and diverse subject in itself. Several papers point to this fact and reference the pun. Before exploring diversity and the related literature, it is essential to set the context of diversity, and that is for this thesis, the workplace and relates to the diversity of the workforce. Diversity describes the differences between employees when considering any dimension where individuals can be told apart whether that is related to demographic variables, educational history, personality or functional backgrounds (van Knippenberg and Mell 2016). It is important to note that a group of people whether that is a team or the entire organization can have diversity on one or multiple attributes, e.g. ethnicity, age; and that it's not the group that has diversity, but "an attribute of individuals within units has diversity" (Harrison and Klein 2007).

First, it is useful to present a taxonomy of the term diversity as can be found in the literature. As perhaps most people think of diversity as only visible differences such as ethnicity, gender and age it must be pointed out that there are also invisible differences that may or may not become 'visible' over time. The visibility of diversity can be transient as elaborated in the case of a person with an invisible difference, e.g. sexuality, where the person is in control to reveal this aspect of their personality, and the timing of it and are therefore perceived to belong to another group (Prasad et al. 2006).

This also closely relates to whether the difference between individuals is actual or only perceived. Indeed there are arguments that organisational behaviour is more directly influenced by the perception rather than the professional environment itself (Harrison and Klein 2007). While there are several research papers based on the perceived diversity within a team, Harrison and Klein (2007) are quick to point out the flaws of perceived diversity, such as inability to assess colleagues accurately and bias in the assessment.

Separation, variety and disparity are another way to look at different types of diversity (Harrison and Klein 2007). Separation means the difference between

team members on “position or opinion”. Variety describes the differences in skill and knowledge. Disparity describes the differences in rewards and status. Figure 2 illustrates minimum, moderate and maximum diversity for each of the types.

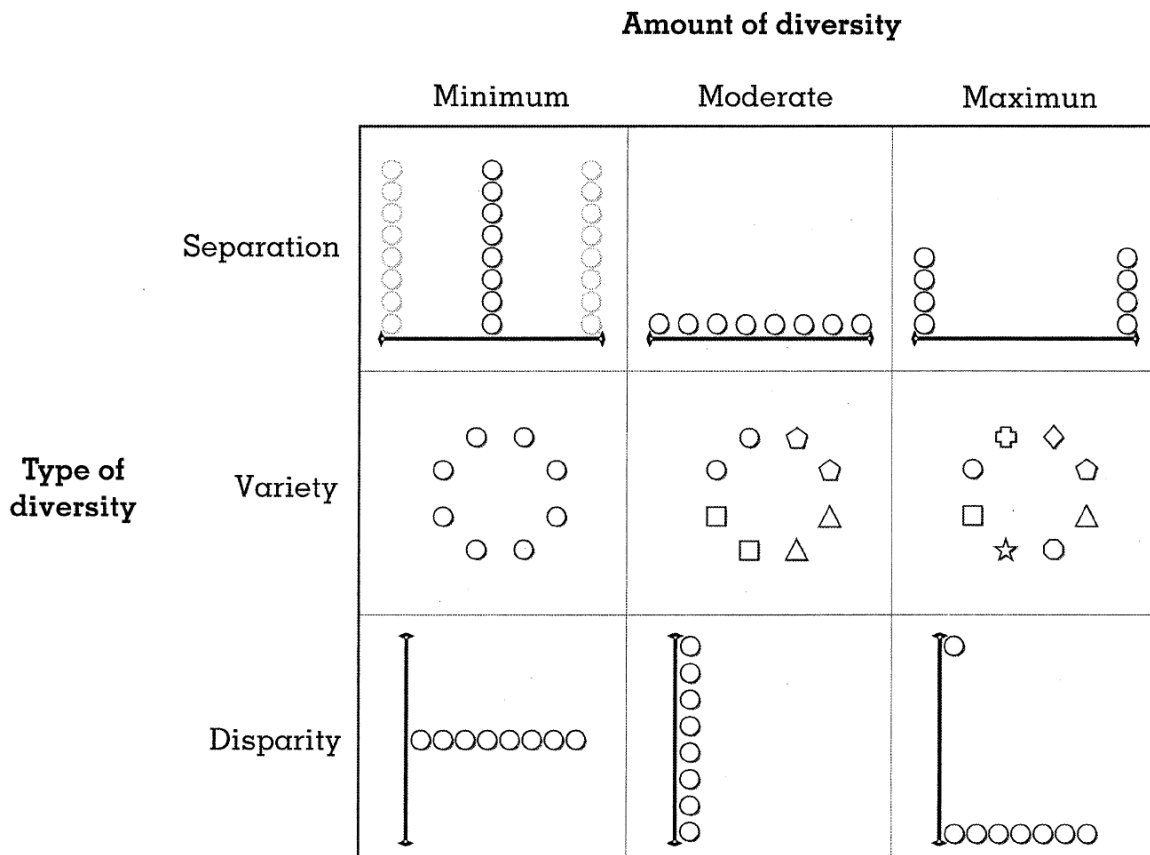


Figure 2 - Types and scales of diversity types (Harrison and Klein 2007)

They point out that demographic diversity can be conceptualised as either separation or variety in their model and brings a different lens through which one can examine this topic. Their model also illustrates low, medium and high levels of diversity for each of their categories, and with it a recommendation on how to operationalise the diversity types. Their research, consistent with many others (van Knippenberg and Schippers 2007; Guillaume et al. 2017; van Knippenberg and Mell 2016) points out the inconclusive findings of diversity research thus far, such that some find positive outcomes from diversity and others negative. The argument is mainly focused on the lack of rigour in defining diversity at the centre of any given study, and the inconsistent (and arguably) improper operationalisation of diversity making the results incomparable and meta-analyses difficult. Harrison and Klein (2007) propose the use of Standard deviation or Mean Euclidean distance for Separation, the Blau or Teachman Index for Variety, and a coefficient of variation or Gini coefficient for Disparity diversity.

## Chapter 2 - Theoretical context

Another thought-provoking aspect is the concept of group faultlines where one or more attributes align themselves in the same way and therefore have the potential to divide a group into subgroups (Lau and Murnighan 1998). Adding to other concepts, they argue that faultlines provide an additional dimension, and while diversity has the potential to increase group performance, the faultline has the potential to decrease group performance. The other implication of the faultline concept is the impact on group processes and particularly on group formation and development, where such faultlines influence the member's interaction at each group development stage to the point where some stages may be even skipped or vastly accelerated. This suggests any alliances or conflict groups within a team are likely the result of these formative times at the very beginning. Lau and Murnighan (1998) provide amongst the many discussions of the relationship between diversity and performance, a potential strategy to overcome some of the downsides, by elaborating the fact that better knowledge of other team members' invisible diversity attributes, e.g. hobbies, political preferences can diminish the impact of the faultline. They argue that the number of diversity attributes that are aligned and responsible for the subgroup formation is reduced through the discovery of other aspects to the point where the entire group is perceived more heterogeneous than before.

Finally van Knippenberg and Mell (2016) present another angle by proposing an interacting model of three forms of diversity based on trait diversity (stable attributes such as gender or personality), state diversity (changeable attributes that are shaped independent from the team such as distributed information or preferences) and emergent diversity (attributes and states shaped as result of team processes such as team cognition). They argue that there is an influence chain from trait to state to emergent diversity and that the sharedness amongst the team serves as the polar opposite to diversity, leading to better cognition of the group itself and the tasks. This elevated level of cognition is likely to provide better outcomes. However, as van Knippenberg and Mell (2016) point out, trait diversity can be detrimental for such sharedness to arise due to the reduced openness to other team members' points of view.

It is also important to note the two major perspectives on diversity: the (1) social categorisation perspective which is based on social categorisation theory (Turner et al. 1987), similarity-attraction theory (Byrne 1973) and social identity theory (Tajfel 1978) and the (2) information/decision making perspective

(Williams and O'Reilly III 1998). The (1) social categorisation perspective views differences between team members and their attributes as a categorisation that results in either being assessed as similar and therefore in-group, or dissimilar and therefore out-group which in turn can lead to issues in the group process (van Knippenberg and Schippers 2007). The (2) information/decision making perspective, on the other hand, looks at diversity as a source of more abundant knowledge and points of view that can lead to better results particularly for non-routine, creative and innovation related work (van Knippenberg and Schippers 2007; Page 2017).

### 2.2 Team performance

The assessment of team performance in the context of software development takes place in two significant areas. The first is the generation and integration of ideas by the team, which serve as input for the entire process. The second is the deliverable and outcome that the team produces as a result of these ideas.

The quality of ideas can be assessed as an individual item. Ideation quality is measured using these four steps: 1) determining the number of unique ideas, 2) attributing each idea with a quality score, 3) calculating a metric and 4) using this metric to compare over time (Reinig et al. 2007). They mention several criteria for the quality score, e.g. feasibility, effectiveness, and potential value creation. In the context of software development, it also matters how reusable and applicable the idea is in other areas of the business, or even to become a foundational aspect to other pieces of code.

While the approach is refreshing and used in a research setting, it has not spilt over into the daily practice of software development. It seems group decision making and inherent knowledge of what constitutes a good idea prevail as the determining factors on which ideas to proceed with further. Arguably it would be beneficial to introduce some rigour to measure the quality of ideas in order to avoid biases and assess ideas on a broader spectrum. It would also reduce the overreliance on skills of individuals and instead make a more transferable measurement. Although Reinig et al. (2007) argue that "good-idea-count as the only valid ideation quality measure" also has its limitations. The first is the ignorance of the embedded context, i.e. how many total ideas are there vs good ideas. The second limitation is the fact that the quality of an idea is not a binary



## Chapter 2 - Theoretical context

measure but can often be quantified. These limitations might explain the lack of practical use, and as Reinig et al. (2007) suggests teams instead evaluate ideas based on actionable next steps.

Software development is highly specialised knowledge work, that increases in quality through the various inputs of complementary skilled team members. Therefore the team needs to synthesise and integrate ideas, which raises the question of how to measure the team's decision making quality to either pick a single idea or to integrate various ideas. Montoya-Weiss et al. (2001) used range, organisation and depth as decision quality metrics, where the range is a measure for broad or narrow coverage of the topic area, the organisation is a measure of the decision matching the structure of the topic, and depth measures how deeply the topic was explored to derive at a decision.

Agile methodologies value working deliverables (software) over intermediate products (Schwaber and Sutherland) and therefore, also emphasise working software as accurate progress measurement (Kupiainen et al. 2015). They also make a point of such outcome-based metrics being used to measure product and process and not the individual. This statement also corroborates Jones (2008) that "most successful software companies measure software productivity and quality accurately" which draws the line between high (e.g. IBM, Microsoft) and low performance. Kupiainen et al. (2015) elaborate on the different purposes for measuring which includes (1) fixing software process problems as teams become aware of issues through the availability of metrics and subsequently trigger conversations on how to improve, and (2) motivating people as they react faster and change their behaviour if specific metrics are exposed to the entire team. The aspects of the software product and process that matter also get measured, as they have found through their systematic literature review. Teams measure planning through effort estimate, track their progress and measure productivity through velocity (sum of story points of completed tasks in a sprint), and observe quality through the number of bugs or defect count and customer satisfaction. They also point out that the quality metrics are not defined in Agile methodologies, but instead teams come up with their own ways of measuring, including borrowing from other disciplines such as customer satisfaction and Net Promoter Score (Reichheld 2003). This creative approach exemplifies what Kupiainen et al. (2015) call "situative metrics" which are metrics based on a need to find a solution to a particular problem. In their literature review they found high influence metrics to



all share these three main characteristics, first they are easy to implement and understand, especially with existing tools, second the use of the metric serves as a trigger for subsequent conversations that initiate improvement and third the metrics' ability to highlight problems. Finally, they warn that using metrics can have unwanted adverse effects, such as increased throughput to meet the productivity target, but in doing so, reduce quality. This caveat perhaps explains why successful teams measure both productivity and quality. Further caution is raised on velocity as a productivity measure as it does not track business value (Sutherland et al. 2009)

The taxonomy of team processes developed by Marks et al. (2001) includes transition, action and interpersonal processes, which may be relevant in the analysis of the interviews, as some of these processes may be revealed in scenarios that informants discuss. The process dimension map to the metrics highlighted in the meta-study of Kupiainen et al. (2015). First transition processes such as goal specification and strategy formulation as part of the planning are measured through effort estimates. Second action processes such as monitoring progress toward goals as part of ongoing work in progress are measured through velocity. Interestingly the Interpersonal processes domain (Conflict Management, Motivation and confidence building, Affect management) is not measured at all. However, Agile frameworks specifically allow for it through suggested practices such as the use of retrospective meetings.

### **2.3 Influencing the relationship between team diversity and performance**

Team performance as a function of its diversity must be studied in the context of team processes (Tekleab et al. 2016) as they may influence the results. The authors also point out the lack of practical benefit of such studies without detailed guidelines on reducing negative aspects of and instead benefitting from the diversity of the team, and point to behavioural integration or "the degree to which mutual and collective interaction exists within the group" (Hambrick 1994).

The study conducted by Tekleab et al. (2016) highlights the indirect relationship between functional diversity and team performance and shows the importance of the mediating and moderating factors, as well as the dependencies between them.

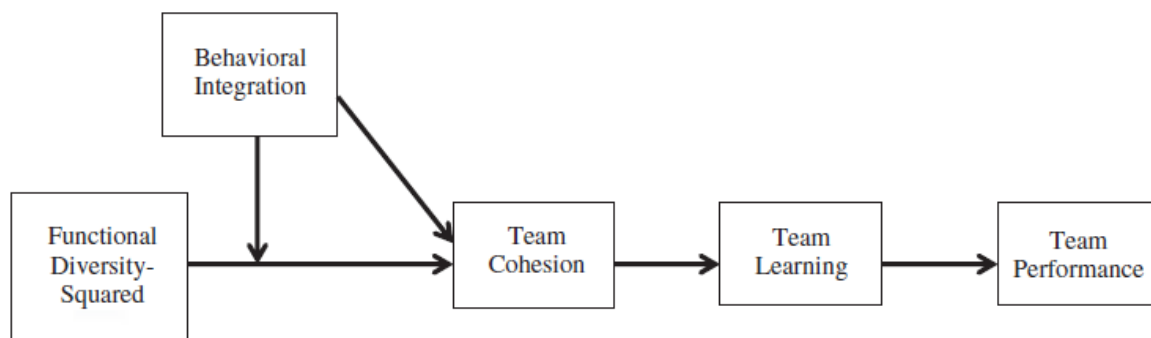


Figure 3 - Behavioural integration model (Tekleab et al. 2016)

They suggest behavioural integration as the critical lever in order to benefit from functional diversity. Behavioural integration was measured by surveying team members with questions such as “It was easy to talk openly to all members of this team” and “Members of this team were willing to sacrifice their self-interest for the benefits of the team” (Tekleab et al. 2016). This effect is also discussed in a study on demographic diversity by Chatman and Flynn (2001) where they show that increased contact of heterogeneous team members leads to increase in cooperative norms, and therefore suggests a possibility to influence behavioural integration positively. However, either study does not go into more specifics or practical steps on creating these cooperative norms to increase behavioural integration to make better use of a team’s diversity ultimately.

Furthermore Edmondson and Harvey (2016) highlight a research gap when they state that “studies of team diversity have not explored the process through which a group of diverse individuals develop into a team ready to solve a new complex problem” and this thesis aims to address this gap in the specific area of software development teams. They also discuss the need for inclusion of diverse team members, as otherwise, the benefits of the variety of expertise remain theoretical. Faraj and Sproull (2000), in their study of 69 software development teams, also showed that functional diversity alone is not enough to positively influence team performance. Nevertheless, other studies point out “information elaboration” (van Knippenberg and Schippers 2007) and “rigorous debate” (Mannix and Neale 2005) which is task-related as potential mediators.

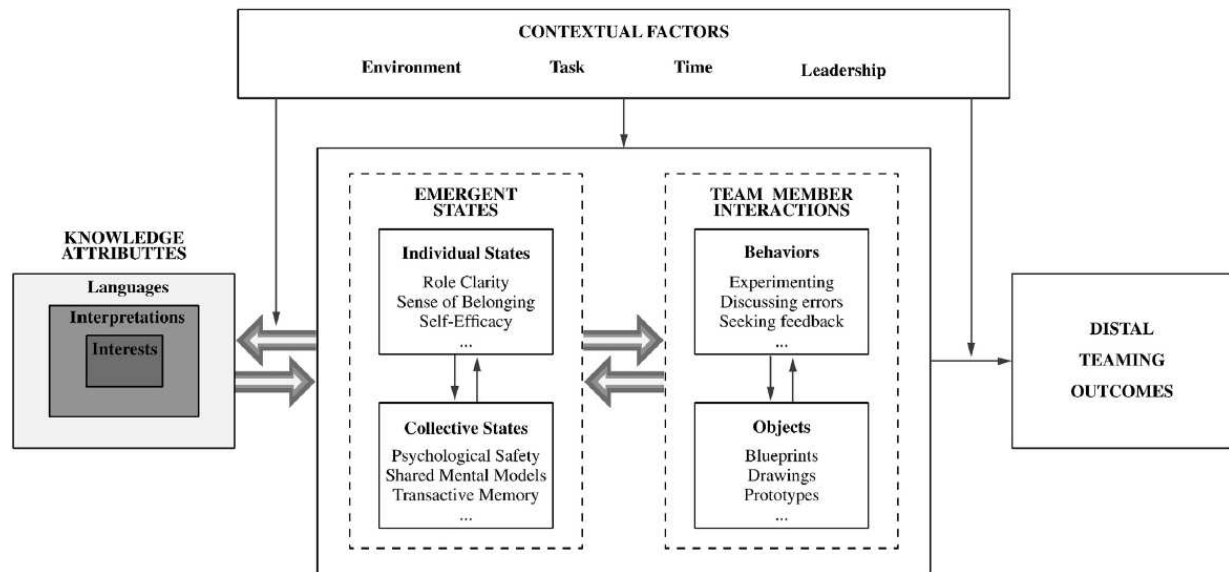


Figure 4 - Cross-boundary teaming model (Edmondson and Harvey 2016)

Although their paper looks at teams crossing organisational boundaries, the model of emergent states and team member interactions that influence each other and ultimately team outcomes is also useful in the context of newly formed teams, as it reveals positively influencing behaviours such as “asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions” (Edmondson and Harvey 2016). Their study criticises the lack of practical application from other studies, and their model highlights through the concept of emergent states and team member interactions possibilities for practice. Team member interactions could be influenced by management so that interactions which are known to have positive influences are increasingly exhibited by the team. As these interactions influence emergent states these could be controlled and measured to determine success of the experiment.

### 3 Research method

The research was carried out in the context of Autodesk (the author’s current employer) to get answers for the research questions posed in 1.1

Objective of the thesis. The following section describes the research context, and why this firm was picked, the data sources explored, and the data analysis conducted.

### 3.1 Research context

Autodesk makes software for people who make things, whether that is high-performance cars, towering skyscrapers, smartphones, or blockbuster films and is a great example of a knowledge-inclusive organisation. Autodesk customers are using its software to design and make these things. There are numerous competitors depending on industry one can list in Manufacturing and Automotive focused design software the likes of Siemens PLM, Parametric Technology Corporation (PTC) and Dassault Systemes and in the Architecture, Engineering and Construction discipline the likes of Bentley and Nemetschek.

Design software is computationally heavy requiring complex mathematics to render complex geometries in three dimensions while maintaining high-definition visual fidelity for client animations. So another factor is the type of software and challenges the tools must overcome. This is also an essential element for the development teams producing this software.

Autodesk's customers are continuously striving to improve their efficiencies. While using the software is part of this quest, it is only a partial answer. Customers are looking towards minimising the loss of information between the multiple steps in their increasingly digital workflow. Every step and handover is both a risk of data loss and the time and energy spent to overcome that hurdle equates to lost productivity. This means the development of software is no longer centred around standalone tools, but a complex architecture of components that interact with each other passing information back and forth between multiple disciplines and personas in the process.

This complex ecosystem of applications that interact with each other and the relatively low barrier to entry for new competitors that provide solutions to hitherto uncovered parts of the customer workflow resulted in lots of startups and the subsequent acquisition by the more significant players. This becomes a challenge for all competitors both in terms of integrating these smaller teams in their broader corporate culture and sometimes even a source of talent by acquiring startups to access technical talent quickly.

Autodesk, like many of its competitors, is globally spread, often with operations in India and China to access resources at a lower cost. As an example, Autodesk operates in 47 countries, and its employees speak over 14 languages (from 2018 Autodesk Diversity & Inclusion report). Access to talent is a significant challenge,

and open positions can remain unfilled for many months, creating pressure on the teams.

Autodesk, as the author's employer, was at the time of writing easily accessible. This relationship makes it possible to conduct in-depth interviews with employees where a certain level of trust between the author as a researcher and the interviewee exists almost from the start, as the relationship is in the context of colleagues rather than a stranger conducting research.

Diversity and inclusion is an important topic for Autodesk and many other players in the software industry to attract and retain talent. This is shown by the various awards and rankings that Autodesk has achieved in the last years, e.g. ranked 315<sup>th</sup> on the 'Best Employers for Diversity 2019' by (Forbes), as well as #42 on 'Just Companies 2019' and #149 on 'Best Employers for Women 2018 or for being recognized as being a Best Place to work for the LGBTQ community and scoring full 100% on the Human Rights Campaign Corporate Equality Index (Autodesk 12/5/2016).

As probably most major producers of modern software these days, Autodesk uses Agile methodologies and in particular the Scrum framework (Schwaber and Sutherland).

### 3.2 Case selection

The following section describe the diversity and performance dimensions these interviews are designed to investigate and the selection criteria for teams to interview.

First the cases need to explore the diversity dimension. When considering diversity this work should consider all diversity forms, that is trait diversity, state and emergent diversity, where trait diversity describes the stable features of team members (race/ethnicity, gender, age, sexual orientation, educational background), state diversity the changeable features independent from team and process (overall work experience, team/company tenure, distributed information) and emergent diversity the team processes and emotional conditions (dyadic interactions, diversity of team cognition) in reference to the team (van Knippenberg and Mell 2016).

Second the cases need to uncover the performance dimension. The ideal measurement would be the success of the product the team develops, but that is

not just under the influence of and as such a result of that individual team, as multiple teams are working on the product. Further the commercial success also depends on Marketing and Sales efforts, level of competition and macroeconomic conditions.

Therefore, often proxies such as quality measured by the number of software bugs introduced and fixed, or velocity, which is a measure in agile development for the speed and throughput that the team achieves, are used. As these measures may also be influenced by other conditions, e.g. more mature products may have less new features and are more focused on fixing bugs and improving performance, the performance dimension will be assessed by their management that can compare the performance of multiple teams.

As described in 3.1 Research context, Autodesk provides both relevancy to the research question in terms of diversity and inclusion initiatives and awards, as well as access given that it is the author's current employer and therefore allows easier identification of and contact with relevant teams. Opposing views ought to be discovered by talking to teams that are on opposite ends of the spectrum for diversity. The results of the research and its analysis will reveal whether it is possible to generalise from this research. However, given the nature of Autodesk's business and the way software is produced it seems plausible to apply the learnings in other international companies that develop software, and share other attributes outlined in 3.1 Research context.



Figure 5 - Team characteristics of interviewees

Considering the aspects discussed in 2.1 Diversity teams will be picked that have either high or low diversity. The goal is to have equal number of informants for each type of team to allow for better comparison and discovery of opposing views. The interview design itself will also focus on the time dimension to discover

whether project pressures and other time aspects are moderators in the diversity and performance relation.

### **3.3 Primary data collection**

This section focuses on a problem-centric approach to answer the research question, by describing the characteristics of the interviewees and their respective teams, and the initial design of a semi-structured interview that is ready for a responsive interviewing style (Rubin and Rubin 2012). The formal semi-structured interviews will serve as the primary data collection method.

#### **3.3.1 Interviewee selection (teams)**

Interviewees should have the first-hand experience of the topic, as well as complementary experiences when looking at all the interviewees, and be able to offer different points of view (Rubin and Rubin 2012). According to Rubin and Rubin (2012) the site selection criteria include relevance to the research question, accessibility, ability to discover opposing views and feasibility of generalising from this research elsewhere.

The interviews will be conducted with the respective Scrum Masters, to be abbreviated (SM), of each team. In Agile project methodology, the SM is “responsible for ensuring the team lives agile values and principles and follows the processes and practices” (Agile Alliance). The role is also defined as “a servant-leader for the Scrum Team” (Schwaber and Sutherland). They are an integral part of the team and responsible for the team interaction without any formal authority. Therefore they should have a solid understanding of the team composition in terms of individuals and their diversity, and which practices lead to higher performance and which have negative impacts. One important aspect to test for is any potential bias on behalf of the SM due to belonging either to a majority or minority on the team.

In addition to the SM as resource on the ground additional expert interviews will be carried out with Senior Software Development Managers, to be abbreviated (SDM), to also investigate the management perspective.

#### **3.3.2 Interview guide**

The interview is designed with an original structure as a starting point for the semi-structured interviews, containing the main questions to be asked consistently across all interviews, and then followed up responsively during each



interview with follow-up questions to elicit depth and detail as well as probes to manage the conversation (Rubin and Rubin 2012). The topic itself may be viewed as rather sensitive by some if not all, interviewees, which will require appropriate handling of the responses and respectful interaction. Rubin and Rubin talk about the necessity to establish trust in the relationship between interviewer and interviewee and suggest that the interviewer reveal something about themselves. Another suggested strategy is to check their reactions on initial conclusions, as well as offering the interviewee to review the transcript. This might also be useful to ensure there are no misunderstandings, both literally and figuratively.

The detailed interview guide used is available in the appendix 7 Appendix – Interview guide. It starts with an introduction of the topic to the interviewee to put them at ease and establish trust. Then it aims to capture through a framework of the main questions the central topics of the research questions, by querying the diversity of the team and its self-awareness, the performance level of the team, time together as a team and time pressures as the moderating factors, and which practices and ritual the team adheres to.

As Rubin and Rubin (2012) suggest probes were used where appropriate to keep interviewees talking by asking for clarification and eliciting more evidence or examples when interviewees provide not enough concrete details.

### **3.3.3 Data capture**

Due to the global distribution of interview participants, the interviews were conducted via Zoom conference calls. This tool allowed in addition to a simple voice conversation, also seeing each other via high-definition webcams and the recording of both audio and video parts of the conversation. As the recordings sometimes contain elements sensitive to Autodesk business, these cannot be made available. However, they were fully transcribed for subsequent coding and analysis. The transcripts are available on request, after anonymising the sources and removal of company confidential or other sensitive information.

## **3.4 Secondary data collection**

In addition to the transcripts with interviewees, some of them shared supporting material. These materials allowed a more in-depth insight into the team's day-to-day collaboration and interactions without having to observe them.



A central tool for globally distributed teams these days is the widespread application Slack. Autodesk also makes extensive use of it and has a 'default-to-open' policy to foster collaboration. This means that in general all channels are open to all Autodesk employees. Teams use these channels for various purposes from discussing technical issues to notifying each other of absences and in some cases replicating the water-cooler conversations by sharing jokes and pictures.

While much communication takes place in the digital realm, certain aspects call for more analogue methods. The agile ceremony of the retrospective is often carried out with just participants putting their thoughts on sticky notes. As some of the teams were all remote, they used a tool called mural.ly, which essentially mimics the sticky note environment that is collaborative and accessible via a browser — seeing the output of these meetings and how they evolved added another layer of insight, especially for team development and learning.

A tool for online collaboration that is used universally regardless of being co-located or remote is Confluence. It allows teams to create, edit and share documents, and where they capture anything from team agreements, over meeting protocols and software designs. Particularly some pages sharing team agreements and meeting notes added yet another layer that showed how teams collaborate and their respective attitudes.

Primary data sources		
Data type	Source	Amount
<b>Video recording of interviews with:</b>	Scrum Master	8 x ca. 60 min
	Team member	1 x ca. 60 min
	Expert (Sr. Dev. Manager)	3 x ca. 30 min
<b>Full transcripts</b>		164 A4 pages
Secondary data sources		
Data type	Source	Amount
<b>Confluence pages</b>	3 teams	3 x 5 A4 pages
<b>Slack channel</b>	2 teams	2 x 5 captures

Table 1 - Primary and secondary data sources

### 3.5 Data analysis

The recordings of the Zoom video conference calls which were typically one hour long with eight SM, one team member and three SDM were automatically transcribed. Some of the participants had strong accents reducing the accuracy of the transcripts. Therefore, all transcripts were reviewed and corrected where necessary with f4transkript software.

Based on inductive research Gioia et al. (2013) the coding of transcripts was conducted in Nvivo 12 software using terms initially used by informants and led to over 200 1<sup>st</sup>-order categories, which after additional interviews with experts were reduced to 49. These were mapped to finally eleven overarching second order themes and finally related to aggregate dimensions that are also grounded in the team process model (Figure 3 (Tekleab et al. 2016)).

### 3.6 Transparency criterions

The following table summarises the research method, along with the 12 most crucial transparency criterions relevant for qualitative research (Aguinis and Solarino 2019).

Transparency criterion	Detail
<b>Kind of qualitative method</b>	Case study within an organisation
<b>Research setting</b>	Autodesk, a global developer of software for engineering and creative disciplines, adopting Agile practices with a Diversity & Inclusion strategy
<b>Position of researcher along the insider-outsider continuum</b>	The researcher was at the time of conducting the interviews an insider as far as being an employee of the same company as the interviewees, which helped to establish trust. However, there was no direct working relationship with these individuals, and therefore allowed an objective point of view.

<b>Sampling procedures</b>	Selection based on fitting the low and high diversity metric, with support of Global Head of Agile Practice.
<b>Relative importance of the participants/cases</b>	Using both different teams functionally, as well as teams with different levels, diversity allowed for some comparative analysis.
<b>Documenting interactions with participants</b>	Recordings of Zoom conference calls with audio, and where available video, plus transcripts of the conversation.
<b>Saturation point</b>	This was reached after the sixth interview of a SM, and two expert interviews, as additional interviews added no additional insights, however confirmed and strengthened the previously identified concepts.
<b>Unexpected opportunities, challenges, and other events</b>	Interviewees sometimes offered additional material, such as online chat protocols, photos from team outings and team collaboration sites (Mural, Confluence) that added another layer of rich information for analysis and coding.
<b>Management of power imbalance</b>	Introduction from a mutually known and trusted source which is the Global Head of Agile Practice. Careful handling of sensitive information.
<b>Data coding and first-order codes</b>	Inductive research method and coding of transcripts and supporting material in Nvivo to 49 1 <sup>st</sup> -order concepts.
<b>Data analysis and second- and higher order codes</b>	Further aggregation in Nvivo to eleven 2 <sup>nd</sup> -order themes and five aggregate dimensions related to a team learning model (Tekleab et al. 2016)
<b>Data disclosure</b>	Recordings, due to potentially sensitive nature, will not be made available. Transcripts are available on request.

Table 2 - Research transparency criteria

## 4 Findings

The analysis of the interview transcripts revealed five significant elements that are also related to behavioural integration, team cohesion and team learning model (Tekleab et al. 2016).

**Team diversity** is a central construct based on the research question. How that diversity then is utilised in the team process, was largely dependent on the **attitudes** of team members. Team attitudes surfaced as an essential determinant for **team behaviour**, which includes the various ways the team interacts with each other. Continuous improvement requires **team learning**, and this construct reveals some findings on what successful teams do to make this work. Finally, the team had **reactions** to events in their work experience that also influenced the outcome of the team process.

### 4.1 Team diversity

Team diversity is a vital component of the research question and therefore also featured as one of the topics in the interviews prompted by various questions (also see 7 Appendix – Interview guide). Surprisingly what informants had to say on this topic is not always what one would expect given the definition in literature. The examples given provide a richer set of individual attributes, that can explain differences in individuals behaviour that are beneficial to overall team interaction, collaboration and ultimately team process outcomes.

#### 4.1.1 Visible diversity

Among the externally noticeable difference informants consistently brought up age, location, ethnic diversity and gender.

**Age** occurred most often and was named by all except one informant. A smaller age range was considered by some informants as making collaboration and communication easier.

*The age difference is not that much. So I think the youngest is 30 and the oldest is maybe 38, so we are quite close.*

*[Team member] our youngest developer, he might be pleased that we now have [another team member], you know, just a couple years older than him but also closer to his age, that might be a good thing.*

## Chapter 4 - Findings

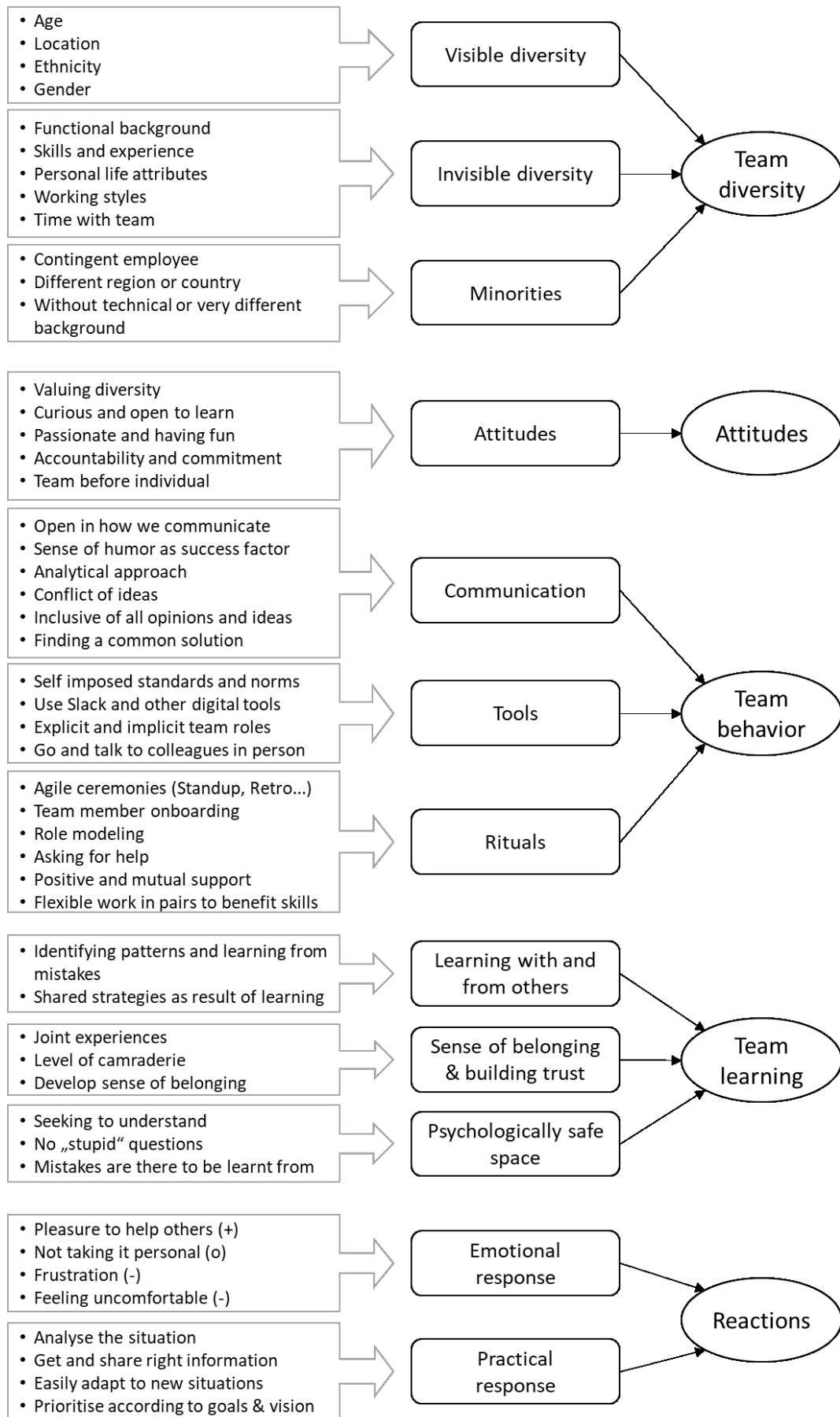


Figure 6 - Data structure

## Chapter 4 - Findings

However, while easier communication is maybe desirable, what teams are ultimately looking for is making better decisions and producing better outputs. Informants suggested that the combination of older and newer generations on a single team delivered good results because of the 'dynamic'.

*Scrum Master: I think age always helps, to have a diversity in age. So you cannot always have it, but when you have it I think it's good because growing up in different times, you have different styles for looking at things or for solving problems and I think it's always useful to have variation of age. Young people, new generations, and also old and experienced people.*

*Sr. SDM: People who just came out of university that bring something. And if you have someone with the, you know, heavy background in there for ten years. I like that type of dynamic.*

In a global organisation **location** naturally plays an important role, mainly when members of a team are spread often over multiple time zones allowing only for a few short hours in the day where they can talk to each other on the phone or via video collaboration tools. As with many things also for the location we have a range of measures, from all team members being distributed, over some team being distributed to all team members co-located. All team members being distributed also can include the dynamic of people working from home:

*Scrum Master: They're mostly based in Europe, and they are mostly based at home. So, they work from home.*

There is an acknowledgement that the distributed nature is often seen as problematic; however, it does not necessarily need to be that way:

*Sr. SDM: That team was on paper, probably not the most ideal as it was spread across Shanghai, China and Portland, Oregon and then Novi, Michigan. So you know we had three different time zones [a 12 hour time difference between the extremes, i.e. China and Michigan].*

There are also examples of only one, or some team members being remote, with the remainder co-located. These 'odd-one-out' individuals often serve additional roles such as liaisons with the team in their local country.

*Scrum Master (in Bucharest, Romania): We also have a remote developer which is based in Manchester US. ...help form this team and to be some sort of let's say liaison between the team here in Bucharest and the teams in Manchester, US.*

Moreover, on the other hand, there are teams which are purely co-located.

*Scrum master: We are all based in Bucharest. We live here and work here, so we all work in the same office. It's an open space.*

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*Another Scrum master: We are all co-located, we are all working in the same space. So, All of our decks are united. And we can easily talk to each other all the time, and I'm in the centre, so I always know everything.*

Co-location is in some cases seen by management as the preferred method, as it has direct implications on the team's communication, which features as an important second-order theme in 4.3 Team behaviour.

*Author: Can you describe a team to me, that you have worked with in the past, and that performed particularly well? What are some of the characteristics of that team?*

*Sr. SDM: So, I would say one of the biggest characteristics is the communication. I would say real communication, not through Slack or email. But really, you know, face to face communication.*

Another aspect of location is the preconceived notion of how people from certain regions behave, ranging from certain expectations to viewing everybody the same.

*Scrum master: There's [team member]. He's from California. That's like being from outside the country. California is its own animal.*

*Same Scrum master in the following statement: [same team member], like I said the California state of mind.*

When the topic of **ethnic diversity** came up, informants also named nationalities, mainly when the team was not racially diverse.

*Scrum Master: So, we have one British, one French, one Swedish, one Italian, one German. Here I have a Russian, one Spanish, and one Italian and I have one Canadian in Ottawa and one American.*

In terms of real ethnic diversity, the range was from all Caucasian

*Scrum Master: Yes, we are all Romanians [Caucasian]. I told you that we are not that diverse.*

Over somewhat mixed teams, also with minorities

*Scrum Master: So, if we're talking about visible minority. I don't think any of them will qualify as a visible minority except me [Asian].*

To quite balanced teams:

*Sr SDM: Asian vs American. That was, that was again four to three, you know, whatever it is four people in Shanghai and three people in the US.*

It is also worth noting is the fact that informants sometimes conflate ethnicity with nationality, as shown in the quote above. This is evidence of preconceived notions of which race a particular national belongs to and should be considered when challenging biases.

In a typically male-dominated industry such as software development there was still some observable **gender** diversity, also ranging from zero diversity (all male



teams) to teams with a female minority (often the Scrum Master) to teams with a balanced gender mix.

*Scrum Master: since [female team member] left, we don't have gender diversity anymore.*

*Female Scrum Master: So they are all male. I'm the only woman, and I'm in a leadership role in that team.*

*Scrum master: We are three men, four women, currently.*

Although team roles are part of 4.3 Team behaviour, it is essential to note that female team members tend to fulfil the same roles, regardless of which team interviewed. That is the role of User Experience Designer and Scrum Master, and rarely as a Software Developer.

### 4.1.2 Invisible diversity

Apart from in literature often cited **background (educational and functional)** informants provided additional insights on other differences that can genuinely enrich a team's composition, and provide for a more balanced way of interactions among the team as well as different points of view on particular issues the team is working on. These other differences are **personal life attributes, working styles, time with the team** and **skills & experience**.

The **background** has multiple facets of its own, including the university education, the particular function or role someone plays on the team (e.g. Developer, Quality Assurance), and industry background. Industry background is particularly relevant when developing specialised software for a particular industry. Constant access to industry knowledge on the development team through one of the team members can help come up with better solutions than if only provided via the Product Manager or other distant colleagues.

*Scrum Master: We have some different backgrounds, as I mentioned, we have both developers, UX, and structural engineer in one team [this team develops software for Structural Engineers]*

*Another Scrum master: Different education background could help. And one of the most helpful things is that we actually have structural engineers in these teams as product owners.*

This also becomes important as different points of view are laid out in discussions when it should not only be about a technically feasible solution but first and foremost something that provides value in the marketplace, i.e. something that a customer can use and is willing to pay for:



*Scrum Master about a UX team member: She really has to be an advocate in front of the rest of the team for the user. And she does.*

**Skills & experience** is closely related but subtly different. Skills are often more about the softer skills that team members bring to the table such as the ability to empathise with the customer or the level of optimism they bring to a difficult discussion that can get unstuck through an alternative point of view.

*Scrum master: Some are a little bit more optimistic, some are a bit more pessimistic, but we also try to make it a safe space.*

*Team member: Yes, it's the experience. I mean, not just because they've been doing this for longer than I have.*

*Scrum Master: ...because each one is specialized in a [software] component and has another point of view. When we talk about a new subject, everybody talks about what they see [from their point of view]*

**Personal life attributes** were perhaps the most surprising finding; however, coupled with the explanation can add tremendous value and accelerate team learning.

*Scrum master about team members who have children: I and [team member] and [another team member] don't have children, and we are more individualistic. The guys with families are more patient because they have experienced with their kids and understand that this takes time for us to understand stuff and try to rephrase an idea, maybe two, three times just for us to understand. Maybe the first time that takes they explain it we don't understand. So there may be more patient.*

**Working styles** is a noteworthy dimension with many facets. There are the action-oriented go-getters who are also willing to take more risk,

*...like to get out of the comfort zone and actually pick new things.*

Moreover, there are more relaxed folks who work at a constant pace with meticulous attention to detail.

*[team member], she is the constant organizer, um, everything's meticulously detailed and documented. You think all learning content people would be that good, but she is perfect.*

Arguably any effort requires both: the drive and action to push forward AND the consistent and deliberate pace to make sure things are done properly.

The amount of **time with the team** influences their interactions. Newer teams or teams with newer team members behave differently than teams who have been together for 10 or more years. Communication and rituals tend to be more explicit and elaborate with newer teams. Established teams almost know each other blind. It may seem things are often assumed and taken for granted. If

true, this can be a great shortcut and efficiency gain; however, if untrue a risk to miss things because too many assumptions are being made.

*Scrum Master: All of us are long timers now outside of our contract worker and [team member], most of us are 12 years plus. So we've been working together for a while. So, we have a good synergy.*

*Same Scrum Master: It's just smooth, because everybody knows where their wheelhouse is, and they know where they're going to be working. We don't usually have to debate it a whole lot. Like the sprint, poker is unheard of.*

### 4.1.3 Minorities

Minorities were sometimes labelled as the odd-one-out on the team, however both by the minority team member themselves and members of the majority who were aware of the minority situation. The reasons named for being part of the minority were *(lack of) technical background* and from a *different region or country*. Although it came up in conversations that some team members were *contingent* (temporary) workers or the only female, these aspects were not attributed to the odd-one-out phenomenon.

*Scrum Master: ... maybe that [team member] not having a technical background at all and doesn't really feel very comfortable with all the technical aspects of the discussions, you know. She may feel the odd one out.*

## 4.2 Attitudes

Several attitudes emerged that can be attributed to teams with high cohesion, and that utilised their diversity to their advantage and had better performance as a result. This revealed itself as a 2<sup>nd</sup> order theme on its own, as it appears to influence 4.3 Team behaviour and 4.4 Team learning.

Perhaps most significant in the context of the research question was that team members were **valuing diversity** and appreciated the differences in skills and experience others brought to the team. This was shown in mutual respect:

*Team member: I do look up to each and every one of them, because of course they have different skills. ... And I wish that someday someone else will come and ask me questions, and I will be able to, you know, pass the knowledge down because they really did help me a lot. So in this respect, I really look up to them.*

In not trying to see each other differently and being inclusive:

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*Team member: I try not to see people differently. I think because of the way I think I'm not really seeing differences. I mean, essential differences. Of course, there are different ways of thinking, I guess. As I told you earlier, I think we are on the same page as a team, so we don't feel any difference.*

Also, being inclusive of remote colleagues through various methods, e.g. shifting meeting times to accommodate for time zones or record if too late.

*Scrum Master (about teaming agreement): We looked at our time overlaps, people's existing schedules and things like that, and we consider the need to align in sprint, let's say, starts and endings to be aligned with the other teams in the US. And then we find the best option when to start meetings: so that people here won't have to stay too late, people there don't have to wake up early.*

Closely linked to valuing the differences is whether team members are naturally **curious and open to learning**. This by itself opens them up to be more open to other people's points of view, and to learn from them.

*Scrum Master: ... our superpower is to work and adapt to do new things, I think.*

*Sr. SDM: it's more important that you are open to others. You're open to learn and you know try things and it's more important than having worked on something very specific in the past.*

With all this focus on performance, people sometimes forget to relax a little. However, high performing teams tend to have team members who are both **passionate** and know the importance of **having fun** doing their work.

*Scrum Master: They're not just passionate about what they're delivering they are passionate about how they can improve processes, they're passionate about improving the content and how we want to deliver it... Everybody seems very passionate about their work*

That also reveals itself in how work is conducted such as 'heated discussions'

*Scrum Master: We sometimes have heated discussions on some occasions and on some topics.*

*Sr SDM on the importance of enjoying what you do: ...and the last thing I would say, you know, people need to have fun also, some sort of fun and enjoy what you're doing.*

The way high performing teams ensure they deliver on their promises is consistently through **accountability** – saying what one will do, delivering on it, and if not, there will be scrutiny from the team:

*Scrum Master: We were really focused on delivering stuff.*

*Sr. SDM: People just kind of took responsibilities and got things done because they thought it needed to be done and you know you weren't really waiting for somebody else to do it [or tell them to do it].*

*Scrum Master of another team: an individual or team commit to something they go through with their commitment. And if they don't go through for to the commitment for a reason or another, we want to find out the reason that prevents them to go through [on their] commitment. So there's really no room for interpretation. Oh, that person is not is failing at his commitment, but more understanding.*

This last quote is also an interesting connection to the last attitude, making teams successful, and that is to put the **team before** the **individual**. In the above quote, it reveals itself as the desire to understand the reasons for failure to deliver on a commitment without prior judgement.

*Scrum Master: Understanding why things were difficult and you create empathy like that. Also enforcing it through "Hey team whenever you make a commitment, you make a commitment to the team."*

*Scrum Master: more like a role model because of his attitude ... helping the others on the team with technical stuff. Yeah, he is always interested in moving forward the entire team.*

*Sr SDM: ...people willing to put the team before themselves ... in order to focus on the team outcome...*

### 4.3 Team behaviour

The attitudes that team members bring to the team are often reflected in the team's behaviour which can be observed in three major dimensions: how the team communicates, the tools they use (incl. standards) and the rituals they practice.

#### 4.3.1 Communication

How the team communicates is an essential piece in their collaboration to determine better solutions and make use of their diverse skillset, by sharing opinions and valuable insights from their various points of view. This is not always easy and demands some diplomacy. High performing teams exhibit the following six principles in their communication.

These teams unanimously state: 'We are (very) **open in how we communicate**'. This may differ in shapes and forms, such as direct and sometimes even bad language to help them express themselves very clearly:

*Scrum master: We like to be honest direct and don't shy away from the occasional foul language...so it's rather intimate, and we don't shy away from being direct and blunt, very, very blunt.*

Of course, being coarse is not required and may not work for every team. The consistent theme is directness without making it personal.

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*Scrum Master: ... we can be a lot more honest with each other. And like I said that that level of camaraderie is you know, there's a level of honesty.*

*Scrum Master (different team): we can openly talk about personal things or about work and not feeling that we are censored because there is management watching or looking at things like that.*

Having a (good) **sense of humour** (also see 'passionate and having fun' in 4.2 Attitudes) is on the one hand a way for the team to share a laugh and have fun, on the other hand, a reminder that while it's important to focus it's also important to not overstrain it. Finally, it can also serve as pressure relief during tense periods.

*Scrum Master: ...if I miss a deadline or anything. They're always the first to, you know, say that it's not the end of the world, it happens to everybody. After the general ribbing of course. Yeah, it's just a lot of good sense of humour.*

*Scrum Master (different team): we have an American in our team, so we do poke him once a while on his country's politics, as much as we poke the UK member on Brexit... the French with the wine and the German with "every day is beer o'clock."*

While laughing may be useful for team morale, it does not by itself get work done, so teams use an **analytical** and rigorous **approach** to break issues down, to better understand the issue and each other. That could either be the use of scenarios to analyse issues from various angles better, seeking to understand the problem first before jumping to solution mode, or 'deep thinking' before breaking down issues in smaller chunks.

*Scrum Master: So whenever we work on things, even though we have a lot of expertise, we generally talk a lot. We want to understand. So, we have this philosophy of let's try and really understand and layout of the reasons why we're doing something not just follow a specific user saying something or a specific manager asking for something. Let's try and understand really why that is good.*

*Another Scrum Master: ...kind of go through what we think's involved and ask more questions and ask the UX guy to give us more details and usually they come with some rough pictures are we're kind of thinking this, and then based on our questions they get us more details.*

This inevitably leads to a **conflict of ideas** as, through the rigorous analysis, different points of view appear that need to be reconciled. When asking teams about a conflict they did not talk of personal conflict but rather technical conflict, or as some informants phrased it "disagreements" or "different points of view" that are put forward and either the best idea is selected, or a new solution is constructed from the diverging inputs. This exemplifies collaboration as one of five

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conflict management behaviours (avoidance, accommodation, competition, collaboration, and compromise) where collaboration is described as “attempts to identify and achieve outcomes that integrate the interests of all parties involved” and ought to positively influence team performance (Montoya-Weiss et al. 2001).

*Team member: So within the team, I never saw conflicts or tension or anything.*

*Scrum Master: We have some disagreements between some devs, ... on what's the best way to approach an issue.*

*Scrum Master (different team): There is conflict, only technical conflict. It's a conflict of ideas.*

The ability to have this conflict of ideas is not a given, however, as the following quotes show that a) it is founded in trust and openness and b) there can be too much of a good thing:

*Scrum Master (on the foundation of being able to have a conflict): So in terms of conflict, I think is very important that you start with a very strong base of trust and openness.*

*Sr SDM (on the risk of too much conflict): ...the need to be open minded. Look, I've seen some team where when it's too strong, then you don't move. Yeah, you know, the team doesn't move.*

Teams need to be **inclusive of all opinions** to build that trust and foster continuous openness of all team members. This means, on the one hand, making sure everyone is heard including the less outgoing team members which requires other team members to make ‘space’ for them to also talk and on the other hand to accept these opinions as valuable inputs, which relates to ‘Valuing diversity’ in 4.2 Attitudes.

*Scrum Master: Not everyone talks the same amount, but of course we do try and have everyone's opinion ... I believe I'm not the only one in the team that tries and respect everyone else. And try and make room for someone who wanted to say something.*

*Sr. SDM: create an environment where it's like, you know, "What is your opinion?". ... and trying to draw that out and then seeing that it's okay to kind of give that opinion and have a different opinion in that case.*

Finally, the team needs to reconcile these diverse ideas and opinions and move forward by **finding a common solution**. This could either take the form of convincing the rest of the team of one’s idea, having the team decide on an option or coming up with a combined solution of all the different ideas expressed.

*Scrum Master: Yeah, we have a discussion on either ad hoc or during a meeting. Arguments are presented, we have discussions we tried to*



*convince each other. This is how we try and convince each other. This is, this is basically a work of convincing.*

*Scrum Master (different team): And then I will let that discussion going for some time and then I will say, okay, now that we got to the bottom of the problems let's discuss solution. What are you going to do about it or how should we do it differently so it doesn't run into that same problem anymore?*

### 4.3.2 Tools

There were four main tools that teams consistently used to perform at a higher level. These were *self-imposed standards and norms* that were usually devised during team agreement meetings and modified during sprint retrospectives as necessary. There was also heavy *use of Slack and other digital tools*, particularly when working with distributed teams. They also had both *explicit and implicit team roles* helping them organise work more quickly while still maintaining flexibility to get the job done even if certain team members with a specific role were not available. Finally, teams practised going to *talk to a colleague in person* or digital variants often to keep the dialogue fresh.

Teams have **self-imposed standards and norms** although some could be thought of as basic standards of communication in a professional environment, these teams tend to be explicit about them, to the point of writing it down in team agreements. And these are individual to the team and change and adapt depending on needs and occurrences, e.g. new team members joining.

*Scrum Master: There's a few standards like respect, being polite. You know, being direct. So those are, I would say principles [for the team].*

*Example headings from a team agreement on Confluence: Have a good attitude, Efficient meetings, Respect team members, Reflect on shared goals and recommit, Think flexibly, Work hard – play harder*

While the **use of Slack and other digital tools** is noticeable, especially for remote teams, they also get used elsewhere. A frequently mentioned aspect for remote teams is the use of video calls where the camera needs to be on.

*Team member: We have daily standups, and it's, you know, nine in the morning there and 4 pm here. So it's not that bad. So we communicate through our daily stand up, so we meet via zoom and with the cameras and I see them. But other than our usual daily meetings I usually use Slack now.*

The benefit of Slack for remote teams is the asynchronous communication, i.e. sending a question when it is suitable, and the response may come from a team

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member in another time-zone when it is suitable for them. This also comes up when a request is not urgent and does not require to interrupt somebody

*Scrum master: So slack also works if they're not in the office, or if it's, you know, you want to interrupt them, but you don't want to interrupt them quite so much. You want to interrupt them when they have a second, not this very second so it gives them a chance to respond at their own pace.*

However, having the team's knowledge documented in this digital tool and therefore making it searchable also plays a role.

*Team member: The information stays there. So I can revisit it whenever I forget what my colleagues replied to whatever question I had. So, I had a lot of situations where I went back to my message to see the replies.*

Moreover, teams that have primarily or all team members who are remote use it to replicate the coffee chats and personal exchange

*Scrum Master: And we make sure that, you know, we reproduce the coffee chat. So, you know, of course, obviously, they don't meet each other at the coffee or the cafeteria. So, we need to reproduce that social interaction. So, it was very important for us to have a 'private' Slack channel.*

The **explicit and implicit team roles** are important for the team to organise their work better and know who is responsible for which part. Roles that were mentioned are Team manager, Software Architect, User Experience Designer, Developer, Quality Assurance, Scrum Master and Product Owner. While the roles themselves already tell something about the responsibility, some teams make it even more explicit

*Sr SDM: We kind of split it again among kind of the overall definition, the execution and then the user experience. So we kind of split those areas responsibilities.*

This can add a level of comfort to the team when they know whom to escalate a particular problem to, or that they have a specific knowledge on the team, particularly for challenging technical issues that were raised to the Software Architect who could either solve it themselves or take it to his SW Architect meeting with other architects.

*Scrum Master: ...puts the team at ease. Sometimes we have to deal with very difficult Issue where we don't know the solution. We talk to him, or if even he doesn't know, he will take it to his fellow architects and stuff like that.*

Another role that is particularly relevant for the overall team process leading to team cohesion and team learning through positively influencing the team behaviours is the Scrum Master.



*Scrum Master: As a scrum master I ensure that people understand the Sprint Goal, and I am also responsible for the processes to be implemented and also for the deliverables what the team does and the Sprint.*

*Another Scrum Master: The first role of Scrum master is making the team performant. They need to perform at their best and be self-sufficient. So that's my role.... So my role is to create behaviour and the end goal is to be able to make them self-sufficient in a way that if I am not there and if I step away they have those behaviour ingrained already, and this is when you tell that the team is working or not. My role is not to be there and to parent or tell them what to do all the time.*

The other aspect is the implicit team role when team members self-assign specific tasks and take it upon themselves to figure it out. There is no discussion about who should do it or it being assigned by a central authority. It is purely self-organising by recognising the need in a specific area for the team and that person then also taking action to solve it.

*Sr SDM: There was another person in the team that would kind of pick up a lot of little things like creating builds and running reports and doing other things that just kind of come up along the way that they have to kind of get done.*

Finally, it consistently came up that team members just communicated during meetings. There is an initiative to go and **talk to a colleague in person**. This is very strong in co-located teams who often are grouped with their desks in a pod where it is a matter of turning around and calling out someone's name.

*Scrum Master: ...the best communication channel is turn around to the colleague and shout out their name.*

While the 'noise' may be seen as a disadvantage by some, the advantage is the collective knowledge of what is happening by overhearing these conversations.

*Scrum Master: ...our desks are united. And we can easily talk to each other all the time, and I'm in the centre, so I always know everything.*

Remote teams use digital tools to replicate this as much as possible to stay connected and in touch. This helps teams move quickly and not be held up by issues they can resolve within their team.

### 4.3.3 Rituals

Teams that were interviewed named six rituals or ritualistic behaviours as part of their operating rhythm. Given the Agile context of the operation, the consistent mention of *Agile ceremonies* should come as no surprise, yet it highlights the value teams derive from running these meetings. As team composition is not necessarily static in eternity, the integration of new team members and introduction through

*team member onboarding* plays another vital role. Good or desired behaviours do not surface out of anywhere. They are often the result of *role modelling* of leaders or other senior figures on the team that stand in high regard. Some of these ritualistic behaviours that teams exhibit are the consistency with which they *ask each other for help* and receiving help through *positive and mutual support*. Finally, a ritual that is probably specific to software development is the *flexible work in pairs* where a duo quickly iterates through ideas, provide each with peer feedback and disband to form another duo to work on the next problem.

Out of all **Agile ceremonies**, the daily standup, sprint planning and the Sprint retrospective received the most mentions. The daily standup is crucial for team cohesion and progressing on the commitment the team has given during the Sprint Planning meeting.

*Scrum Master: We have our stand-ups [and] are very faithful in doing those. It's very rare that we have to call them off and if we do call them off we post statuses just in Slack.*

The Sprint planning meeting is based on the priorities that the Product Owner sets and where the team commits to delivering a certain amount of work.

*Scrum Master: The PO based on where we are with the epics is defining the goal for the next sprint... we will consider the next sprint a success if the following goal is done.*

**Team member onboarding** is an important team ritual to welcome new team members and get them accustomed to the team's ways of working.

*Scrum Master: We try to make them as welcome as possible, and we told them about our ceremonies, how we did things. We asked them what they thought if it's okay.*

This can even take the shape of tuning new team members into particular ways of communication. The theme is that new team members usually have to adjust to the team's ways, not the other way around.

*Scrum Master: ... sort of the team dynamic has been rather adjust all the team members to this way of being direct and blunt, rather than trying to tone it down and accommodate for everyone.*

However, getting to know each other better is a critical component and one that Scrum Masters tend to emphasise by changing ceremonies slightly to make room for introductions and getting to know team members on a more personal level.

*Scrum Master: So that's very, very important. Introduce yourself. And I do [team] building activities, or I just squeeze in a little bit of it. Tell me more about you in my stand up or my planning meetings, I would say. ...will*

*change things a bit, and I will ask about talking about themselves, and I would add activities like this.*

The act of **role modelling** helps teams observe desirable behaviours and the resulting outcomes. Those that take the risk and do things first to role model do so in the hope that it will catch on recognising it may be uncomfortable at first and needs consistent application.

*Sr SDM: ...particularly the technical leader to kind of set the example here. Even though I'm charged as the architect or the technical leader for this.*

*Scrum Master: I'm gonna be honest with you that demands a lot of courage. But again, I try not to give up even if I feel uncomfortable. And to keep on doing because I believe that's be uncomfortable is what is the first sign of change. Right, so you cannot change anything without being uncomfortable.*

One of the powers of a team over an individual is collective knowledge; however, not all teams know how to tap into that knowledge. Teams that move quickly are accustomed to **asking for help**. They do so because they know whom to ask, they know they will receive help (creating the psychologically safe space), and they also know that this will make the team overall faster and better.

*Team member: Ask for help. So I would say ask for help from your teammates because that makes the whole team more productive. If you get stuck in a problem, you don't quite know how to solve... once I first started asking the one question, that first question, I never stop.*

*Scrum Master: I think everybody in the team feels comfortable enough to reach out for help if they need it.*

*Another Scrum Master: I will talk with the person who has the most knowledge about that subject.*

Part of that psychological safety that enables teams to ask for help extensively is the **positive and mutual support** within the team. While a lot of it is centred around work topics

*Scrum Master: ...they are easy always easy to talk to and friendly, which I find it a great quality. Like no matter what they're doing. If someone has a subject that wants to talk about it, you usually stop what they're doing and discuss.*

*Another Scrum Master: While we do have certain areas of expertise, we definitely try to help out where people are overloaded in some sprints because that does happen with the development cycle... just a lot of positive support all the way around.*

There are also private topics where teammates express their feelings, e.g. when a team member has an accident or other stressful situation in their private life.

Flexible work in pairs takes different shapes as well. First of all, it is very flexible meaning duos form based on need rather than on personal preferences, combining the skills needed for a particular task, e.g. a UX and a developer, or a developer and a QA with industry background.

*Scrum Master: It shifts from task to task sometimes. Well, a dev will work with another dev. Or dev would work with QA for a particular task for a few hours in a day. Then depending on what issue we're working on, we usually collaborate in pairs.*

Although some also suggest having dedicated pairs that get on well together.

*Sr. SDM: I also believe a lot in pair work. So I find when you find two people work well together. They usually bring something quite good to the team.*

The other aspect for working in pairs is the peer review of software code or content, to give it a fresh look and another perspective that the person who created the code or content misses as they are too close to it.

*Scrum Master: ... we also support each other as we do peer to peer reviews of content. Where we don't have an official copy editor, it's nice to have fresh eyes. They can pick up things that you see 1000 times and just don't pick up on.*

### 4.4 Team learning

The team learns from its past experiences, and what happens when behaviours and rituals are changed. This does not happen overnight and may require multiple repetitions but eventually. There is the learning process itself of *learning with and from others* that has to develop through certain rituals such as the sprint retrospective. The outcomes of these learning experiences create a *sense of belonging and establish trust* among team members. This makes the team a *psychologically safe space* where team members can ask questions and own their mistakes with the knowledge that this is in the spirit of helping the team grow as a whole and not about calling out the error an individual has made.

#### 4.4.1 Learning with and from others

There are two key concepts when it comes to learning with and from other team members. First is the idea of a *knowledge carrier* on the team and with a *T-shaped knowledge profile* that all team members should aspire to. The horizontal bar of the letter T represents more shallow knowledge on several subjects, and the vertical bar the depth of knowledge on a small number of subjects. Second is the

ability to *identify patterns from past actions* so that the team can develop *shared strategies to perform better* in future.

Part of the concept around the **knowledge carrier** is that the team knows who holds which knowledge. Usually, this does not get documented but rather forms the tacit knowledge on the team that develops over time as team members emerge as having either already having expertise in a particular area or developing it.

*Scrum Master: We know what we can get out of each other, you know. So if a certain thing comes up I know I can go to [team member] for this or. We immediately know who to go to, who's going to be able to offer the best results.*

It appears stronger teams are aware of this and enforce the discovery of this tacit knowledge.

*Sr SDM: ...identifying what those experiences are and calling it out: "Hey, Colin, you know, you're really good at this react technology. None of us have ever done it. So could you help us learn."*

This helps with the development of the **T-shaped knowledge profile** for all team members, so the skill set is complimentary on the areas of depth while allowing broad coverage of all areas even if the specialist is not available. This also appears to develop as team members take on responsibilities because nobody else is available, suggesting scarcity at some point could even be a good thing.

*Sr. SDM: So really open their view on their role. It could be the same for the developer, you know. You are used to work on a specific type of feature, but your friend next to you needs some help. You know, you jumped in and things like that. So we call that the T shaped type of person. So, you have the thing, you know well, and the thing you're good at. And you are ready to expand on the side.*

Learning takes place when the team **identifies patterns** from past experiences that it calls out and then translates into **actions through shared strategies** to perform better next time around.

*Team member: I guess if the same problem, really the same problem repeats itself a lot ... So, I think we saw a pattern. And that's when we decided to change something.*

These patterns become ingrained in the team's collective memory, so anyone on the team can remind the rest and hold them accountable to stick to the new strategy.

*Scrum Master: After we got that release out saying "Okay, that that was not a good situation, you know, the next time we do this, let's talk about*

*how we can do this." ... So, we had a kind of a retrospective on how we could have done this, you know, more calmly more sanely the next time we have something like this. And then when we face kind of similar things, then it's "Remember that thing? Let's not do that thing again! Remember we were going to do this differently."*

### 4.4.2 Sense of belonging & building trust

Interviewees consistently reported of their team's activities to establish and even strengthen trust, that ultimately led to a sense of belonging. That often requires activities outside of work or at least outside the typical work context. Examples that came up were team dinners at someone's home (with pictures shared on their Slack channel), joint outings to an architectural site (pictures on Slack), or meeting up at a conference and spending more time together.

*Scrum Master: So three of us got to go to TechX [conference] that just last week. So that was really neat. It was neat to see [developer]. And then, [another developer], the youngest developer. So that was really neat for me to spend more time with them, you know, like, not at work and all of that. ...So, so it's good to have, you know, the occasional thing. You know, like the TechX thing that was good because you get to see them in different time.*

The teams recognise this is important as this higher level of trust enables the team to perform better, e.g. raising conflicts (of ideas) and resolving those.

*Scrum Master: ... then you create this behaviour in the team of not being afraid of getting into conflicts because they know that it will get resolved.*

It is also acknowledged that this process takes time and consistent application of rituals.

*Scrum Master: ... with time you start building a sense of trust.*

Also having this type of deeper work relationship does not necessarily mean people are friends outside of work too. If it does happen, the common interest is something else than work.

*Scrum Master: We are more work colleagues and not friends outside of work. Some guys in the office, we are friends, and we do outdoor activities like going kayaking or biking, but these are usually because we have the same hobby. ...The Scrum Team isn't the connecting thing; the hobby is the connecting [thing].*



Another aspect mentioned was the need to highlight and celebrate differences, rather than ignoring these differences or treating everybody as if they were identical.

*Scrum Master: ... really highlighting the differences. And by doing that, I find that they feel a bit more comfortable on being authentic and when a person is feeling authentic, then they give the best of themselves.*

### 4.4.3 Psychologically safe space

Team members feeling comfortable to bring their authentic selves to work helps establish the psychologically safe space where they can ask questions, raise concerns and disagree with each other without fear of retribution. Teams recognise this ability as a critical success factor.

*Scrum Master: I think the success comes a lot of the times, I don't know if most, or how much, but from the fact that we are accustomed to asking these questions and try and do things right.*

The key word here is being accustomed to doing, where it has become a habit or behaviour.

*Scrum Master: It's the habit that we have of asking these questions.*

These habits also need the persistence to stick and repeatedly to experience the positive outcomes leads to the team learning and absorbing it into their routine.

*Scrum Master: It is a clear sign that it's an environment of trust and safety. Admitting mistakes fast, apologizing and coming up with actions to address them are also other good behaviours. "Dude, that was my bad!" "I made a mistake, man, let me fix it!" "I am on it, sorry for that!" Those [sayings] come up very naturally.*

Others also reference Google as a positive example for psychological safety in teams, in order to make use of the diverse skill set as all ideas are brought to the table.

*Sr SDM: The Google team model for good or well behaving Google teams. Right. And one of the things they have in there is psychological safety. So the ability for people to feel comfortable. Coming up with an idea and presenting that to the group or stating an opinion and not always remaining quiet.*

Finally, team members also reflected on what they observe from other teams that struggle with this, relate it to their own experience, and how it impaired their progress to complete tasks on time and with high quality.

*Team member: They don't usually say when they don't know. It's related to the asking for help. They don't really admit they don't know something. This was me, actually, back in the day. I didn't want to admit that I don't*



*know a thing. And it was more time consuming for me to try to find an answer on my own... it was not really comfortable for me to admit that.*

## 4.5 Reactions

The team process and how the team behaves and learns results in both emotional and practical responses that will also influence the outcomes.

### 4.5.1 Emotional response

There is a vast range of emotions, however in the work context and the scenarios discussed during the interview four responses emerged which are team members getting *pleasure from helping others* (positive), *not taking it personally* (neutral), *frustration* (negative) and *feeling uncomfortable or shocked* (negative).

The emotion of feeling **pleased to help** is perhaps rooted in the pride of knowing something that others can benefit from. However, it appears to be less about the pride of one's ability and more about progressing together as a team.

*Team member: So they feel proud that they could help another person with their knowledge and whatever.*

Often interviewees mentioned how team members were **not taking it personally** in various contexts, whether that were unexpected events and changes, or disagreeing on technical issues. It appears to be a central element to see it for what it is and not interpret it as a personal attack, as it makes it easier for the individual (and therefore the team) to look for solutions.

*Scrum Master: I don't think they are taking it too personal. I think this is a good thing, [in] my opinion. It's a problem that we had to address. Maybe we underestimate an issue. Or maybe there is an impediment.*

*Scrum Master: We discussed more vividly, let's say. After when the discussion was done, it was no hard feelings*

Also, the knowledge that others are not getting hurt or might take it personally allows for a more open discussion that is important to surfacing all relevant aspects of a problem:

*Scrum Master: There was no fear of feeling: 'Oh, I'm going to hurt his feelings.' Because we are [at] the point where we accept feedback openly, and we gave feedback openly, of course, as long as given with respect.*

Of course, there are also negative emotions, and it appears that being able to express these as a team also helps to strengthen the psychological safe space they operate in. Interviewees mentioned **shock and frustration** when exposed

to last minute changes or other unexpected and undesirable outcomes that impacted their work.

*Scrum Master: It was quite a shock, and maybe some of the members were a little bit frustrated.*

This also applies to elements within the team's control, such as how much work they commit to in a sprint, and then realising at the end that they overcommitted (again).

*Scrum Master: ... at the end of the sprints and they're not frustrated, but they feel a little disappointed in themselves that they didn't get the work done*

**Feeling uncomfortable** is often a result of a state of uncertainty that results from dependencies on other teams with yet to be determined outcomes or other unknowns, which can also lead to adverse outcomes such as reduced performance.

*Scrum Master: And in that state with not having the decision, then the team doesn't feel comfortable making continue or fail with the project sort of decisions. We feel a very uneasy when we don't know what to do and that. We lose a lot of time; we have become underperforming.*

However, how the team deals with this uncertainty and feeling uncomfortable can change the outcome, while acknowledging it is not an easy thing to do.

*Scrum Master: First thing is like shock. "Oh, man, we also have to do this!" ... but then they do it and they take the responsibility. ... It's in normal human nature when you want to take it outside of the comfort zone, the first reaction is to stay there. You have a moment of resistance to change.*

### 4.5.2 Practical response

Another way to overcome the negative emotional responses is through some very practical steps that teams apply when confronted with challenges. There were four that emerged from the interviews which were *analysing the situation, getting and sharing the right information, (re)prioritise the work* according to goals and vision and *remain flexible to adapt*.

**Analysing the situation** helps the team mobilise resources quickly where it is needed and often in the process reduce the negative emotional reaction when realising the situation is less complicated. Of course, it could also turn out the other way, but the swift gathering of relevant team members to analyse the new situation is crucial to master it successfully.

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*Scrum Master: We need to know whenever there's an interruption. We need to know right away, and we always gather as a team and do an assessment. ... So the turnaround has to be quick, to be proactive about it.*

The analysis helps to build a plan of action that the team can then rally to execute.

*Scrum Master: But then they put on the work, they saw that it was not that difficult. And they did the wiki page with what had to be done, and they looked into it and they did it.*

Communication is vital in any team process, and even more so when dealing with unknown and unexpected scenarios. The analysis can reveal a lack of information either on the team itself or on other dependent teams. This then triggers the action of **getting and sharing the right information**.

*Sr. SDM (talking about reacting to a challenge brought to the team): Is that the right change to make now? ...Did we hear enough kind of information? So those were kinds of challenges I guess that were put back to the person that was bringing that perspective in.*

*Scrum Master: So what we do at that point is we want to make sure that we have the right information... I'm going to let the team [know]. It is really those information sessions that happen first.*

Unexpected events can often be additional work that needs to be completed at short notice. Finite resources require the team to **(re)prioritise work** and determine what gets bumped as a result of taking on other work. This decision is not taken in isolation but with stakeholders who provide input and clearly define goals and vision for the project. This also points back to the previous point of obtaining the right information.

*Scrum Master: We just did a quick prioritization and see if there's anything that could get bumped. And I think we moved one story out for the sprint and you know we make it happen.*

It also helps teams to **remain flexible to adapt** to new situations, where some take pride in being able to do so. This is also exhibited through individuals attitudes, such as being a self-starter that recognises tasks to be done and takes it upon themselves to execute.

*Scrum Master: You have to make do with fewer resources, and you just adapt basically.*

*Sr. SDM: ...because they were able to quickly adapt the way that they work to a different type of initiative or domain. And again, quickly be able to kind of figure out, okay, what, what can I do to contribute to this project and it wasn't somebody waiting to coordinate things. People were just going up and getting things done.*

*Scrum Master: We have the reputation of doing sort of interesting things. At least in the past, when we work with the [technology] and now with the [special] project.*

## 5 Discussion

The findings of this research summarised in Figure 6 outline the essential parts of team diversity that they perceive themselves as relevant, the existing attitudes amongst team members, the team’s behaviours and learnings and finally how they respond to events. This section draws on the concepts identified to extend the model proposed by Tekleab et al. (2016) that highlights team learning as mediator of the team cohesion-team performance link. The combination of findings provides some support for the conceptual premise of the model shown in Figure 7.

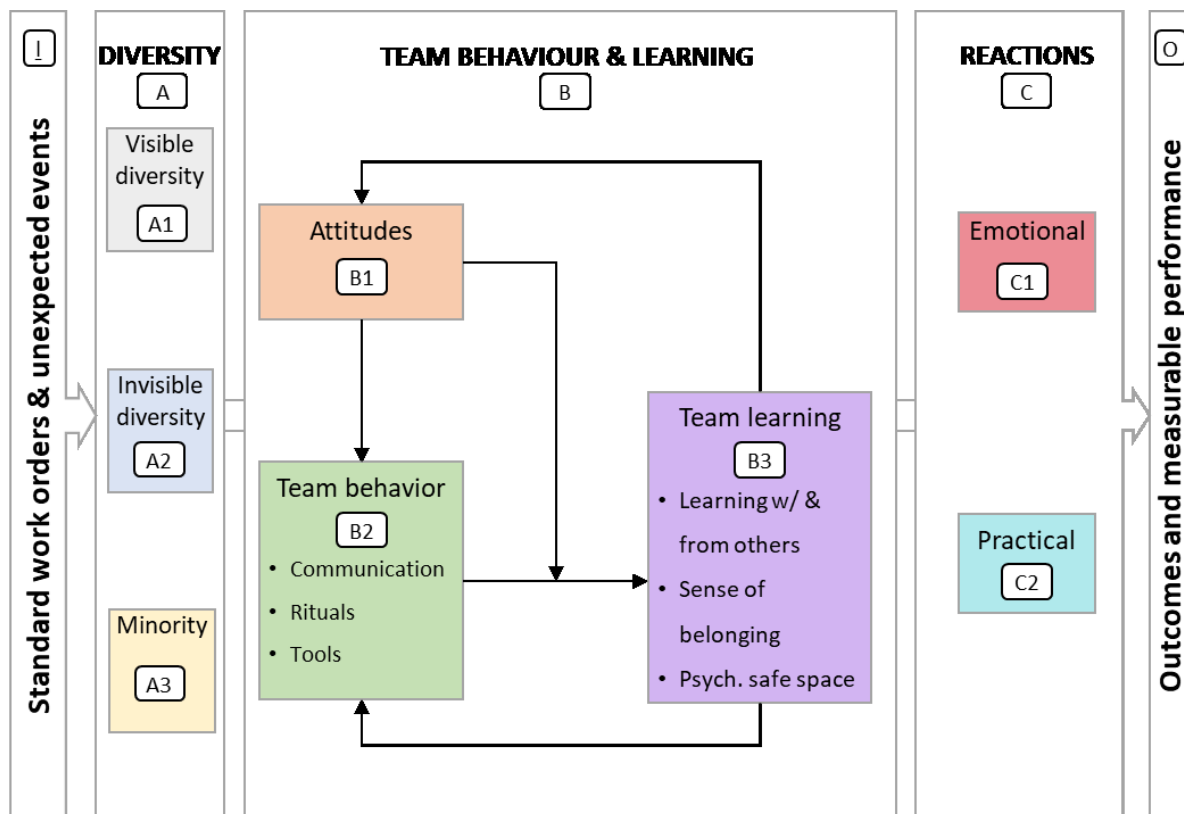


Figure 7 - Model to benefit from team diversity

### 5.1 Work orders and events as team process input

The model begins at the input stage of the team process (Figure 7, box I), which can consist either of formal assignments or self-assigned tasks based on the organisation’s goals and vision in the Agile context. The quick pace of the business environment and technological dependencies often necessitate quickly adapting

to typically unexpected events. The responses from informants suggested that teams seem to differ in their ability and willingness to react to such surprises. Whether a team merely reacts or embraces the change may impact the team's overall performance and become a vital success factor.

### 5.2 Team diversity moderates team process

While evidence from the interviews was inconclusive on how teams viewed the influence of team diversity on their outcomes, two concepts stood out as critical success factors that helped teams in their output. First are the aspects of invisible diversity (Figure 7, box A2) such as functional background, skills & experience, time with the team and personal life attributes (van Knippenberg and Mell 2016). In some cases, it would have been challenging to complete the work, or at the very least complete it, so the software component is valuable to customers. The reason was the need for some industry knowledge or even experience.

Second is the concept of minorities (Figure 7, box A3) on the team, which is in contrast to the existing literature (cf. Harrison and Klein (2007), van Knippenberg and Mell (2016)) on team diversity where the outgroup of minorities typically suffers from lack of inclusion and may impact the overall team performance. However, in this case, it appears the minorities brought an often-important novel perspective to the team, whether that was the liaison role that helped them connect to another team, or the user experience lens without the 'blindness' of technology on. It may not have been sufficient to only have these minorities on the team, however. The evidence suggests that additional processes are necessary to benefit from this type of resource on the team (cf. Chatman and Flynn (2001), Tekleab et al. (2016)).

### 5.3 Team behaviour and learning process

The core of the team behaviour and learning process (Figure 7, box B) revolves around three concepts, which are attitudes (Figure 7, box B1), team behaviour (Figure 7, box B2) and team learning (Figure 7, box B3).

**Attitudes** are a determining factor of team behaviour, and perhaps more importantly how they moderate the malleable aspects of team learning. Valuing diversity on the team may be the most important attitude that helps the team

translate the outcomes of team behaviour translate into true team learning and thus grow the team's capabilities. On the other hand, putting the team before the individual may positively moderate the team learning of safe space and creating a sense of belonging. Evidence from teams that exhibited negative attitudes, e.g. lack of curiousness or openness to learn, may also be interpreted, such that they resisted using tools and ritual (part of team behaviour: Figure 7, box B2) and therefore could not translate the outcomes into valuable learning. Equally attitude can either enhance or decrease the learning effect.

**Team behaviour** (Figure 7, box B2) with its core elements of communication, rituals and tools may influence the team's learning (Figure 7, box B3). The consistent communication and role modelling where team members can observe that asking questions, and even making mistakes is not reprimanded but indeed welcomed may lead over time to the concept of the psychologically safe space. This safe space may enable more team members to exhibit this positive behaviour and therefore reinforce both the ritual as well as the learning, hence suggesting an iterative loop between behaviour and learning. This research additionally confirms the findings of Edmondson and Harvey (2016) albeit in the context of a single-company team opposed to the cross-boundary setup of the original study. Finally as with all loops this may also be a downward spiral where negative experiences are amplified and reinforced.

**Team learning** (Figure 7, box B3) in turn may not only influence team behaviour as suggested above, but also the attitudes. It is possible that team members observing the learnings made as result from positive attitudes and well executed team behaviours adjust their attitudes, such as valuing the diversity. Informants have suggested that constant learning over time will adjust the style of communication, how rituals are performed and the tools which are used. Every new impulse may provide an opportunity for learning and therefore changes in the process. Particularly adding new team members exhibits such an impulse, however informants noted they typically induct the new member to the dominant working environment where they have to fit in, before they can influence it through the usual learning process. These findings seem to further substantiate the work by Tekleab et al. (2016).

## 5.4 Team reactions moderating outcomes

Evidence from the interviews suggest the teams may react through emotional responses (Figure 7, box C1) and practical responses (Figure 7, box C2). This observation may support the hypothesis that team reactions mediate the team behaviour and learning process (Figure 7, box B) to outcomes (Figure 7, box O) link. While the interviews do not allow drawing specific conclusions on the influence of emotional responses on the team process to outcome link, it appears plausible that positive and neutral emotions influence positively, whereas negative emotions influence negatively. E.g. taking pleasure to help others, positively reinforces attitudes such as putting the team before the individual, which in practice means the team completes the work they committed to, because another team member helps. Equally if the frustration levels are too high it may block the team from performing at their best. However, in reality it may not be quite so simple, as giving voice to emotional responses such as frustrations may also influence team learning as suggested by one Scrum Master.

*Scrum Master: I allow the team to have rants. You know ranting, complaining and all of that. So each of the members is allowed to have an epic, massive rant twice a year, they can use the F word they can use whatever language they want. They say "Today, I feel like I need to rant." ...then we'll all sit back ... and we all listen to that ranting. ...[after listening to rant conclude with] "Now is there anything you would like us to do to help you with that?" ...because it's an agreement in the team when somebody rants the rest of the team doesn't feel offended about it.*

While emotional responses seem to play an important role in reinforcing and positively moderating attitudes, the practical responses appear to be concrete tactics teams could adopt to positively influence their outcomes.

## 5.5 Outcomes and measurable performance

The research results also suggest the possibility of extending the outcome metrics (Figure 7, box O) that Kupiainen et al. (2015) identified in their meta-study, by meta-metrics such as consistency in the delivery against commitments, or the ability to take on unusual work and still perform at similar levels. While 'classic' software development metrics such as velocity and number of features as output measures, and the number of defects or managing technical debt as quality measures were confirmed, informants suggested a hitherto unknown 'measure' of



team mood, if it qualifies as such. It is possible, though that checking the mood of the team could serve as a quick litmus test of how well the team process, and the integration of attitudes, behaviours and learning functions. As one Scrum Master suggested by checking on the last person in the process chain, one can quickly determine the overall health of team interaction.

## 6 Conclusion

The aim of this thesis was to discover strategies teams could employ to harness the team diversity for improved performance. Evidence from the research suggests that teams with higher diversity can benefit from it and improve their outcomes. As is widely suggested in the literature (cf. Tekleab et al. (2016), Chatman and Flynn (2001), Edmondson and Harvey (2016; van Knippenberg and Schippers), Mannix and Neale (2005)) it is not enough for the team to consist of a diverse set of team members, but instead, the team needs to work on extracting value from its diversity consistently.

The findings were elaborated in a team process model (Figure 7) that builds on and extends the process model by Tekleab et al. (2016). This extended team process model is believed to have significant implications for helping software development teams increase their performance by leveraging existing diversity. While not an explicit research target the findings also suggest possible implications for team design and hiring strategies, such as ensuring at least some industry background on the team. This may be especially relevant for very technical or industry-specific software applications such as engineering and financial applications.

### 6.1 Research conclusion

This thesis has provided more in-depth insight into the team process model (Tekleab et al. 2016) by exploring it in the context of eight specific software development teams, that confirmed previous research findings and extended it through a new dimension: team attitudes. While the research was conducted on software development teams, it is thought that the findings may also apply to other types of teams as long as they share the main traits of their tasks, that is work in the knowledge domain and solving unique problems. Therefore, it may

have wide-reaching implications to distant domains such as teams of architects and engineers, or medical teams. Given the similarities in findings to Edmondson and Harvey (2016) it would be of interest to study this further also with cross-boundary teams.

While it may apply beyond the software development realm, it is essential to point out the limitations of this research. The Research method (cf. chapter 3) is based on purely qualitative analysis, that helped extract potential strategies, however, due to its nature does not allow for confirming the exact moderation and mediation influences of the various links in the hypothesised model. The future potential to extend this work is elaborated in 6.3 Future research recommendation.

### **6.2 Recommendation for implementation**

This section collates the findings related to the research question to provide actionable steps for teams to harness existing diversity for improved performance. The findings suggest three possible areas that practitioners can address.

First, they should evaluate existing team attitudes, in particular for the themes identified in this study. Depending on the evaluation results, practitioners can develop a plan on which attitudes they want to address and through which mechanisms. This, of course, implies that attitudes can be changed (even though it may take time). If the team scores low on valuing diversity, they could spend some time in future retrospective to call out the differences and specialised skills that team members add. Role modelling is vital to let all team members observe and ideally follow the role model.

Second, as all informants extensively reported about specific team behaviours and practical response mechanisms that appear to influence outcomes and performance positively, it stands to reason to follow their example and ensure adoption of these communication practices, team rituals, tools and practical response mechanisms. While these may naturally emerge in high-performing teams, it is likely that merely copying these models and applying them will also yield results. The first order themes of the data structure in Figure 6 and the elaboration of the findings in 4.3 Team behaviour and 4.5.2 Practical response provide ample ideas to implement. Arguably a number of the rituals are rooted in the SCRUM ceremonies (Schwaber and Sutherland). However, while these may serve as a solid foundation, there is more that teams can and should do. It might

also be useful to highlight and share these particular practices to team members to discuss how they may adopt these, ensuring buy-in and also make this an inclusive activity. This also elaborates the findings of being open in the communication (cf. Tekleab et al. (2016) and inclusive of opinions and ideas, as this should encourage debate and perhaps even a conflict of ideas that team members need to resolve through a common solution, which further supports the findings of Edmondson and Harvey (2016). Undoubtedly this action will require strong leadership from the servant-leaders on the team, particularly the Scrum Master. However, also other leaders would do well to role model the desired behaviours, whether that is asking for help or providing positive and mutual support.

Third, practitioners should encourage the development of a psychologically safe space through rituals that reinforce the teams' learning, so they seek to understand each other first, make it clear there are no stupid questions, and mistakes present an opportunity to learn as a team (cf. Edmondson and Harvey (2016). Again, role modelling will be a tool of choice, albeit not the only one as discussing this with the team openly is equally important on this journey. It should also be noted that none of these implementation findings is likely to address problems and provide immediate results. Essentially this is in many ways a process change, and therefore requires change management. While this can be planned for, the servant-leaders of the team should also anticipate the level of discomfort they may go through as they help the team with their transition. One informant aptly put it like this:

*I'm gonna be honest with you that demands a lot of courage. But again, I try not to give up even if I feel uncomfortable. And to keep on doing because I believe that being uncomfortable is what is the first sign of change. Right, so you cannot change anything without being uncomfortable.*

While not included in the research question, there may also be practical implications for hiring strategies and team design. As is widely accepted in team formation theory (Tuckman 1965) introducing new team members essentially lets the team go through the entire formation process, although it may be quicker. If the team has to go through such often performance-reducing stages, it stands to reason to make it worthwhile. Therefore, one could think of considering the diversity of the particular team that a new employee should join, and ensure their profile adds to the team skillset and not just fits the hiring manager's job profile.

This suggests having two parts for the search profile: 1) the generic job profile for the role and 2) the profile of skills, backgrounds and attitudes that complements the team. Therefore, the team is being designed as much as this is possible, as opposed to emerging out of the individuals.

### 6.3 Future research recommendation

Both the nature and scope of the research as well as the findings present opportunities for further research work which are elaborated in this section.

First is the limitation of the qualitative research carried out. Therefore it would be useful to evaluate the hypothesised model of team process (Figure 7) through quantitative research to confirm or reject the proposed links in the model, and better understand their relative significance.

Second, while valuable insights on team attitudes and reactions emerged as a result of this research, there is a reason to believe that the first order dimensions are incomplete. Understanding the full set of attitudes would be useful for the evaluation of existing team attitudes suggested in 6.2 Recommendation for implementation. Equally to better understand the full(er) set of practical responses would provide a richer set of implementing choices, particularly for teams that already perform quite well but still see room for improvement. The same goes for emotional responses, as the team leader can use these as a litmus test of team mood, and therefore expected team performance.

Third, while this research aimed to compare teams with different levels of diversity, a broader study should also consider the diversity of informants, as their point of view may also influence the results. Out of eight Scrum Masters that were the primary interview target, only two were female, and one Asian compared to seven Caucasian, and they typically grew into their role coming from a software developer background.

Finally, future research might want to explore the ideal characteristics and best practices and behaviours of servant-leader roles such as the Scrum Master. There were observable differences in how the eight interviewees approached their role. While in this research particularly female informants were more open to talking about the softer aspects of team interactions and emotions, it is not clear whether this is because they have a stronger focus on it or find it easier to talk about it.

Identifying these aspects may be vital to aid team cohesion because of the orchestrating role of the Scrum Master.

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## 7 Appendix – Interview guide

### Introduction

- First, explain purpose of meeting and interview, that is to conduct a study on the relationship between team diversity and team performance, and which practices help teams perform better.
- Ask for candour in all responses and assure the interviewee that the results will be anonymised
- Ask for permission to record the interview
- Offer a chance to review the interview transcript for errors and completeness afterwards.
- Show understanding that this may be a sensitive topic and that I am looking for both positive and negative aspects of team interactions, as it will help form a more explicit and realistic picture of team interactions that will lead to valid conclusions and therefore useful recommendations.

### Main questions

In order for the interview to feel like a smoothly flowing conversation rather than a choppy questioning or even interrogation, each question will be introduced by providing a link to the previous or prior topic.

#### 1) *Open the conversation and topic*

- a) Let us start with your immediate team:
- b) Can you describe your (Scrum) team and how the team works together?
- c) How would you describe team dynamics?
- d) How would you describe team communication?
- e) *Possible follow up questions:* What are some of the characteristics of the team members? Is it unique in anyway? What makes this team successful?

#### 2) *Check for diversity, if not covered by the interviewee as part of the first question:*

- a) Now let us take a closer look at the team members and the diversity amongst them:
- b) How would you describe diversity? (Check for their definition and understanding of diversity, to also assess the validity of next question). If they miss parts of diversity, give them the prompts and background.
- c) Considering this definition, on a scale from 1-10, how would you rank your team for diversity, with one being not diverse at all and ten being highly diverse?

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- d) Can you talk about the individuals on the team: what makes them perhaps unique and stand out from others in the team, and what makes them similar to each other?
  - e) How do these similarities and dissimilarities show in their teamwork?
  - f) *Possible follow-up question:* What would other people on the team say about diversity? I am aware I am asking you as a representative of the team. Imagine for a moment being one of your teammates – what would they add to this subject?
- 3) *Check for performance, if not covered prior*
- a) Now I am going to switch to the other aspect I am interested, that is the team performance:
  - b) Can you tell me how well the team performs?
  - c) How do others (e.g. management) view their performance?
  - d) How does the team view its performance?
  - e) On a scale from 1-10, how would you rate your team for performance, with one being low performing and 10 being high performing?
  - f) What do you and the team think are the cornerstones of their success?
  - g) *Possible follow-up question:* How do you assess the team's performance, i.e. which criteria do you and others use? To what extent do they think is the low/high diversity on their team a contributing factor for their performance? I am aware I am asking you as a representative of the team. Imagine for a moment being one of your teammates – what would they add to this subject?
- 4) *Check for time together as a team, and time pressure as moderating factors*
- a) Next, I would like to find out some other aspects that might relate to the team's performance:
  - b) How long has the team been together in its current form?
  - c) Can you give me a history of how the team developed over time?
  - d) Please describe the team's usual workload? Would you rate it high or low?
  - e) How does the team's behaviour change when workload increases/decreases?
- 5) *Check for practices and rituals*
- a) I am curious to identify best practices and rituals that teams have that help perform better, so we will spend some time talking about that:
  - b) What are the top 3 strategies you have found to be successful in helping a team perform at its best?
  - c) Please tell me about the teams work practices, they can be both Agile methodologies like daily stand-up and others?
  - d) Please tell me about the teams' interactions outside of the work context, that could be breaks and lunch, or after work.

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- e) What are the benefits of these practices and rituals for working together as a team?
  - f) Who typically introduces new rituals and practices, and why?
  - g) What happens when a new practice is introduced?
- 6) *Check for the impact of diversity, and how the team handles it*
- a) Next, I would like to spend some time talking about how the team handles friction and conflict
  - b) Can you tell me about a situation where the team experienced friction? Was the result good or bad because of it?
  - c) Can you tell me about a situation where the team had a conflict?
  - d) What were the learnings from such conflicts?
  - e) What actions do they take when conflicts occur?
  - f) How do different people on the team cope with conflict?
  - g) How do you think these coping strategies are related to diversity?
  - h) *Possible follow-up question:* I am aware I am asking you as a representative of the team. Imagine for a moment being one of your teammates – what would they add to this subject?
- 6) *Closing and invite further comments*
- a) Thanks for having this conversation and sharing your experience. Is there anything else you think is important on this subject or that you would like to share?
  - a) Offer an initial conclusion of what I heard and ask their thoughts on it
  - b) Thank interviewee for their time and sharing of their insights