

# Appendices

## Appendix 1. Justification of case choice

As the concept of psychological safety is to be investigated, the aim is to find a team where the overall working conditions are rather standardised and typical for the industry, as many of the working condition constituents are also antecedents of psychological safety. It is then easier to draw conclusions from the findings and relate them to any case which enjoys similar conditions, making it more generalisable and thus adding validity.

In this endeavour, Quanterall presents itself as an appropriate case study candidate. It is company with twenty years of experience in the software industry ([quanterall.com](https://quanterall.com), 2023), which suggests good practices that the company must have employed over the years to stay competitive for so long. It does multitude of projects of varying size and theme, making the findings more generalizable and relatable, allowing for conclusions to be drawn and applied to the context of another software development company.

Quanterall's team composition, featuring specialists across diverse fields, aligns with the intricate dynamics of software development teams ([quanterall.com](https://quanterall.com), 2023). With a roster of over 70 engineers, the company presents the opportunity to observe the complex dynamics that ensue in companies of such size. Quanterall boasts the capacity for in-house multidisciplinary development and prototyping, which gives the opportunity to test behaviours that are associated with interpersonal threat (such as innovation, giving ideas), which will make the levels of

psychological safety more apparent. That adds further validity to the findings.

Quanterall's commitment to a scientific approach is a foundational aspect of its operational ethos. The company leverages strategic partnerships with Institutes and Universities, facilitating access to cuttingedge technological research ([quanterall.com](https://quanterall.com), 2023). This strategic positioning not only ensures that it remains at the forefront of technological advancements but also signifies a strong foundation for empirically grounded research. In the pursuit of understanding psychological safety within the Software Development context, Quanterall's scientific approach enhances the credibility of the findings.

To overcome potential researcher bias, the issues of internal and external validity are considered together with reliability and objectivity (Yin, 1994):

<b>Factor</b>	<b>Description</b>	<b>Evaluation of chosen case</b>
Relevance	Suitability of the case with the purpose of the research.	Suitable, as it is a team in the Software Development industry.
Feasibility	The ability of the researcher to practically execute the research within the case study.	Feasible, as the researcher can physically go and conduct the research.
Access	Need to ensure the full cooperation of the interviewees and case study organisation.	Accessible, as an organisational representative have informally agreed to cooperate.

Application	Case study organisation should be of sufficient calibre to allow the research's findings to have sufficient leverage for justification.	Applicable, as the company has decades of experience across different disciplines in the software development industry.
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*Table 2.2. Evaluation of chosen case. Adapted from Yin (1994).*

## **Appendix 2. Interview Questions and justification behind them**

Questions	Reason for inclusion
1. Do you feel free to admit a mistake?	To find out whether members feel interpersonal threat related to admitting mistakes (Guchait et al., 2011) and whether they engage in such behaviour.
2. Do you think something bad will happen if you do?	
3. Do you see any point in doing so?	
4. Do you admit your mistakes?	
5. Do you feel free to ask for help?	To find out whether members feel interpersonal threat related to helpseeking (Edmondson, 2004) and whether they engage in such behaviour.
6. Do you think something bad will happen if you do?	
7. Do you see any point in doing so?	
8. Do you ask for help?	
9. Do you feel free to ask for feedback?	To find out whether members feel interpersonal threat related to feedbackseeking (Schein, 1985) and whether they engage in such behaviour.
10. Do you think something bad will happen if you do?	
11. Do you see any point in doing so?	
12. Do you ask for feedback?	
13. Do you feel free to voice your opinion or give suggestions?	To find out whether members feel interpersonal threat related to voice behaviour (Van Dyne and LePine, 1998) and whether they engage in such behaviour.
14. Do you think something bad will happen if you do?	
15. Do you think something good can come out of that?	
16. Do you voice your opinion or give suggestions?	

17. Do you feel free to ask questions and learn?	To find out whether members feel interpersonal threat related to learning behaviour (Schein, 1985) and whether they engage in such behaviour.
18. Do you think something bad will happen if you do?	
19. Do you think something good can come out of that?	
20. Do you ask questions and learn?	
21. Do you feel free to be creative and innovate?	To find out whether members feel interpersonal threat related to creativity and innovation (West, 1990) and whether they engage in such behaviour.
22. Do you think something bad will happen if you do?	
23. Do you see any point in doing so?	
24. Do you use creativity or innovate?	
25. Do you make an extra effort for the good of the team?	To find out whether members are engaged to the team (Walters and Diab, 2016) and whether they perform extra-role behaviour as an indication of engagement (Deluga, 1994).
26. Do you see any point in doing so?	
27. Do you feel like part of the team?	
28. Do you want to stay on the team?	To find out whether members feel inclined to stay in the team or exhibit turnover intentions.
29. Why? / Why not?	

### Appendix 3. Prediction matrices

#### 1. If psychological safety is present

Questions	Predicted answers
Do you feel free to admit a mistake?	Yes
Do you think something bad will happen if you do?	No
Do you feel free to ask for help?	Yes
Do you think something bad will happen if you do?	No
Do you feel free to ask for feedback?	Yes

Do you think something bad will happen if you do?	No
Do you feel free to voice your opinion or give suggestions?	Yes
Do you think something bad will happen if you do?	No
Do you feel free to ask questions and learn?	Yes
Do you think something bad will happen if you do?	No
Do you feel free to be creative and innovate?	Yes
Do you think something bad will happen if you do?	No

## 2. If all psychological safety's outcomes are achieved (perfect case)

Questions	Predicted answers
Do you feel free to admit a mistake?	Yes
Do you think something bad will happen if you do?	No
Do you see any point in doing so?	Yes
Do you admit your mistakes?	Yes
Do you feel free to ask for help?	Yes
Do you think something bad will happen if you do?	No
Do you see any point in doing so?	Yes
Do you ask for help?	Yes
Do you feel free to ask for feedback?	Yes
Do you think something bad will happen if you do?	No
Do you see any point in doing so?	Yes
Do you ask for feedback?	Yes
Do you feel free to voice your opinion or give suggestions?	Yes
Do you think something bad will happen if you do?	No
Do you think something good can come out of that?	Yes
Do you voice your opinion or give suggestions?	Yes
Do you feel free to ask questions and learn?	Yes
Do you think something bad will happen if you do?	No
Do you think something good can come out of that?	Yes
Do you ask questions and learn?	Yes
Do you feel free to be creative and innovate?	Yes
Do you think something bad will happen if you do?	No
Do you see any point in doing so?	Yes
Do you use creativity or innovate?	Yes

Do you feel as part of the team?	Yes
Do you sometimes make extra effort for the good of the team?	Yes
Do you see any point in doing so?	Yes
Do you want to stay in the team?	Yes

#### **Appendix 4. Individual respondent entry**

These entries from the open-ended survey are presented to offer insight on the data collection method employed. The rest of the entries from the rest of the participants can be presented upon request.

<b>Question:</b>	<b>Answer:</b>
Do you feel free to admit a mistake? Why? / Why not?	Yes. If I were in a company where mistakes felt bad to admit I would be likely to leave. In the vast majority of cases I have done my best and it's with that perspective that I carry myself. In those circumstances mistakes can still happen, but I don't feel ashamed of making them.
Do you think there might be negative consequences if you do? Why? / Why not?	Not really. With every mistake there is an explanation or reason and for the most part the mistakes that have been made have been understandable.
Do you see any point in admitting a mistake? Would something good come out of it? Why? / Why not?	I do see a point. The most obvious one is to bring the topic to the forefront and possibly make it a valuable learning lesson for everyone else, but even just acknowledging a mistake to yourself can help you process things.
Do you admit your mistakes?	5

Can you provide an example of admitting your mistakes?	As a team lead, I made the mistake of arguing for a less process heavy and bureaucratic way of working on a project we were working on, but had to recognize that this made it hard to reconstruct exactly what the client had asked for and changes that were made in our contract later on, as we didn't have a clear paper trail to follow. This was highlighted in my discussion with our middleman agency and became a very real learning experience.
Do you feel free to ask for help? Why? / Why not?	I feel free to do so and I oftentimes ask for more eyes on problems where I feel that there is a point to more opinions. It can also be the case that I have stared at a problem for too long and need
	fresh eyes on it and this happens every now and then.
Do you think there might be negative consequences if you do? Why? / Why not?	No, not really. If there is some massive problem at the root of the thing I'm asking for help with, i.e. I've repeatedly ignored a process or something that I should've paid attention to, and need help fixing the problem, I could see that that would maybe be bad... But this has never happened, so I'm not sure.
Do you see any point in asking for help? Would something good come out of it? Why? / Why not?	Absolutely. Our work is difficult and it's easy to get stuck on things that more eyes could help you with.
Do you ask for help?	4
Can you provide an example of asking for help?	Not a specific one but asking for help in fixing bugs in a program where a series of disconnected steps form a result and we only have the (wrong) result is oftentimes hard, so what will usually happen is that the person, if they get stuck, will ask for help and begin describing the problem and whilst describing it will realize where the problem is.

Do you feel free to ask for feedback? Why? / Why not?	Yes, but we don't have a formal feedback process. I think it's very low stakes, so feedback isn't exactly a reflection of some permanent record in the company. This makes it less scary but also less impactful in positive ways.
Do you think there might be negative consequences if you do? Why? / Why not?	No, not really. Asking for feedback, even official feedback can only be bad if you are knowingly doing bad things.
Do you see any point in asking for feedback? Would something good come out of it? Why? / Why not?	It can help you iron out some of the bad things while also feeling better about and possibly accentuating the good things.
Do you ask for feedback?	4

Can you provide an example of asking for feedback?	When I was new as a leader, I asked for feedback on my leadership style and made adjustments accordingly. It was also useful to hear that some of my ideas were actually making sense to my team.
Do you feel free to voice your opinion or give suggestions? Why? / Why not?	Yes, I do, though depending on the context it hasn't been necessarily listened to. My confidence is reasonably high, so I tend to believe that my opinion counts for something. This also extends to other people, I might add.
Do you think there might be negative consequences if you do? Why? / Why not?	It depends on the delivery, I suppose. If a discussion becomes very intense and one or more of the parties does not deal with it well it can certainly have bad consequences on a workplace politics and personal level.



Do you see any point in voicing your opinion or asking for suggestions? Would something good come out of it? Why? / Why not?	Our company has historically not dealt super well with suggestions, so the point has grown weaker and weaker over time. When leadership continuously does not seem to take into account what their workers are saying I would say that this tends to kill the drive to share opinions and make suggestions.
Do you voice your opinion or give suggestion?	3
Can you provide an example of voicing your opinion or giving suggestion?	Several others and I have been very vocal about the lack of planning that has gone into projects in our company and the continuous work done on them despite this lack of upfront planning. We have urged the company to be more critical early on and trying to establish a strong purpose and viability before a lot of work goes into a project.
Do you feel free to ask questions? Why? / Why not?	Yes. I don't take the not knowing of something (generally) as an indicator of incompetence unless pre-requisites are well established as part of a role, contract or agreed on beforehand otherwise.
Do you think there might be negative consequences if you do? Why? / Why not?	If a question is regarding something I definitely should know as an experienced developer, I think that my co-workers and potentially clients would value me less. If not, I don't think there really are negative consequences.

Do you see any point in asking questions? Would something good come out of it? Why? / Why not?	Absolutely. We have to ask things in order to get a clearer picture of the things that we don't know, either in terms of knowledge or in terms of others' wishes.
Do you ask questions?	5

Can you provide an example of asking questions?	<p>In working with one of our clients I had to ask about specific terminology that they were using as part of their description of the desired system. This is sometimes tangential to knowledge that one could claim should be had already, but even so it only really helps with clarifying what we are all expecting from a certain thing.</p> <p>Sometimes we also have more specific roles on a team where one person will be better at a thing than everyone else on the team; it's frequently the case that we need to ask this person about that topic in order to make sure that our expectations line up with reality.</p>
Do you feel free to innovate and be creative? Why? / Why not?	<p>Over time I have become less and less interested in doing so in the company, even though I have a very strong drive to innovate naturally.</p> <p>The reason for the lessened creativity in work is because I have less and less motivation for work in this company.</p>
Do you think there might be negative consequences if you do? Why? / Why not?	No, I would say that the worst reaction/consequence that I've seen is one of ambivalence which isn't as much negative as it is neutral.
Do you see any point in innovating and being creative? Would something good come out of it? Why? / Why not?	<p>The reason for my strong drive initially is because I enjoy it and I believe it leads to better solutions. It also helps in sharpening your skills as you'll see far more diverse scenarios. This itself leads to precise solutions for almost any scenario that do exactly what you need and no more.</p>
Do you innovate and show creativity?	5

Can you provide an example of innovating and being creative?	I wrote a language for expressing types in a language that is then compiled to other languages. This helped us integrate the exact same types in several different languages and also automatically added functionality that we would otherwise have to write ourselves. This is atypical but is a solution to a very specific problem and it worked out extremely well.
Do you feel like you make an extra effort for the good of the team? Why? / Why not?	Yes. I have observed that it has raised morale and inspired people.
Do you see any point in making extra effort for the good of the team? Would something good come out of it? Why? / Why not?	Yes. It can raise morale and inspire people.
Can you provide an example of making the extra effort?	I worked on my free time on tools that made it easier to analyze and work with our systems. This was done with technologies that I wanted to use anyway so it served several purposes.
Do you really feel like part of the team (not just in the organisation chart...)? Why / Why not?	Yes. Our team is very tight knit, and we are really just a bunch of friends who work together.
Do you want to stay on the team? Would you turn down a competing offer for the same position at a different company with slightly better pay? Why / Why not?	I have actually already taken an offer at another company as we speak. The reason for this was that our company has been falling apart because of mismanagement and a lack of planning/thinking on the part of C-level leadership. At some point I got tired of trying to change things because my perception is that it's a lot more work than it ought to be.

## Appendix 5. Filled prediction matrix

Questions	Predicted answers	Hit rate	Hit rate (%)	P Value	Significance*
Do you feel free to admit a mistake?	Yes	16/17	94.12	0,000008688	++
Do you think something bad will happen if you do?	No	13/17	76.47	0,055550393	+
Do you feel free to ask for help?	Yes	16/17	94.12	0,000008688	++
Do you think something bad will happen if you do?	No	12/17	70.59	0,099990707	+
Do you feel free to ask for feedback?	Yes	13/17	76.47	0,055550393	+
Do you think something bad will happen if you do?	No	12/17	70.59	0,099990707	+
Do you feel free to voice your opinion or give suggestions?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	11/17	64.71	0,194981878	+
Do you feel free to ask questions and learn?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	14/17	82.35	0,006943799	++
Do you feel free to be creative and innovate?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	17/17	100	0,000000000	++
<b>Average hit rate:</b>			<b>85.78</b>	<b>0,005246179</b>	<b>++</b>
<p>* Statistical significance was determined by a chi-square test, as suggested by Wilson and Woodside (1999). It uses the following indicators: ++, the partnering relationship prediction is supported both directionally and statistically (<math>P &lt; 0.05</math>); +, the partnering relationship prediction is supported directionally; -, the partnering relationship prediction is not supported directionally; --, the partnering relationship opposite to that predicted is supported statistically (<math>P &lt; 0.05</math>).</p>					

Table 1. Prediction matrix if high levels of psychological safety are exhibited.

Questions	Predicted answers	Hit rate	Hit rate (%)	P Value	Significance*
Do you feel free to admit a mistake?	Yes	16/17	94.12	0,000008688	++
Do you think something bad will happen if you do?	No	13/17	76.47	0,055550393	+
Do you see any point in doing so?	Yes	17/17	100	0,000000000	++
<b>Do you admit your mistakes?</b>	<b>4 &amp; 5</b>	<b>16/17</b>	<b>94.12</b>	<b>0,000008688</b>	<b>++</b>
Do you feel free to ask for help?	Yes	16/17	94.12	0,000008688	++
Do you think something bad will happen if you do?	No	12/17	70.59	0,099990707	+
Do you see any point in doing so?	Yes	17/17	100	0,000000000	++
<b>Do you ask for help?</b>	<b>4 &amp; 5</b>	<b>9/17</b>	<b>52.94</b>	<b>0,964185388</b>	<b>+</b>
Do you feel free to ask for feedback?	Yes	13/17	76.47	0,055550393	+
Do you think something bad will happen if you do?	No	12/17	70.59	0,099990707	+
Do you see any point in doing so?	Yes	17/17	100	0,000000000	++
<b>Do you ask for feedback?</b>	<b>4 &amp; 5</b>	<b>9/17</b>	<b>52.94</b>	<b>0,964185388</b>	<b>+</b>
Do you feel free to voice your opinion or give suggestions?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	11/17	64.71	0,194981878	+
Do you think something good can come out of that?	Yes	16/17	94.12	0,000008688	++

<b>Do you voice your opinion or give suggestions?</b>	<b>4 &amp; 5</b>	<b>12/17</b>	<b>70.59</b>	<b>0,099990707</b>	<b>+</b>
Do you feel free to ask questions and learn?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	14/17	82.35	0,006943799	++
Do you think something good can come out of that?	Yes	17/17	100	0,000000000	++
<b>Do you ask questions and learn?</b>	<b>4 &amp; 5</b>	<b>12/17</b>	<b>70.59</b>	<b>0,048375365</b>	<b>+</b>
Do you feel free to be creative and innovate?	Yes	17/17	100	0,000000000	++
Do you think something bad will happen if you do?	No	17/17	100	0,000000000	++
Do you see any point in doing so?	Yes	16/17	94.12	0,000008688	++
<b>Do you use creativity or innovate?</b>	<b>4 &amp; 5</b>	<b>14/17</b>	<b>82.35</b>	<b>0,006943799</b>	<b>++</b>
Do you feel as part of the team?	Yes	17/17	100	0,000000000	++
<b>Do you sometimes make an extra effort for the good of the team?</b>	<b>Yes</b>	<b>16/17</b>	<b>94.12</b>	<b>0,000008688</b>	<b>++</b>
Do you see any point in doing so?	Yes	16/17	94.12	0,000008688	++
<b>Do you want to stay in the team?</b>	<b>Yes</b>	<b>15/17</b>	<b>88.24</b>	<b>0,003892417</b>	<b>++</b>
<b>Average weighted** hit rate:</b>			<b>75.74</b>	<b>0,059272458</b>	<b>+</b>
<p>* Statistical significance was determined by a chi-square test, as suggested by Wilson and Woodside (1999). It uses the following indicators: ++, the partnering relationship prediction is supported both directionally and statistically (<math>P &lt; 0.05</math>); +, the partnering relationship prediction is supported directionally; -, the partnering relationship prediction is not supported directionally; --, the partnering relationship opposite to that predicted is supported statistically (<math>P &lt; 0.05</math>).</p> <p>** Whilst all the related predictions are presented in the matrix, only the ones in bold have weight in the confirmation of the concept, as they are the 'end product' as per the conceptual model (see Figure 1.6).</p>					

Table 2. Prediction matrix if all psychological safety's outcomes are achieved.