Agile and Wellbeing — Stress, Empowerment, and Performance in Scrum and Kanban Teams

Abstract.
Little research data exist about agile teams and wellbeing. After changing software engineering mode to agile, we wanted to find out if people experienced more or less stress than before. This study is based on a company-wide survey of 466 software engineering practitioners. We asked about their subjective feelings about stress, empowerment, and performance in their respective engineering teams after they had started to use agile methods. The results reveal that the feelings of higher performance improvement and sustainable pace are related, and that this difference is statistically significant. Respondents who feel that their team is empowered also feel less stress. However, no significant difference in feelings of stress and empowerment was found between respondents working in Kanban and Scrum mode after transition to agile. The group that was improving its performance because of agile was also reporting a better workload balance. The group that was experiencing worse performance because of agile methods was also more stressed. The differences may be explained by the management styles being practiced in the teams.

1. Introduction and Related Literature

1.1. Sustainable Pace

According to a Forrester study, agile has reached mainstream: in their survey majority of respondents stated that agile most closely reflects their development methods [1]. The growth of the usage of agile methods in last three years (from 17% up to 35%) has been remarkable [2]. This implies that the benefits of agile methods have been widely recognized in the software industry. In addition, the existing numerous publications on agile methods in both scientific and non-scientific forums mainly seem to report positive impacts of agile adoption. However, adoption of agile methods has proven to be a challenging task [3]. It has been claimed that agile adopters are often unaware of what agile adoption really means, and how broad a change is actually required [2].

Agile methods are reported to bring business value to users but only a little research exists about whether this is actually happening at the expense of the wellbeing of the personnel in agile projects. Syed-A Abdullah, Holcombe, and Gheorge [4] have studied wellbeing in teams using Extreme Programming while Whitworth and Biddle have studied The Social Nature of Agile Teams [5].

It is being said that Scrum, for example, resembles a typical project crisis mode: all people work just on the most important tasks at hand; priorities are made very explicit and there is pressure from the deadline.

Traditionally, when the crisis is over people will return back to their normal working conditions and maybe need a break (or less busy hours) to recover from the overwork. Because agile teams are supposed to be capable of working with a constant flow (and constant pace) one of the twelve agile principles is the principle of sustainable pace: Agile processes promote sustainable development. Product managers and owners, development teams, and people responsible for testing should be able to maintain a constant pace indefinitely [6]. So the central question is: how well can agile teams adapt to constant pressure of deadlines and priorities?

This paper studies wellbeing in agile teams focusing on performance, empowerment, and stress level. The data are based on a survey done in December 2010 with 466 respondents from various teams in a large embedded software development organization at Nokia. The main agile model in use was scaled-up Scrum [6] as defined in [7] and [8] but some teams were also using Kanban [9] or a mixture of Scrum and Kanban. At the time of the research, Kanban was used only at team level, and mainly for maintenance.

This paper provides a reference point for similar wellbeing studies on other product development practices. The results indicate that working in empowered teams is related to feelings of stress with those people who think that stress is related to working methods at all, and that sustainable pace and teams’ performance are related.
2.1. Background

In Scrum, sustainable pace is linked with empowerment [10] and maintained by measuring the team velocity. Effort is planned to the next timebox, a.k.a. sprint, based on the achievement from the previous timebox. Empowered teams measure their velocity, i.e. how many story points they can complete on the average in one sprint. One story point is an abstract measurement unit for relative work amount size estimation. Each user story is estimated separately in terms of story points [11]. An empowered Scrum team plans only to do as much work as they completed in the previous sprint and is thus able to work following a sustainable pace. This is opposite to traditional plan-driven development, where management is setting deadlines and teams are cutting quality and working overtime to get the release out [10].

Empowered Scrum teams are also able to make technical decisions by themselves, whereas business decisions are the responsibility of product manager a.k.a. product owner. “Product owner” is a Scrum role responsible for defining and communicating the vision for the product being built and scoping the content when necessary. Agile development is based on the discovery that traditional software products have many features that are not at all or seldom used [12]. Thus the profitability of agile methods is also based on focusing on doing the right things with very good quality when compared to traditional methods that are trying to push all planned features out of the development pipeline at the same time. This often results in unclarity about the final release date since the last weeks of the product development project are spent testing and improving the quality to an acceptable level.

The fear of empowerment that traditional project management seems to have is related to the fear of breaking commitment to a delivery at a final project delivery deadline. Yet in Scrum teams there is willingness to achieve a release after every sprint. Peer pressure from agile team members is replacing the former management command-and-control type of target setting. This visibility may cause significantly higher stress for some individuals. From the data available, we can only guess the reasons. Lack of competences, personality types, not liking teamwork are some of the suggested reasons as well that agile is demanding a lot of openness and teamwork but the fact is we really do not know.

2. Research Approach

In this section, the research aims, context, and data collection and analysis methods are presented. The assumption is that the studied variables have complex and unknown relations with each other. Thus the research done is exploratory research. This is why there are several research questions in this paper.

1.1. Research Aims

Several wellbeing studies have been conducted in traditional product development contexts, but only very few have been done within an agile setting. The aim of this research was to test the most typical claims in agile literature regarding subjective wellbeing in agile teams.

Subjective feelings are important because “whatever we perceive is organized into patterns for which we the perceivers are largely responsible” [13]. Kurtz and Snowden [14] propose that for those parts that we do not understand, “we fill the gaps to create an experience-based pattern on which we act.” These experiences, in turn, are visible only by means of inquiring about subjective feelings. Thus, it can be argued that they represent, when asked from a significant portion of the population, the reality as it exists in the studied organization. The consideration of whether this reality is transferable to another organization falls outside the scope of this study. We maintain those subjective feelings and their subsequent correlations (or non-correlations) with the determinant factors that can act as a vehicle for discovering patterns of behaviour, which inherently are present in an agile organization. We acknowledge that the patterns may repeat for a time, but we cannot guarantee and foresee that they would continue to repeat [13].

One of the typical statements in Scrum is that performance can increase even though teams are working with sustainable pace. This seems to be one typical discussion topic in blogs and other forums where agile practitioners discuss with each other. These forums provide rich material for researchers to study different opinions of agile practitioners.

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1 A related InfoQ article listing many links to agile blogs and other forums discussing overtime can be found here http://www.infoq.com/news/2008/05/sustainable-pace
Working overtime is one of the traditional management methods used, so the Scrum statement that sustainable pace increases performance is hard for seasoned project managers to believe. Thus, we set the first research question as:

**Q1. Has performance increased in all teams alike? Has sustainable pace anything to do with performance increase?**

One of the things that Scrum and sprint planning advocate is “stress-free productivity.” In a survey like this we cannot measure productivity objectively, but the perceived (self-measured) performance. This perceived performance can then be compared to a perceived feeling of how empowered a team is and what is the team stress level.

Not all people agree with the idea of “stress-free productivity”, though. Traditional project management is based on thinking that more can be achieved if the team over-commits rather than under-commits. We set the second research question as:

**Q2. Do feelings of stress and team empowerment relate?**

The final claims studied are the work mode is related to feelings of stress and empowerment. Is the work mode (Kanban or Scrum) related to the feelings of empowerment? Ken Schwaber has been claiming in his blog that “Kanban is just a death march without a pause” [15]. If this is true, then Kanban teams should have more stress and feel less empowered. Thus we set the third and fourth research questions as:

**Q3. Do Kanban and Scrum teams feel similar stress, compared to traditional development?**

**Q4. Do Kanban and Scrum teams feel equally empowered, compared to traditional development?**

### 2.1. Research Context

The survey was sent semi-randomly to different parts of the software engineering organization. We tried to send the survey to over 10,000 people but our survey tool could not handle this load and kept reporting problems. As a result, we do not know the actual number of sent invitations. Eventually, we received 466 answers. There would have been an option to repeat the survey with a better tool but when we analyzed the 466 answers we concluded that they were representative enough as the responses were spread over many roles and different types of teams.

Most of the respondents were working in Scrum teams. Fifty-nine percent identified themselves as Scrum team members, 22% were Scrum masters, and 10% were product owners (see Figure 2.1). Selection of multiple roles was possible, so the sum exceeds 100%.

The teams were also asked if they were able to use all Scrum practices or if they were able to use just some. Following only a subset of practices from Scrum is called ScrumBUT according to Nokia Test’, and several teams were using this approach [16]. Some teams were also using a combination of Scrum and Kanban, called Scrumban.

![Figure 2.1](http://scrumftw.blogspot.com/2011/02/overcommitment-is-better-than.html)

Figure 2.1 Roles of the 466 survey respondents in percentages.

From the survey respondents, 39% said they are following Scrum and almost as many of respondents stated that they are following ScrumBUT (37%). 10% were following Scrumban and 5% were following Kanban (see Figure 2.2).

The rest of the background questions that were asked from all respondents were:

- Organization

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2 See a related blog post, e.g. in http://scrumftw.blogspot.com/2011/02/overcommitment-is-better-than.html

3 Nokia Test consists of several questions that test if a team is following all Scrum rules or not. The test was developed in Nokia Siemens Networks.
• Agile and non-agile background (length of experience)
• Are you working in a multisite team / multiple teams / multisite project
• Do you have externals in your team / project
• Do you do maintenance or support

These questions are left out of the scope of this study\textsuperscript{4}, as the study is focusing only on sustainable pace and empowerment and stress and working mode.

These questions are left out of the scope of this study\textsuperscript{4}, as the study is focusing only on sustainable pace and empowerment and stress and working mode.

![Figure 2.2 Respondents’ working methods used.](image)

3.1. Data Collection and Analysis

This research was conducted as a questionnaire-based survey. The questionnaire was open for two and a half weeks in the end of December 2010. In the survey we also asked for opinions on Kanban, the existing backlog tool, and what kind of tool the Kanban users would prefer. In this study, however, we limit ourselves to wellbeing and work mode questions.

The work mode questions asked were:

• How is your team’s workload after taking agile into use?
• How is your team’s performance after taking agile into use?
• How is your stress level after moving to agile?
• Is your team “empowered”?
• Does your team work at “sustainable pace”?
• Would you go back to the old way of working?

The work mode questions were multi-choice questions with both positive and negative options. The choices to questions were as follows:

Q1. How is your team’s workload after taking agile into use?

1 = There is more work, but it is not because of agile
2 = There is more work / more hectic because of agile
3 = There is workload balance / sustainable pace
4 = There is less work because better communication helps us optimize the solutions & content; we also do scope management
5 = There is simply too much work
6 = Agile has no impact to workload
7 = Other

Q2. How is your team’s performance after taking agile into use?

1 = Performance has decreased significantly
2 = Performance has decreased
3 = Performance has increased
4 = Performance has increased significantly
5 = Performance has improved and it is still improving
6 = Other

Q3. How is your stress level after moving to agile?

1 = Better because of agile
2 = The same
3 = Worse because of agile

\textsuperscript{4} Kruskal-Wallis H test results for Organization & Stress, Asymp. Sig. = 0.098; for Organization & Empowerment Asymp. Sig. = 0.853; for Agile background & Stress Asymp. Sig. = 0.059; for Agile background & Empowerment Asymp. Sig. = 0.077; for Non-agile background & Stress Asymp. Sig. = 0.003; for Non-agile background & Empowerment Asymp. Sig. = 0.105. Multisite team & stress Asymp. Sig. = 0.871; Multisite Team & Empowerment Asymp. Sig. = 0.883; Multiple teams & Stress Asymp. Sig. = 0.130; Multiple Teams & Empowerment Asymp. Sig. = 0.002; Multisite project & Stress Asymp. Sig. = 0.632; Multisite project & empowerment Asymp. Sig. = 0.238; Externals & Stress Asymp. Sig. = 0.259; Externals & Empowerment Asymp. Sig. = 0.883; Maintenance & Stress Asymp. Sig. = 0.393; Maintenance & Empowerment Asymp. Sig. = 0.75. There is a significant relation between how long background the respondent has and stress with (H= 18.011, 5 d.f., P < 0.05). Here, the 23% group that thinks work mode and stress are not related is omitted from statistical test. (If this group would not be omitted the result would not be significant with Asymp.Sig. 0.062.) There is also a significant relation in a project having multiple teams and empowerment with (H=9.166, 1 d.f., P < 0.05).
4 = Not related to agile methods

Q4. Is your team “empowered”?
1 = Yes
2 = No

Q5. Does your team work at “sustainable pace”?
1 = Yes
2 = No

Q6. Would you go back to the old way of working?
1 = Yes
2 = I do not know
3 = No
4 = I do not know as I have never worked with non-agile methods

The distribution of responses to each question are listed in Section 3.1; see Figures 3.1, 3.2, 3.3, 3.4, 3.5, and 3.6 respectively.

The quantitative analysis done is based on the Kruskal-Wallis H test [17]. This test is a nonparametric test that does not assume normality. It tests the equality of population medians among the groups. Instead of using the variance, it is replacing the actual values with ranks — otherwise it is identical to the one-way ANOVA (analysis of variance) parametric test. The Kruskal-Wallis H test is like the Mann-Whitney U test, but it can be used with multiple values where the Mann-Whitney U is limited to nominal variables with only two values.

It is assumed in the Kruskal-Wallis test that the observations in the data set are independent of each other and that the observations must be drawn from the population by the process of random sampling.

3. Results of the Survey

This section presents the responses to the wellbeing survey in detail. As a summary, the feedback towards agile methods was very positive:

- When people were asked about the workload with seven answer options, the biggest respondent group, i.e. 29% felt they were working with sustainable pace.
- The majority (64%) of respondents felt their performance had increased.
- Of those who stated that changing to use agile methods had impacted their stress level, a slightly larger group — 12% larger — stated that the impact had been positive.
- When simply asked if the respondents were working with sustainable pace with only Yes or No options, a clear majority (82%) felt their team was working with sustainable pace. The same is true also with empowerment as almost as many (71%) felt their team was empowered.
- 55% of respondents would like to stay working in agile way, and only 12% would like to go back to traditional way of working.

The next sub-sections are looking into each of these findings more specifically.

3.1 How is Your Team’s Performance after Taking Agile into Use?

![Figure 3.1 How is your team’s performance after taking agile into use? Responses in percentages.](image)

Sixty-four percent of the respondents felt that performance has increased, 10% stated the opposite, and 26% selected “Other”, commenting that agile and performance are not related.

See Figure 3.1.

3.2 How is Your Team’s Workload after Taking Agile into Use?

Twenty-nine percent of respondents felt they were working with sustainable pace, 25% stated that agile has no impact on workload, and only 7% reported on
using scope management. Twelve percent stated they work more hectically because of agile methods. See Figure 3.2.

Figure 3.2 How is your team’s workload after taking agile into use? Responses in percentages.

3.3 How is Your Stress Level after Moving to Agile?

Twenty-seven percent of respondents stated that their stress level was better because of agile, while 15% said they felt worse. See Figure 3.3.

Figure 3.3 How is your stress level after moving to agile? Responses in percentages.

3.4 Is Your Team Empowered?

Seventy-one percent of respondents felt their team was empowered, while 30% thought their team was not. See Figure 3.4.

Figure 3.4 Is your team empowered? Responses in percentages.

3.5 Would You Like to go Back to Old Ways of Working?

Fifty-five percent of respondents would have liked to stay in agile mode, while 12% would have liked to go back to traditional waterfall model, see Figure 3.5.

Figure 3.5 Would you like to go back to old ways of working? Responses in percentages.

3.6 Does Your Team Work with Sustainable Pace?

Eighty-two percent of respondents felt their team was working with sustainable pace, while 18% thought their team was not. See Figure 3.6.
4. Analysis of Results

1.1. Kruskal-Wallis H Test for Sustainable Pace and Performance

The relation of sustainable pace and performance increase was studied with the Kruskal-Wallis H test. With the Kruskal-Wallis H test the mean ranks of samples from the populations are expected to be the same, i.e.:

\[ H_0: \mu_1 = \mu_2 = \mu_3 \]

\[ H_A: \mu_i \neq \mu_j \]

For this test we are omitting the 26% group who answered “Other” (i.e. with free text answer) — most of them stated that their performance is not related to agile methods.

Figure 4.1 illustrates the performance improvement after agile methods had been taken into use grouped against the sustainability of the team working mode.

The mean ranks in Table 4.1 indicate that teams that were working with sustainable pace had increased their performance more than those who did not work with sustainable pace.

From Table 4.2 we can see that the means of the two groups are unequal and that the mean of the group that was working with sustainable pace is higher (so their performance had increased more). This result is significant with (H= 6.208, 1 d.f., P < 0.05).

<table>
<thead>
<tr>
<th>Sustainable pace</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>159.44</td>
</tr>
<tr>
<td>No</td>
<td>127.95</td>
</tr>
<tr>
<td>Total</td>
<td>137</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.208</td>
<td>1</td>
<td>0.013</td>
</tr>
</tbody>
</table>

4.1 Kruskal-Wallis H Test for Stress and Empowerment

The research question that stress and empowerment are not connected was tested with the Kruskal-Wallis H test. For this test we are omitting the 23% group who answered “Not related to agile methods” as in Kruskal-Wallis H Test the survey answers need to be ordered.6 Figure 4.2 shows the stress levels in the empowered and non-empowered teams.

<table>
<thead>
<tr>
<th>Empowered</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>161.85</td>
</tr>
<tr>
<td>No</td>
<td>226.30</td>
</tr>
<tr>
<td>Total</td>
<td>357</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.714</td>
<td>1</td>
<td>0.000</td>
</tr>
</tbody>
</table>

5 d.f. = degree of freedom

6 However, the survey response “Not related to agile methods” has numerical value of 4, i.e. it is the biggest of all response options. "Worse because of agile" has 3, “The same” has 2 and “better because of agile” has 1. When it is included in Kruskal-Wallis H Test, the result is significant with (H= 27.301, 1 d.f., P < 0.01).
The mean ranks in Table 4.3 indicate that empowered teams are more likely to have less stress because of agile. Table 4.4 shows that the differences are significant.

From the results we can see that the means of the two groups are unequal and that the empowered teams are more likely to have less stress. This result is significant with ($H=27.301, 1\text{ d.f.}, P<0.01$).

**Figure 4.1** Performance opinions grouped by whether or not the team works with sustainable pace in percentages.

**Figure 4.2** Stress level opinions grouped by whether the team is empowered or not represented in percentages.

**Figure 4.3** Stress levels by work mode in percentages.
4.2 Kruskal-Wallis H Test for Stress in Kanban and Scrum Teams

Figure 4.3 illustrates the stress levels and work mode relation. The question if feelings of stress were similar in Kanban and Scrum teams was tested with the Kruskal-Wallis H test.

Again, we omit the group of 23% who think that stress and agile methods are not related are omitted from the Kruskal-Wallis H test. The mean ranks in Table 4.5 indicate that Kanban teams might have slightly less stress, but Table 4.6 shows that these differences are not significant.

The results indicate that no significant difference was found on respondent’s feeling of stress based on which agile method they used.7

Table 4.5 Mean ranks of stress levels in different teams.

<table>
<thead>
<tr>
<th>Teams way of working</th>
<th>Stress level after moving to agile N</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrum</td>
<td>144</td>
<td>162.07</td>
</tr>
<tr>
<td>ScrumBUT</td>
<td>136</td>
<td>171.85</td>
</tr>
<tr>
<td>Scrumban</td>
<td>37</td>
<td>183.69</td>
</tr>
<tr>
<td>Kanban</td>
<td>16</td>
<td>133.94</td>
</tr>
<tr>
<td>Total</td>
<td>333</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6 Kruskal-Wallis test statistics, grouping variable: team’s way of working.

<table>
<thead>
<tr>
<th></th>
<th>Stress level after moving to agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>4.197</td>
</tr>
<tr>
<td>df</td>
<td>3</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>0.241</td>
</tr>
</tbody>
</table>

4.3 Kruskal-Wallis H Test for Empowerment in Kanban and Scrum Teams

The research question if Kanban and Scrum teams felt equally empowered was tested with the Kruskal-Wallis H test. Figure 4.4 shows the empowerment and work mode.

The mean ranks in Table 4.7 indicate that Scrum teams are likely to feel more empowered than Kanban teams, but table 4.8 shows that this difference is not significant.

The results indicate that no significant difference was found between respondents’ feeling of empowerment depending on their use of Scrum or Kanban after transition to agile methods.8

Figure 4.4. Team Empowerment (Yes / No) by work mode (Kanban / Scrumban / ScrumBUT / Scrum).

Table 4.7 Mean ranks of empowerment in different teams.

<table>
<thead>
<tr>
<th>Empowered</th>
<th>N</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team’s way of working</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scrum</td>
<td>181</td>
<td>100.88</td>
</tr>
<tr>
<td>Kanban</td>
<td>22</td>
<td>111.18</td>
</tr>
<tr>
<td>Total</td>
<td>203</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.8 Kruskal-Wallis test statistics, grouping variable: team’s way of working.

<table>
<thead>
<tr>
<th></th>
<th>Empowered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>1.348</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>0.246</td>
</tr>
</tbody>
</table>

5. Discussion

5.1 How are Over-commitment, Stress, and Performance Related?

In the absence of more objective measures of empowered teams and productivity, we can see how the reported stress levels compare to subjective opinions of teams’ performance. Figure 5.1 shows

7 The result would be the same with Asymp. Sig. 0.766, even though you would include also the group that think stress and agile methods are not related.

8 This test was also repeated with Scrum and ScrumbUT teams, and it was discovered that this difference was significant — Scrum teams felt more empowered (H=21.571, 1 d.f., P < 0.01).
these data. From the graph we can see that respondents who said that their stress level is the same or better are also mostly those who also stated their teams’ performance has increased or is still improving. These are people who seem to benefit from working in agile mode.

It would be worth of studying what leads to high performance with less stress. Scrum suggests continuous improvement as one answer. It could also be that these teams work with better tools than other teams. E.g. Kokko [19] has suggested that a well-working and jointly maintained Continuous Integration system improves the team’s and project’s productivity and speed of execution.

![Figure 5.1 Stress level opinions grouped by performance.](image1)

There were 5 respondents who stated that their performance has decreased and their stress level was worse because of agile. These were the ones who were clearly unhappy with agile methods. It would be interesting to know why.

![Figure 5.2 Stress level opinions grouped by if respondent would like to go back to traditional methods.](image2)

Figure 5.2 reveals that people who felt stressed because of agile methods are also over-represented among those who would have liked to go back to the old way of working.
Figure 5.3 Stress level opinions grouped by workload opinions.

Table 6.1 Summary of Research questions with results.

<table>
<thead>
<tr>
<th>Research question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Has performance has increased in all teams alike? Has sustainable pace anything to do with performance increase?</td>
</tr>
<tr>
<td>Q2. Do feelings of stress and team empowerment relate?</td>
</tr>
<tr>
<td>Q3. Do Kanban and Scrum teams feel similar stress, compared to traditional development?</td>
</tr>
<tr>
<td>Q4. Do Kanban and Scrum teams feel equally empowered, compared to traditional development?</td>
</tr>
</tbody>
</table>

Figure 5.3 shows that these feelings of stress are highly linked with the respondents’ workload: there seem to be teams that were able to work with sustainable pace and others that had not made this transition — i.e. they had higher stress and higher workload because of agile.

Combining the result from Section 4.1 — teams who were working with sustainable pace also had higher performance — it can be concluded that over-commitment will not lead to better results. There could be an alternative to over-commitment, high stress, and high workload. A different management style, which builds on empowered teams and working smarter, not harder, with high focus might lead to better results. Management theories exist about how to lead empowered organizations — our study suggests that some managers relying on traditional management methods might benefit from such training.

5.2 Limitations of the Study

The biggest limitation of this study is that it is purely survey-based and the real performance of teams was not measured. A survey like this cannot reveal other contributing factors outside the survey instrument that could have revealed in in-depth interviews.

The survey was done in one company (Nokia) only, so it might have been biased by the organization culture and the specific interpretation of agility. This raises question regarding external validity (i.e. how largely these results can be generalized).

This study was covering several organizational units in Nokia and various types of projects. Thus the expectation is that there is variation of project and sub-organization cultures and how agile has been interpreted and deployed. This suggests that the
results are more general, rather than specific to this one company. However, it is suggested that different companies and organizations would conduct related studies in order to validate our assumptions and the generality of these findings.

It is typical to measure stress with many latent variables. E.g. the Siegrist model uses two summary measures of work stress: imbalance, the ratio between extrinsic effort (demands on the job) and rewards (money, esteem, and status control), and over-commitment, a psychological coping style associated with the inability to withdraw from work obligations [20]. The Job Demands – Job Decision Latitude Model [21] is providing the scientific basis for studies on psychological stressors such as working long and hard compared to worker’s authority on making decisions on the job and variety of skills used by worker on the job. However, there are studies showing that subjective appraisals of work stress correlate more strongly with self-reported depression than objective studies of work conditions do [22]. Even though a more thorough study would be required to capture different perceptions regarding latent variables of stress, the perception cannot be totally neglected either. The fundamental principle of sociology, known as the Thomas theorem, states that "It is not important whether or not the interpretation is correct – if men define situations as real, they are real in their consequences" [23].

The Kruskal-Wallis H test measures the differences of medians among the groups. This study detected no differences in stress or empowerment variables between groups using Scrum and Kanban. This, however, does not mean that Scrum and Kanban teams are the same.⁹ On the contrary, it is suggested that further studies are conducted to study differences directly between Scrum and Kanban teams.

Also, because of the problems with the survey tool, the response percentage remains unknown.

6. Conclusions

In this study, four research questions related to wellbeing in agile teams were studied. Traditionally, wellbeing in software development teams has been seen as important but not as important as getting the products ready. Based on the results of our survey this kind of dualism may not have scientific support. In fact, it may be plausible that agile teams with high wellbeing actually have better performance. This is in alignment with previous studies of empowerment and performance [24].

The four research questions were studied using quantitative methods. First, we investigated if a team’s sustainable pace leads to better performance. This was supported by our survey results. Second, we discovered that empowered teams cope better with stress. Finally, no statistical difference was found in stress and empowerment between Scrum and Kanban teams. Table 6.1 presents a summary of the research questions with the corresponding findings.

The finding that empowered teams cope better with stress was no surprise and is aligned what psychologists have for a long time stated for individuals: that feelings of empowerment lead to better control of stress [24]. However, this to our knowledge has not been previously verified in software development and with Scrum teams.

It is notable that even when we asked about team empowerment, every person answered this survey individually, so people in the same team may have answered this question differently as they might have disagreed about their team being empowered or not. This could open further possibilities for research comparing teams instead of asking from individuals, or comparing the opinions of individuals within the same team.

The results regarding sustainable pace and better performance need further verification by real performance metrics done at the team level. One could always argue that subjective means like this survey do not reveal the real situation. Yet the high number of respondents (466) would make it unlikely that people would just reply to the survey to please the researcher. We believe that it is far more plausible that people have answered this survey because they saw the real situation in their everyday life. This means that organizations should take agile coaching far more seriously than what they have done so far, as it is very important to help teams and managers to transform from over-committing, stressful, and un-performing working mode to sustainable, less-stressful, and better-performing mode.

⁹ Here, it should be noted that the questionnaire emphasis was set to "after taking agile into use". A study comparing Scrum mode directly to Kanban mode might give different results, and is suggested.
Last but not least, special attention needs to be given to the small population that felt worse because of agile and whose performance had also decreased. Is this because of a problem in the existing way how agile is deployed that could be corrected? What made them favor the traditional way of working? Is there anything we could have changed in the existing setting to make them feel better?

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References


