Utilizing Organizational Culture Assessment Instrument in Agile Software Development Context

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1 Introduction

Organization culture has a key role in agile software development (Misra et al., 2009). Being agile is not merely a set of tools and practices, first and foremost it is a mind-set. Shared mind-sets create a culture, a meaning inside a system of meaning (Deal and Kennedy, 1983; Sackmann, 1991). The importance of culture is emphasized by Version One’s annual surveys, which have for 3 consecutive years marked culture as one of the top 3 reasons of failing in adopting agile methods (VersionOne, 2010, 2009, 2008). In addition, according to their 2010 survey, ability to change cultural environment is the number one barrier to further adoption of agile methods (VersionOne, 2010). Despite the very apparent importance of culture in agile software development, culture is mainly an empty word in that context. There is very little literature examining agility from cultural perspective. In order to avoid challenges created by an incompatible organization culture, we need both methods to examine the current cultural environment and methods to change that environment.

Describing agility from a cultural perspective and diagnosing organization culture in agile software development form the focus of this research. This study adopts an instrumental approach to organization culture in agile software development and pilots a research setting based on the Organization Culture Assessment Instrument (Cameron and Quinn, 2005).

Currently the most popular agile software development method (VersionOne, 2010, 2009, 2008) Scrum is examined in this research, which pilots a modified version of Organization Culture Assessment Instrument in Scrum context. During this study a scrum-team was observed during several events and team members were interviewed in order to depict how they perceive freedoms and views to change promoted by agile software development. These observation are used to examine the Organization Culture Assessment Instrument, to which the team members also replied.

In Chapter 2 agile software development is depicted through the analytic lens of organization culture. Also, tools for using the lens are provided. The research context...
is described in Chapter 3. The research design and procedures are presented in Chapter 4. Results of the study are shown in Chapter 5. And finally Chapter 6 summarizes this study.

2 Cultural Perspective

Agility is a cultural phenomenon. This chapter first presents the analytic lens of organization culture in Section 2.1. Then agile software development is depicted through the concept of organization culture in Section 2.2. Section 2.3 presents research approaches used to examine organization culture and in Section 2.4 one such method, the Organization Culture Assessment Instrument, is presented in detail.

2.1 Organization Culture

The word and concept of organization, as well as organization culture, has multiple meanings. In this research organizations are viewed as "socially constructed systems of meaning" (Barley, 1983). Sackmann (1991) presents culture as "beliefs commonly held by a group" and Deal and Kennedy (1983) as a set of common assumptions, beliefs, artifacts, and language patterns that are passed from generation to generation. However, Ajiferuke and Boddewyn (1970) note that there are as many meanings to the word culture as there are people using the word.

The ambiguity in the concept of culture is also present in the concept of organizational culture, as it is based on the former. However, as organizations are socially constructed systems of meaning, organization culture consists of the shared meaning. Schein (1984) defines organization culture as

\[
\text{the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.}
\]

In the center of this definition are the underlying basic assumptions, which Deal and Kennedy (1983) describe as "the way we do things around here". The basic assumptions, the deeply shared meanings, are taken for granted and thus are not present in individuals awareness (Schein, 1984).

Schein (1984) builds values on top of the basic assumptions, and manifestations of a culture on values. This three-tier-model is presented in Figure 1. Only very little of the culture is visible above the waterline, most of it remains submerged for the naked eye. Sackmann (1991) provides a metaphor for understanding the importance of cultural values and basic assumptions: pyramids can be found in Egypt and Mexico, but they serve in two very different meanings. Ones were used as tombs and the others for worshipping the sun. Without knowledge of the values and basic assumptions, it is impossible to decipher the actual meaning.
In addition to ambiguity of organization culture, it is often confused with corporate culture. According to Sathe (1983) corporate culture can mean unit or division culture in addition to the culture shared by the whole company. Taking that viewpoint into account, the confusion is unsurprising. As this research defines organization independently from a company, the term corporate culture should not be confused with organization culture in the context of this study.

Management studies often mention united and strong company cultures. Martin (1992) presents three different views to organization culture: integration, differentiation and fragmentation. Integration view assumes that an unified culture exists. Differentiation view acknowledges the existence of multiple subcultures and fragmentation view questions the existence of any shared culture. (Martin, 1992)
2.2 Agile Software Development as Cultural Concept

Responding to change and creating change for others to change is a central idea of different software development methods placed under the term agile software development (Highsmith, 2002). Ability to respond to change requires many levels of freedom (Boehm and Turner, 2003). These two concepts, change and freedom, are also reflected in the Agile Manifesto\(^1\), which states that responding to change is valued over following a plan and that individuals and interactions are valued over processes and tools.

Following the idea of the Agile Manifesto this research utilizes a competing values approach to study agile software development from a cultural perspective. In order to reach competing values for adapting to and creating change and many degrees of freedom, this study turns into finding opposite values. Adapting to and creating to change is contrasted with merely following a long-term fixed plan and many degrees of freedom with external organizational control.

This study focuses on the Scrum-process (Schwaber and Beedle, 2002), where the working environment is highly team oriented. According to Schwaber and Beedle (2002), Scrum software development teams should be self-organizing. Moe et al. (2008) connect the concept of self-organizing in Scrum-process to different levels of autonomy, which fall under the concept of many degrees of freedom in this research. Autonomy occurs in different levels of an organization, organizational level, team level and individual level, to use the distinction used by Moe et al. (2008). van Mierlo et al. (2006) further examine the constructs of autonomy in different levels of the organization and find that these constructs are interlinked. They state that team level autonomy and individual level autonomy are not equal as constructs, but isomorphic.

The different organizational levels, from the concept of autonomy, bring the second analytical perspective to this study. As organization culture is used as a lens to study what shared meanings, artifacts and values are associated with competing values, these items can be shared with different levels of the organization. Thus, the interest focuses on how team’s members see their own team and the organization around that team. This view is illustrated in Figure 2. Furthermore, is the culture integrated over different

teams in the organization or do different teams have separate cultural views to the organization, in the sense as Martin (1992) introduces different views to culture. Also, do teams have distinctive internal cultures and how similar or different are the team level cultures between different teams. This discussion is closely linked with multiple levels of freedom and embracing change, which allows distinctive cultures to form. Organization culture offers a powerful analytical lens to the mentioned questions as shared meanings of different objects and concepts are on the focal point of culture.

2.3 Examining Organization Culture

As culture consists of unconscious components, it is difficult for an outsider to decipher it. This raises the question how such an elusive phenomenon can be examined. Ouchi and Wilkins (1985) divide empirical work in the domain of organization culture into three categories: holistic studies, semiotic or language studies and quantitative studies. Holistic studies, according to Ouchi and Wilkins (1985), follow the ethnographical tradition of Radcliffe-Brown (1952) and Malinowski (1978). van Maanen (1973) is an example of this category with his ethnographic study of a police organization.

Barley (1983), in his semiotical study of a funeral home, depicts the semiotic tradition as study of signs and systems of signs. Semiotics concerns the principles by which events, words, behaviors and objects carry meaning to the community (Barley, 1983). He gathered information with a multitude of interviews and observations, and analyzed the meaning of previously mentioned targets of signification. Geertz (1994) uses the term thick description of an ethnographical form that is extremely sensitive to symbols, to their context and to how they are interpreted. The objective of the semiotical approach is to gain access to the conceptual environment in which the subjects of the study live in and have an ability to converse with them (Geertz, 1994). Ouchi and Wilkins (1985) note qualitative studies by presenting the usage of surveys and content analysis methods in organization culture studies.

Holistic studies, based on ethnographical methods, are very time-consuming and thus hard to apply for diagnosing current organization culture. Even though semiotic studies, as Geertz (1994) shows, can make use of an ethnographical or ethnomethodological approach and can be subjected to the same criticism as holistic studies in terms of time consumption, they can also be carried in less time consuming way as Barley (1983) shows. In terms of time consumption, or to be more exact, fieldwork time consumption, a questionnaire based approach provides a convenient way. One questionnaire-based method is examined more in Chapter 2.4. However, it should be noted that levels of analysis can be vastly different between questionnaires and Geertz’s thick description. Ouchi and Wilkins (1985) also report studies using a mixed-method approach, which combine quantitative and qualitative instruments in examining organization culture.

2.4 Organizational Culture Assessment Instrument

Cameron and Quinn (2005) present an Organizational Culture Assessment Instrument (OCAI) for examining organizational culture by using a survey. The OCAI is a question-
naire based instrumentalization of the Competing Values Framework (CVF) by Quinn and Rohrbaugh (1983). The CVF was originally created as an organizational effectiveness criteria. According to Quinn and Rohrbaugh (1983), it contains three dimensions. The first dimension, the horizontal axis, divides organizational focus by contrasting internal dynamics orientation against outward external environment orientation. The second dimension, the vertical axis, consists of organizational preference to interest in stability and control in contrast with flexibility and change. The third dimension contrasts means and ends, processes versus final outcomes. However, the OCAI does not utilize the third dimension and thus the OCAI has internal versus external and control versus stability dimensions (Cameron and Quinn, 2005). (Quinn and Rohrbaugh, 1983)

![Diagram of OCAI]

Figure 3: Visual characterization of the OCAI, adopted from Cameron and Quinn (2005), Goodman et al. (2001), Helfrich et al. (2007), Kalliath et al. (1999), Quinn and Rohrbaugh (1983) and Quinn et al. (1991).

The two dimensions of the OCAI define four quadrants. Cameron and Quinn (2005) name these quadrants clan, adhocracy, market and hierarchical cultures. These cultural categories are illustrated in Figure 3, along with a brief categorization of each cultural type. A hierarchical culture emphasizes formal coordination, centralized decision making and authority. It values stability and predictability. Rigorous, precise, predictable, organized and clear can be used to describe a hierarchical culture. A market culture emphasizes productivity, efficiency, measurable outcomes and clear goals. An adhocracy
culture emphasizes growth, innovation, flexibility, risk taking, commitment and being in the leading edge. An adhocracy culture creates a dynamic, creative and entrepreneurial workplace. Individual initiative and freedom are also valued. A clan culture, or sometimes called a group culture, is a friendly place where people share a lot of themselves. Broad participation, teamwork, consensus, decentralized decision making and loyalty are parts of a clan culture. Human resource development is an integral focus of a clan culture. (Cameron and Quinn, 2005; Helfrich et al., 2007; Goodman et al., 2001; Quinn et al., 1991; Zammuto and Krakower 1991 via Goodman et al. 2001)

As each of these cultures is embedded in a particular set of competing values the cultures are polar-opposites with contrasting emphases (Quinn and Rohrbaugh, 1983). This polar-opposite setting illustrates conflicts or competing values of organizational life, we want organizations to be adaptive and flexible, but at the same time stable and controlled (Quinn et al., 1991). In such highly polarized view it has to be noted that the cultural types are not mutually exclusive. On the contrary, these opposites are mutually existing (Quinn et al., 1991). Goodman et al. (2001) mark that the framework "makes it explicit that an organization needs to embrace elements of each of the four cultures." Moreover, Quinn (1990, via Goodman et al. (2001)) notes that overemphasis on particular culture can cause organizational dysfunctionality.

3 Study Context

The studied Scrum-team was part of a mid-size software company. The company had multiple internal units which are here called departments. The studied scrum team was part of one of these departments. The department had also other Scrum-teams and other teams, as did the other departments. The studied team had a past of rather independent team working on niche products, but it was also in close communication with other teams within that department as well as with teams from other departments.

The team consisted of 8 people engaged in software development and testing activities, 2 product owners and one team manager. The team had recently, 2 weeks before this study began, undergone an internal change. For nearly two years they had worked as internally two separate teams, but now they had joined their efforts. Before working as internally separate teams they had been working as one single team for a long period. All of the team members had a long experience with agile software development methods and they all had ScrumMaster training. The respondents had worked on average 3.9 years within the current team and 6.3 years within the company.

4 Research Methods

The focus of this study is to be a descriptive case study (Yin, 1994) as the purpose of this study is both to uncover perceptions of agile software development and to pilot the research design. A single-case design (Yin, 1994) was used to approach this focus. The case study included a survey (Section 4.1), interviews, (Section 4.2), and observations, which are explained in Section 4.3.
4.1 Survey

A link to an electronic survey form was sent to the members of the studied team. A total of 11 invitations to participate the survey were sent. The survey consists of five sections. The first section gathers background information of how long the respondents have worked in the company, in their current team, the name of their current team and their position in the team or organization. The second section contains the OCAI questions and examines the current organizational culture setting. The statements were taken as presented by Cameron and Quinn (2005) and are presented in Appendix A. The third section consists of 5-point Linkert scale statements and two open ended questions. The statements capture respondents views on agile software development and are presented in Appendix B. The fourth section contains the same statements as the third section, but the context is an ideal agile software development organization, instead of the current organization. The fifth, and final, section contains two open-ended questions which collect information of the organizational context.

Means for each of the OCAI statements were calculated and combined to four sub-scales by further calculating means-of-means for first option of each question and so forth for all 4 options. Cronbach’s alphas were calculated to test inter-item consistency within each sub-scale (Nunnally et al., 1967). According to Nunnally et al. (1967) a value of 0.7 and above indicates acceptable validity for the sub-scales. The same procedure was used both in current organizational culture and ideal organizational culture for agile development. Analytical procedures for OCAI data are explained in more detail by Cameron and Quinn (2005). Two analytical contexts were used when analyzing the OCAI data, the product owners and team manager, and team members.

The statements of agile software development, Section 3 in the survey, was used to capture insight over three perspective. First, the section contains statements of freedom and change in agile software development in general. Second, there are team level statements of freedom and change, which aim to capture how individuals see their team. Third, statements concerning the organization have no specific definition whether organization means their current department or the whole company. This approach was chosen to gain possibility to examine the standard deviation of the statements and to compare the results against those of the OCAI. Means, medians and standard deviations were calculated for the statements, but no multivariate analysis techniques were employed during this study.

4.2 Interviews

The interviews were conducted in a semi-structured (Yin, 1994) manner. A total of two product owners, one team manager and six team members were interviewed. The interviews took place in the company premises and lasted from 20 minutes to over an hour. Eight of the interviews were made in Finnish and one in English.

The interview transcripts were first read twice through to obtain a general level understanding of the whole material. Next the transcripts where thematically encoded with a purpose to find sections that describe views towards adapting to change and
autonomy. Further on, narrative occurrences of common event, artifacts or objects were searched with an objective of semiotic analysis.

4.3 Observations

The study began by observing three retrospective meetings and one sprint planning meeting. The objective of this approach was to gain understanding of the organizational environment, what the team was doing and what kind of issues they were currently dealing with. This period lasted for three weeks in total and each meeting lasted from one to two hours. After the initial period the team was observed in their team room for one and a half weeks, from 4 to 6 hours per day. In addition to the initial observations one more sprint planning and retrospective were observed.

The retrospective meetings were recorded and are to be transcribed and subjected to narrative and comparative analyses. However, in the context of this study the information gained through the observations is mainly used as a tool of interpretation.

5 Findings

The findings of this study consist of two sources: the modified organizational culture assessment instrument and qualitative observations. The findings of the first instrument are presented in Section 5.1. Interview results are divided in two sections, to the view of the development team and to the view of product owners and team manager. The first one is presented in Section 5.2 and the second one in Section 5.3.

5.1 Positioning a Scrum-team with a Questionaire

<table>
<thead>
<tr>
<th>Current Culture</th>
<th>α_{current}</th>
<th>Ideal Culture</th>
<th>α_{ideal}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clan</td>
<td>25,30</td>
<td>0,142</td>
<td>35,76</td>
</tr>
<tr>
<td>Adhocracy</td>
<td>18,03</td>
<td>0,833</td>
<td>32,50</td>
</tr>
<tr>
<td>Market</td>
<td>23,03</td>
<td>0,745</td>
<td>17,73</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>33,64</td>
<td>0,852</td>
<td>14,02</td>
</tr>
</tbody>
</table>

Table 1 displays the general overview of all responses. Notable figures in the table are Cronbach’s α coefficients for current clan culture and ideal proportion of market culture. The especially low coefficient in current clan culture indicates that there has been extreme variation. As a general finding it should be noted that currently the team identifies the organizational context first and foremost as hierarchical, while they see that a mixture of clan and adhocracy would be the ideal situation.
From Table 2 we can see that the participants agreed very strongly with the first four statements that describe the need of many levels of freedom in agile software development. They also agreed with the following three statements, though not that strongly, stating that the team has enough team-level freedom. The respondents did not see organizational control impeding their operations, collaboration with stakeholders and other teams was not regarded completely without problems.

The data in Table 2 also shows that the team sees adapting to change and continuous improvement very important, while creating change for others to adapt is seen rather neutral. The fourth section statements shows that the team feels they improve and evaluate their practices continuously, while at the same time maintaining enough stability.

The team, only developers and testers, no product owners or team manager, has rather different perspectives of current organization culture in their department and an ideal organization culture in agile software development. This difference is illustrated in Figure 4. In ideal situation they value flexibility and balance between internal and external focus. Where as currently they see that the division has a hierarchical orientation with a slight shift towards internal focus.
<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Inverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to define work practices within the team is a central part of agile software development.</td>
<td>4.60</td>
<td>5.00</td>
<td>0.97</td>
<td>No</td>
</tr>
<tr>
<td>Ability to define and resolve problems within the team is a central part of agile software development.</td>
<td>4.60</td>
<td>5.00</td>
<td>0.52</td>
<td>No</td>
</tr>
<tr>
<td>Ability to operate as a self-organizing team (self-organization within the team) is a central part of agile software development.</td>
<td>4.70</td>
<td>5.00</td>
<td>0.48</td>
<td>No</td>
</tr>
<tr>
<td>Organizational culture that emphasizes collaboration and teamwork is central to agile software development.</td>
<td>4.60</td>
<td>5.00</td>
<td>0.52</td>
<td>No</td>
</tr>
<tr>
<td>We as a team have enough organizational freedom to define our work practices and methods.</td>
<td>4.20</td>
<td>4.50</td>
<td>1.05</td>
<td>No</td>
</tr>
<tr>
<td>We as a team have enough organizational freedom to define and resolve problems.</td>
<td>3.70</td>
<td>4.00</td>
<td>1.06</td>
<td>No</td>
</tr>
<tr>
<td>We have enough organizational freedom to work as a self-organizing team.</td>
<td>4.00</td>
<td>4.00</td>
<td>0.94</td>
<td>No</td>
</tr>
<tr>
<td>Current organizational culture emphasizes collaboration.</td>
<td>3.10</td>
<td>3.50</td>
<td>1.10</td>
<td>No</td>
</tr>
<tr>
<td>Collaboration with other teams is easy.</td>
<td>2.70</td>
<td>3.00</td>
<td>0.67</td>
<td>No</td>
</tr>
<tr>
<td>Collaboration with different stakeholders (individual stakeholders who are not part of your team) is easy.</td>
<td>2.50</td>
<td>2.00</td>
<td>0.97</td>
<td>No</td>
</tr>
<tr>
<td>Our organization places too much control over our team.</td>
<td>2.00</td>
<td>2.00</td>
<td>0.82</td>
<td>Yes</td>
</tr>
<tr>
<td>Our organization impedes our team from functioning in an agile manner.</td>
<td>2.70</td>
<td>2.00</td>
<td>1.34</td>
<td>Yes</td>
</tr>
<tr>
<td>Current organizational culture emphasizes individualism.</td>
<td>2.40</td>
<td>2.50</td>
<td>0.94</td>
<td>Yes</td>
</tr>
<tr>
<td>Adapting to external change is central in agile software development.</td>
<td>4.78</td>
<td>5.00</td>
<td>0.44</td>
<td>No</td>
</tr>
<tr>
<td>Agility is first and foremost about creating change for others to adapt to.</td>
<td>2.67</td>
<td>3.00</td>
<td>0.71</td>
<td>No</td>
</tr>
<tr>
<td>Continuous process and technical improvement is central to agile software development.</td>
<td>4.78</td>
<td>5.00</td>
<td>0.67</td>
<td>No</td>
</tr>
<tr>
<td>We as a team change our work practices and methods when we see a need to do so.</td>
<td>4.50</td>
<td>4.50</td>
<td>0.53</td>
<td>No</td>
</tr>
<tr>
<td>We as a team create change for other to adapt, instead of merely adapting to change created by others.</td>
<td>3.20</td>
<td>3.50</td>
<td>1.14</td>
<td>No</td>
</tr>
<tr>
<td>We as a team continuously evaluate our work practices and methods.</td>
<td>4.00</td>
<td>4.00</td>
<td>0.47</td>
<td>No</td>
</tr>
<tr>
<td>We as a team continuously attempt to improve our work practices and methods.</td>
<td>4.10</td>
<td>4.00</td>
<td>0.99</td>
<td>No</td>
</tr>
<tr>
<td>Current organization culture supports our team in working in a changing environment.</td>
<td>3.10</td>
<td>3.00</td>
<td>0.99</td>
<td>No</td>
</tr>
<tr>
<td>Current organizational rules and policies prevent our team from implementing changes that we see necessary.</td>
<td>3.50</td>
<td>4.00</td>
<td>1.18</td>
<td>Yes</td>
</tr>
<tr>
<td>Our team does not have enough stability.</td>
<td>2.60</td>
<td>2.50</td>
<td>0.70</td>
<td>Yes</td>
</tr>
<tr>
<td>Our team lives in a continuous change that creates a nonsupporting working environment.</td>
<td>1.89</td>
<td>2.00</td>
<td>0.60</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Product owners and team manager on the other hand, Figure 5, have a different perspective than the team. According to them current and ideal situations are quite near each other, with only a slight shift from hierarchy towards adhocracy culture. The preference of flexibility over control is not as clear as it is with the team members. In addition, where the team members are balanced between internal and external focus, the product owners and team manager slightly prefer internal orientation.

5.2 Team Members Perspectives

All team members share the same perspective that the team has a lot of freedom and has been functioning in a rather autonomous way. They mentioned different contexts for the autonomy: work practices, tools, development directions for the software and technical decisions. The most coherent perspective was in the context of work practices and tools, some did not even mention it without explicit questions as they took it for granted in their team. In addition, freedom to choose tools and work practices was the most important one according to team members. One interviewee described that "we live in our own bubble", another stated "we have been kinda independent from the
rest of the organization” and many stated that the team has a lot of freedom in the organization.

A team member explained the origins of the autonomy by stating:

In the beginning everyone had a little bit of a feeling that do we dare to do these things by ourselves. Then when [we] got more courage and stepped outside the circle that one had drawn on the ground for himself, lets do and implement by ourselves. Let’s not wait for [a support functionality].

Another one acknowledged that the organization in fact does place a lot of limitations, but despite those limitation they have chosen their own way:

if we like wanted to do everything the same way the others do, we would apparently have quite a lot of limitations.

Those who talked about origins of the team’s freedom shared the same idea that the organization had not explicitly given the team special freedoms, they simply began operating in their own way.

However, while a few stated that ”who wouldn’t like freedom”, many felt that the organization did not care about what they do. One interviewee stated:

Now it feels sometimes a bit like it doesn’t matter what we do

While an other interviewee thought that the lack of interest is only an idea shared within the team:

we have always had an impression that nobody cares what we do, but on the other hand as our team has a reputation of being a very good team, or like that, then apparently to some extent people are interested and following us.

The team has received feedback from their customers, but some of the team members doubted their importance to the organization. However, the doubt was not totally shared, some rationalized that silence can also be a good thing; “I guess we have done something right”. Also, they wanted to be a more integral part of the organization, at least on an individual level. One team member explained how the importance of the items that his team is doing seems in the company perspective:

Organization always goes like it’s that [their team name], we don’t want to waste any valuable resources on that.

The content of their work was a common explanation for the lack of organizational feedback, or as one interviewee expressed that there were bigger fires burning around the building.

When asked how the organization could show more interest on the items that the team works on, many started balancing between autonomy, control and feedback. One developer stated:
Of course the risk is that when the organization gets more interested, they get more nosy and try to control you more.

All of the interviewed team members agreed that feedback would be a notion of organizational importance.

The team’s departmental environment had not changed in any way that would have affected the teams internal ways of working. Biggest notions were the introduction of certain processes that concerned agile software development, but even in those situations the internal change was to simply begin calling a certain artifact with a different name. The interviewees saw these changes as very minor.

The same applied to changing requirements, nobody said that it is something special, it was the way of life. They were doing one week iterations and one developer explained his view:

...when the sprint has been started, then it will go all the way to the end. At that time the world is fixed.

This was an idea shared throughout the team, although some said that it would be useful to have a rough level idea of the issues that the team will be likely to work on in the near future.

5.3 Product Owners and Team Manager

Product owners and the team manager agree that the team has a certain amount of autonomy. One sees the fact how they design stories as the key to autonomy from his perspective:

Yes it’s you know very free. The organization does not set any major impediments for us. [...] I think that the key to the freedom is that [from his perspective] the stories are planned in such way that external dependencies are kicked out of them.

An other describes the technical dependencies to other teams:

as technically we depend on what other teams do, but on the other hand this team has been very free to do own decisions. [...] But on the fact that how we do, there is a lot of freedom.

Thus there is some difference in the views to team autonomy, one saw the technical dependencies as manageable, while an other merely stated the dependencies as a fact.

One of the interviewees described a discussion, which took place with the team, where they discussed whether the team could the team release directly to their customers or does the delivery have to go through other teams before reaching the customer. He said that the team acknowledged the value produced by other teams through which the release went, but still wanted to deliver directly to the customer. He stated that the team’s view on their own freedom shrieked as they could not deliver directly to their customers.
When asked about whether the team got appropriate feedback from the rest of the organization one interviewee explained that there is a problem with the department. The rest of the organization has a negative view on their department which might interfere with getting feedback to the team.

An other saw the lack of feedback as an company wide problem, not a special issue of their team only. He explained that they experience the issue strongly due to their autonomy:

*It seems [the lack of feedback] as our special feature as we are there in our own box.*

But an other interviewee saw a positive side on the fact that other teams have begun to use the same practices as the observed team. He stated:

*It’s like one clear credit that one can see that what we do is spreading to other places.*

According to the interviewees the team was extremely able to adapt to change. One said that accepting that what they do is creative work, no day is like the other, is a key factor. However, views towards the company in general were not as flexible. The company was described somewhat change resistant and manager oriented, which according to the interviewees were not part of agility.

## 6 Summary

The shared meaning provided by the analytic lens of organization culture is a core concept in this study. The shared meaning is a central concept in the context of agile software development, people who do not share a culture are less likely to work as a high performing team. Agility was simplified to the idea of adapting to change and creating change for others to adapt. This idea was augmented by Scrum’s concept of self-organizing teams. This created two competing values, consisting of control versus flexibility and merely following a plan versus adapting to change.

It is questionable whether a survey instrument can capture the elusive phenomenon of organization culture. The literature on empirical organization culture research shows an anthropologically oriented tradition. Organization culture has often been examined using ethnographical or ethnomethodological approaches. On the one hand the usage of these traditions has been well argued in the literature. On the other hand these methods require field procedures that take several months or years to complete. For a diagnostic tool that is simply too much. Thus we turned to quantitative methods, specifically to the organization culture assessment instrument. This was a natural choice as it is based on a competing values approach, very similar to our conceptualization of agility. It should be noted that the OCAI’s internal versus external axis is not the same concept as adapting to change versus following a plan in this study. However, external orientation and adapting to change do share a similar idea, while internal orientation and merely
following a plan do not. Thus, it is justifiable to claim that OCAI can be a valuable diagnostic tool in the context of Scrum.

The single team research setting in this study does not fully create the need for the OCAI instrument, as more interesting question is how different teams see the same organizational context. Nevertheless, important lessons were learned. The organizational context that is used with the OCAI must be somewhat meaningful for the teams. In this case the team did not take the chosen organizational context as a very meaningful one, they had a lot of communication outside their department and their department was not very visible in everyday life. Though this yields that departmental culture is unlikely to form as it is not a very meaningful context. Further on the team thought they were rather exceptional or unique within the department, which supports a distinctive team subculture.

According to the OCAI instrument the team felt that the organization was too hierarchically and controlled in comparison to an ideal agile organizational environment. This finding was supported by the qualitative inquiry, they saw that their life would be worse if they followed the organizational rules and limitations. Some of these rules were company wide, not departmental. Despite the limitations the team had chosen their own way and was very happy with it. This emphasizes the importance of different analytical perspectives, team level and organization level cultures were rather different. The team had very different assumptions for themselves and for the organization.

The team autonomy did not come without a cost. Team members were rather unsure of their organizational importance. As they had the chance to do their work their own way they were not sure whether their work mattered to the company as a whole. This yields that autonomy should be balanced with support and feedback. The same result is shown with the OCAI instrument as a careful balance between clan and adhocracy cultures. The latter highlights innovation, creativity and entrepreneurship, while the first underlines teamwork and cohesion. The clan culture has a mentoring and supportive approach, which is in line with the need of feedback.

The two presented groups had different OCAI profiles. The interviews showed that the two groups saw the environment differently and were in contact with different people. Still nobody mentioned this difference during the interviews. On the contrary, product owners and team manager were praised by the team and vice versa. It should be noted that all of them had a sense of being part of the same group. Even though the team used to consist of two sub-teams.

No apparent explanation was found for the low validity of the current clan culture value provided by the OCAI. It is even more curious as the other three cultural types had a decent validity according to the alpha coefficients. This anomaly should be subjected to multivariate analysis within the OCAI statements.

The research method should be further validated in a multi team context. In addition to the domain of agile software development, the OCAI instrument might also provide a valuable tool to lean software development.
References


A Organizational Culture Assessment Instrument Form

A.1 Dominant Characteristics
Distribute 100 points among following options.

- The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.
- The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.
- The organization is very results-oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.
- The organization is a very controlled and structured place. Formal procedures generally govern what people do.

A.2 Organizational Leadership
Distribute 100 points among following options.

- The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.
- The leadership in the organization is generally considered to exemplify entrepreneurship, innovation, or risk taking.
- The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.
- The leadership in the organization is generally considered to exemplify coordinating, organizing or smooth-running efficiency

A.3 Management of Employees
Distribute 100 points among following options.

- The management style in the organization is characterized by teamwork, consensus, and participation.
- The management style in the organization is characterized by individual risk taking, innovation, freedom, and uniqueness.
- The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.
- The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships
A.4 Organizational Glue

Distribute 100 points among following options.

- The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.
- The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.
- The glue that holds the organization together is the emphasis on achievement and goal accomplishment.
- The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.

A.5 Strategic Emphases

Distribute 100 points among following options.

- The organization emphasizes human development. High trust, openness, and participation persists.
- The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.
- The organization emphasizes competitive action and achievement. Hitting stretch targets and winning in the marketplace are dominant.
- The organization emphasizes permanence and stability. Efficiency, control, and smooth operations are important.

A.6 Criteria of Success

Distribute 100 points among following options.

- The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.
- The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.
- The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.
- The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.
B Additional Questions

Questions B.1, B.2, B.4 and B.5 are 5-point Linkert-scale statements. Questions B.3 and B.6 are open-ended.

B.1 Freedom versus control in agile software development

- Ability to define work practices within the team is a central part of agile software development.
- Ability to define and resolve problems within the team is a central part of agile software development.
- Ability to operate as a self-organizing team (self-organization within the team) is a central part of agile software development.
- Organizational culture that emphasizes collaboration and teamwork is central to agile software development.

B.2 Freedom versus control in my organization

- We as a team have enough organizational freedom to define our work practices and methods.
- We as a team have enough organizational freedom to define and resolve problems.
- We have enough organizational freedom to work as a self-organizing team.
- Current organizational culture emphasizes collaboration.
- Collaboration with other teams is easy.
- Collaboration with different stakeholders (individual stakeholders who are not part of your team) is easy.
- Our organization places too much control over our team.
- Our organization impedes our team from functioning in an agile manner.
- Current organizational culture emphasizes individualism.

B.3 Describe organizational freedom in your current team. In which cases have organizational freedom or control been discussed within your team?

B.4 Ability to change over merely following plans in agile software development

- Adapting to external change is central in agile software development.
• Agility is first and foremost about creating change for others to adapt to.
• Continuous process and technical improvement is central to agile software development.

B.5  Ability to change over merely following plans in my organization
• We as a team change our work practices and methods when we see a need to do so.
• We as a team create change for other to adapt, instead of merely adapting to change created by others.
• We as a team continuously evaluate our work practices and methods.
• We as a team continuously attempt to improve our work practices and methods.
• Current organization culture supports our team in working in a changing environment.
• Current organizational rules and policies prevent our team from implementing changes that we see necessary.
• Our team does not have enough stability.
• Our team lives in a continuous change that creates a nonsupporting working environment.

B.6  Describe change in your current team. What kind of issues have been present when you have discussed changing team practices, adopting to new environment or similar issues?