Survey of Agile Tool Usage and Needs

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***Abstract*—Today, little is known about what tools software companies are using to support their Agile methods and whether they are satisfied or dissatisfied with them. This is due to a lack of objective surveys on the subject. The surveys that have been made so far are of a subjective nature and have mostly been performed by tool vendors. They are very limited in number and focus mainly on company structure and adherence to a specific Agile method rather than on tool usage and needs. For this reason, many companies have difficulties to choose appropriate tools. One such company is Ericsson. To account for this lack of data, they have commissioned us to conduct an independent tool usage survey and evaluation. In this paper, we report on its first phase during which we made an objective survey of tool usage and needs as experienced by the software community today. The survey covers 121 responses from 120 different companies coming from 35 different countries. Our results show that the most satisfactory tool aspect is ease of use, whereas the least satisfactory one is lack of integration with other systems. Finally, our results provide a list of features that are most desired by the software companies today.**

Keywords- Scrum, XP, taskboard, physical wall, spreedsheets, Trac, Mingle, Version One, Rally, ease of use, flexinility, integration.

I. INTRODUCTION

Despite the multitude of the available tools supporting Agile methods today, little is known about what tool usage habits and needs software companies have. Neither is it known whether current tools adequately meet the industrial needs. This is due to lack of objective surveys aimed at Agile tool usage and needs. [1]

The lack of objective surveys creates problems for many companies willing to adopt an appropriate tool supporting their Agile methods. One such company is Ericsson, the Swedish telecommunications giant [2]. Having a complicated process with distributed teams and many customers, Ericsson has difficulties in choosing a tool that would support their current method needs. For this reason, they have commissioned us to objectively evaluate Agile tools that are currently available on the market.

To make an evaluation for Ericsson was not a trivial task. Due to the lack of objective reports, we had to make it in two phases. In *Phase I*, we made an objective survey of tool usage and needs as experienced and desired by the software community today. The goal was not only to gather objective statistics of tools usage and needs, but also to gain an understanding of the tool adoption from the perspectives of the companies. The results of this phase have provided input to *Phase II*, during which we have focused on Ericsson's needs [3].

In this paper, we report on the results of *Phase I*, during which, we made a survey of current Agile tool usage and needs. The survey covers 121 responses from 120 companies coming from 35 countries. It lists the most and the least satisfactory aspects of currently available tools and elicits information on tool needs as experienced by the software practitioners today.

The body of this paper is organized into six major sections. The next section, Section 2, describes the research steps of our study and the questions used in our tool survey. Section 3 presents related work. Section 4 presents the survey results. Finally, Sections 5 and 6 makes conclusions and suggestions for future work.

II. RESEARCH METHOD

In this section, we describe our research steps that have been taken during *Phase I* and the survey questions. They are presented in Sections II.1 and II.2, respectively.

II.1 Method Steps

Phase I was conducted in three main steps: (1) *Literature study*, (2) *Tool usage survey*, and (3) *Analysis of results*.

During the first step, we analyzed the existing literature and surveys on tool usage in the context of Agile development. We went through several libraries of world's largest educational and scientific computing societies such as IEEE, ACM, Springer, Pearson Education, Prentice Hall, and Addison Wesley. We even searched through less scientific sources such as websites, whitepapers, and published surveys. All in all, we only found three different surveys, two of which were conducted by tool vendors themselves [4, 6]. None of the surveys reported on the industrial tool usage needs. Instead, they focused on gathering statistics on company structure and adoption of Agile methods.

The result of the first step made us realize that we could not deliver any objective results to our acquirer. For this reason, we decided to conduct an objective survey by ourselves. The survey focused on the benefits and

drawbacks of the current tools being used and on extracting information about additional tool needs.

After having completed the survey, we made it available in a blog [7] using Google Docs [8]. To reach Agile professionals worldwide, we then spread it on different websites and web community groups. These included Agile-oriented groups in LinkedIn [9], Yahoo! Groups [10], Google groups [11], and various Agile fora and websites [12, 13].

As a result of the second step, we received 121 responses from 120 companies coming from 35 different countries. An IP address tracker script was embedded in the survey website, enabling us to track which countries the responses originated from. The majority of the responses came from United Kingdom. Sweden, Egypt, United States, France, Canada, India, Spain, Poland, Ukraine, Malaysia, Brazil, Netherlands, Romania, Italy, Australia, Germany. These responses provided good feedback on the positive and negative sides of currently used tools, as well as numerous comments regarding additional features as desired by our respondents. This step had resulted in the data to be presented in Section IV.

In the third step of our research, we analyzed the data gathered by means of our survey. First, we went through all the gathered free-form responses and structured these into groups. Using this along with the remaining data from the multiple-choice questions, we created a number of graphs and charts showing our results. As a last step, we made some of the basic data available and contacted all the respondent companies which wished to have access to our results. We also delivered the survey results to our acquirer. It is this data that is input to our next phase, *Phase II*, to be reported in [3].

II.2 Survey questions

Our survey consisted of two question parts. As shown in Table 1, the first part inquired about the name of the company, the roles of the respondents, the team types they had within their respective companies and the Agile methods they used. The second part of the survey inquired about the tools used by the respondents, their satisfaction and dissatisfaction with the tools, complementary features the respondents would like to be included in their Agile project management tools, and, finally, it provided space for additional comments.

TABLE I. TOOL USAGE SURVEY QUESTIONS

	Question
	Part I
1	**Company name:** What is the name of your company? *This field is required in order to avoid including repetitive responses from different representatives of the same company. The given information will be made anonymous and will not be published.*
2	**Role:** What is your role in the company?
3	**Team type:** What would best describe your development teams? Single selection checkbox: □ Small collocated teams, □ Large collocated teams, □ Distributed teams, □ Other *(free text option)*
4	**Agile method:** Which Agile method(s) does your company use? Multiple selection checkbox: □ Scrum, □ XP, □ Crystal methods, □ FDD, □ DSDM, □ Other *(free text option)*
	Part II
5	**Tools used:** Which tools do you use in your Agile development process? Multiple selection checkbox: □ MS Project, □ Spreadsheets (MS Excel or other), □ Physical wall and paper, □ Custom or in-house tool, □ VersionOne, □ Rally, □ ScrumWorks, □ ScrumDesk, □ Mingle, □ XPlanner, □ Agilo, □ ScrumNinja, □ ScrumPad, □ Agilefant, □ eXPlainPMT, □ Scrum'd, □ Other *(free text option)*
6	**Most satisfactory aspects:** Which aspect(s) of the Agile tool you are using are the MOST satisfactory? *If more than one tool is selected, this question refers to all the tools used together.* Multiple selection checkbox: □ Ease of use, □ Integration with other systems (bug tracking, etc.), □ Customizability, □ Availability of reports, □ Price, □ Other *(free text option)*
7	**Least satisfactory aspects:** Which aspect(s) of the Agile tool you are using are the LEAST satisfactory? *If more than one tool is selected, this question refers to all the tools used together.* Multiple selection checkbox: Usability, Lack of integration with other systems, Too many customization options, Lack of custom reports, Price, Other *(free text option)*
8	**Complementary features:** Which complementary features would you like to be included in your Agile project management tool? (Optional)
9	**Comments:** Do you have any other comments regarding tools you have used or are using in your teams? (Optional)
10	**Contact information:** If you would like us to get back to you with the survey results, please fill in your email address. (Optional)

The survey included a total of ten questions. We attempted to cover as much useful data as possible, while keeping the survey brief and simple. All questions with listed options enabled for the selection of more than one option, and a free-form '*Other'* option was also included in all cases. The questions inquired about the following information:

1. *Company name.* We requested that our respondents provided information about their respective companies. In this report, however, we keep it confidential. We used it only for ensuring that all the responses originated from distinct companies.
2. *Role.* We inquired about the respondent's role. The goal was to ensure that the responses come from the roles that are relevant for this study. Another goal was to find out which roles found our survey interesting.
3. *Team type.* Since team size and distribution plays an important role in the choice of Agile tools, we requested that our respondents identified the team type practices in their respective companies. Our goal was to differentiate between collocated and distributed teams in order to find out which tools were relevant for which team type. For example, in purely distributed teams, it might be impossible to work with physical walls for task planning.
4. *Agile method.* Since many Agile project management tools are targeted at specific Agile methods, we gathered data regarding the Agile methods used. This had helped us take an objective standpoint towards our results.
5. *Tools used.* This was the key question of our survey. Here, we tried to cover all possible tools that are currently available on the market. As can be seen in Table 1, it was possible to select among sixteen different choices. These included: (1) *MS Project*, (2) *Spreadsheets (MS Excel or other)*, (3) *Physical wall and paper*, (4) *Custom or in-house tool*, (5) *VersionOne*, (6) *Rally*, (7) *ScrumWorks*, (8) *ScrumDesk*, (9) *Mingle*, (10) *XPlanner*, (11) *Agilo*, (12) *ScrumNinja*, (13) *ScrumPad*, (14) *Agilefant*, (15) *eXPlainPMT*, (16) *Scrum'd*. This list of tools was chosen to include some very popular basic options (spreadsheets, walls and paper), and a random selection of Agile project management tools. It is interesting to note that after our survey was published, we were contacted by several companies, such as Hansoft and TinyPM, with a request to include their tool in the list. However, the list was not meant to be comprehensive and include all the most popular tools. Instead, it mainly represented a random selection to aid in filling out the survey. However, the respondents were given the opportunity to list additional tools via the '*Other'* free-form field.
6. *Most satisfactory aspects.* This question was included in order to find out what aspects of the tools were most valued. We listed the following five options: (1) *Ease of use*, (2) *Integration with other systems*, (3) *Customizability*, (4) *Availability of reports*, and (5) *Price*. The question also allowed for a free-form response via 'Other'. Our choice of these five reasons was based on the assumption that most companies use tools from third-party vendors, and we attempted to include reasons from the most problematic aspects of tool usage. *Ease of use* is an interesting aspect since off-the-shelf tools are not tailored for the usage needs of specific companies. *Integration with other systems* is meant to evaluate whether the used tools provide satisfactory integration options with other systems in place at the company. *Customizability* is specified to assess how flexible the tools are and how easy it is to adapt them to the company's needs. *Availability of reports* is probably the most problematic area, since tool vendors cannot predict all the types of reports that might be required by the company. The last option, *Price*, was included to discover whether the existing Agile project management tools are becoming too costly, and whether this is a hindrance for companies. Please note that since companies could select more than one tool, the satisfactory aspects provided by the respondents could relate to the combination of several tools.
7. *Least satisfactory aspects.* This question was included in order to find out what aspects of the tools were the most problematic or lacking. As in the previous question, it was possible to select '*Other'* and specify a free-form answer. We included the following five reasons as a predefined list: (1) *Usability*, (2) *Lack of integration with other systems*, (3) *Too many customization options*, (5) *Lack of custom reports*, and (6) *Price*. The options are the same as in the previous question, though some of them are renamed as a negative aspect. For example, *Customizability* is renamed to *Too many customization options.* Please note that since companies could select more than one tool, the least satisfactory aspects could relate to the combination of several tools.
8. *Complementary features.* This field was a free-form question enabling the respondents to specify if they had specific wishes for tool features.
9. *Comments.* This question enabled the respondents to write their thoughts on the subject of Agile tool usage. Though enabling free-form text responses makes it more difficult to analyze the survey results, we felt that this question would aid us to better understand the industrial needs.
10. *Contact information.* This optional question was used to gather email addresses of the respondents in order to send them the survey results. It was interesting to note that 86 out of the total 121 responses provided an answer for this question. This indicates that companies were interested in receiving a summary of the survey results.

III. Related Work

Altogether, we have only found three Agile tool surveys. As shown in Table 2, they all include questions regarding tool usage in companies using Agile methods. In contrast to our study, they did not focus on tool usage *needs*, but rather on gathering statistics such as company size, structure, and the Agile methods used.

TABLE II. THE THREE CASE STUDIES RELATED TO OUR STUDY

Survey	*4th Annual State of Agile Development*	*Agile Project Management (APM) Tooling Survey*	*Agile tools: the good, the bad, and the ugly*
Conducted by	VersionOne	TrailRidge Consulting	TargetProcess
When	2009	2006	2008
Respondents	2570 respondents from different countries	525 responses originating from companies in 39 countries	371 individuals requesting trial versions of TargetProcess
Main question groups	*- Surveyed person's position and experience in Agile* *- Agile methods and techniques used* *- Company size, number of separate sites/locations using Agile, number of outsourced projects* *- Agile adoption stage* *- Reasons for failed Agile projects* *- Further barrier and concerns for Adopting Agile* *- Reasons and consensus for adopting Agile* *- Benefits obtained from implementing Agile* *- Specific tool currently used*	*- Company location, size, number of separate sites/locations using Agile,* *-Agile method used* *-Tools used for requirements management, user stories and product backlogs* *-Tools used for iteration Planning and tracking* *-Tools used in test case tracking* *-Tools used in defect tracking* *-Reasons for selecting an APM tool.*	*-Project management tools used in the company (Free form question)*
Main contribution	Gathered detailed statistics of usage of Agile methods in companies: the different roles involved, number of teams and projects, benefits and drawbacks of using Agile development.	Detailed survey focusing on organization size, structure and distribution, types of tools used in different stages of development, reasons for selecting or not selecting Agile project management tools.	The TargetProcess tool vendor gathered tool usage data from companies requesting trial versions of its product.

One important omission from the existing surveys is that none of them seemed to make it possible to specify more than one tool, though, as our research showed later, most companies use more than one tool to support their processes.

None of the surveys provided opportunity to their respondents to provide comments in form of free text. Also, two of the three surveys were conducted by tool vendors, thus raising the question of their objectivity.

The first survey, called "*4th Annual State of Agile Development*" [4] was, incidentally, sponsored by *VersionOne* - one of the largest Agile project management tool vendors on the market [15]. It was conducted in 2009 and it included 2570 responses from different companies located in a large number of countries. The survey was very detailed, including information such as reasons for adopting Agile methods, resulting benefits, roles in the companies, company size, Agile techniques used, and so on. The part of the survey regarding tool usage, however, was rather scarce. As shown in Table 2, its questions focused mainly on the Agile adoption stage in the companies.

The main contribution of the "*4th Annual State of Agile Development*" survey was general statistics regarding the usage of Agile methods in companies, along with the reasons and benefits of adopting Agile methods. This survey is related to our work because it inquired about the tools the companies were using. However, the survey did not include questions on tool features. It was also unclear whether the survey allowed for the input of only one tool or several tools, even though in many companies, several tools could be used simultaneously [4]. Basic tools such as paper were not mentioned at all, although they play an important role in Agile development. The survey did not include any questions on the companies' satisfaction with their choice of tools. Neither did it address the good and bad aspects of these tools. Last but not least, the survey did not include space for comments on tool usage.

The second survey, "*Agile tools: the good, the bad, and the ugly*", is presented in a whitepaper written by the *TargetProcess* company in 2008 [15]. Its questions were presented to individuals requesting trial versions of the *TargetProcess* tool. As shown in Table 2, they mainly focused on Tools used in Agile projects. The total number of the responses they received was 371. Their summarized results are presented in Table 2. Further, the authors of the whitepaper discuss pros and cons of using different types of tools and present some basic tool adoption guidelines. [6]

This survey is related to our work since it includes a survey of Agile tool usage. However, given that the survey was directed solely to the individuals requesting the trial versions of *TargetProcess*, one could question *whether the surveyed respondents were an objective source of information*. Another issue we observed with this survey was that its questionnaire did not include choices to be ticked off, and respondents had to type in their answers. Because of this, many answers were not always easy to interpret. For instance, it was not clear what the answer '*None'* stood for: did it imply that no

TABLE III. SUMMARY OF THE DIFFERENT ROLES

Role Name	count	Role Name	count
Developer	23	Solution architect	6
Project manager	19	Product owner	6
Scrum Master	16	QA manager	5
Owner	10	CEO	3
Development director	9	Program manager	2
		Agile coach	2
Team leader	8	Managing director	2
Consultant	7	Other	17

tools were used at all, or did it mean that only basic tools such as walls and sticky notes were used? [6]

The third survey, "*Agile Project Management (APM) Tooling Survey*", was conducted in 2006 by *Trail Ridge* Consulting – a company providing consultations on enterprise Agile alignment, transition and adoption [5][14]. It included around 525 responses originating from companies in 39 countries, with over half of the companies being located in the USA. As shown in Table 2, the survey inquired about the size of the respondent's development organization, percentage of Agile methods being used within the organization, number of Agile teams, number of years following Agile methods, company distribution, and the Agile method followed. In this survey, tools are categorized into the following groups: Manual, Office, Wiki, Internal, Agile Tool, and Traditional, and the responses are gathered according to these groups.

What distinguishes this survey from our work is that it focuses on (1) tool support for various parts of the Agile process, (2) reasons for selecting an Agile project management tool, (3) differences between small and large organizations, and, finally, (4) on reasons for not selecting an Agile project management tool. It should also be mentioned that the survey did not allow the respondents to fill in additional reasons.

One important aspect covered by this survey, which has not been covered by the above-mentioned surveys, is that parts of the company process were differentiated in order to account for tools focusing on some of its specific areas such as, for instance, release planning, iteration planning and testing. Unlike the previous two surveys, this survey covers the reasons for selecting an Agile project management tool.

This survey is related to our work in a sense that it inquires about the type of tools being used. It is important to mention that this survey includes two separate questions: (1) *what type of tool is used? (Office, Wiki, Traditional, Agile, and so on)*, and (2) *if an Agile project management tool is used, which one is it? (ScrumWorks, XPlanner, JIRA, and so on)*. Thus Agile project management tools are separated from all other types of tools. Such a separation of questions only enables the comparison of types of tools – for example, spreadsheets compared to Agile project management tools. The survey does not compare tools of different types, for example, a particular spreadsheet, such as *MS Excel*, with a particular Agile tool, such as *ScrumWorks*.

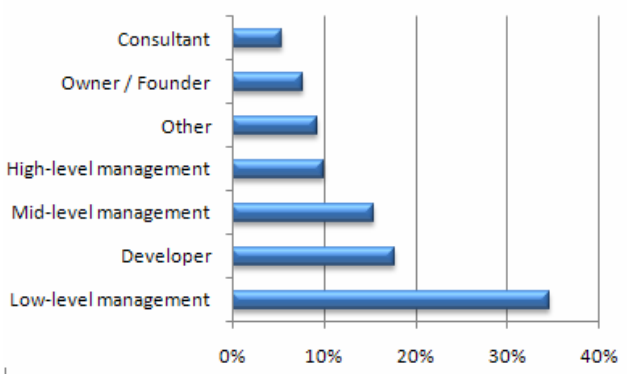

Figure 1: Distribution of roles over different groups

The survey is also lacking in that it is not possible to specify more than one tool name. The usage of multiple tools is only addressed by a separate question asking how many different tools are being used. However, the actual tools are not mentioned and differentiated in any way. Another important omission is that the survey does not consider distributed and collocated teams, but rather distinguishes companies by size. Finally, the survey was conducted in 2006, and, given the rapidly growing popularity of Agile methods and the growth of the Agile tool market, the gathered data could be considered outdated.

It is interesting to note that none of the above-mentioned Agile tool surveys have focused on the ease of use. In the *Trail Ridge* survey, the list of reasons for selecting an Agile project management tool did not include an important choice such as usability. Rather, it focused on tool features and characteristics. Moreover, the list of reasons for *not* selecting an Agile project management tool did not include ease of use, although in this case "Other" was specified as an option.[5]

IV. TOOL USAGE SURVEY

In this section, we present a summary of the 121 responses that we have acquired during our survey. When presenting the results, we follow the order of the survey questions.

Our respondents had many different roles. Their role names and count are presented in Table III. Their distribution over the management levels is presented in Figure 1. Below, we distinguish between the following groups:

- *Low-level management*. Here, we include project managers, Scrum Masters, Product Owners, Team Leaders and Agile Coaches. Thirty nine percent of the respondents belonged to this group.
- *Developers*. In this group, we include Programmers, Developers, and Software Engineers. Seventeen percent of the respondents were in this group.

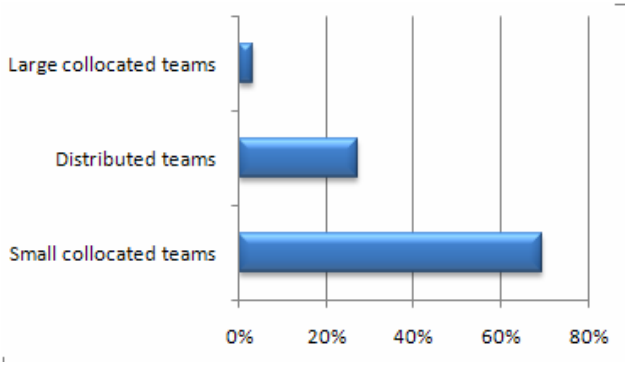

Figure 2. Team structure

- *High-level management.* This group includes CEOs, CIOs, Managing Directors, Development Directors, Presidents, and Portfolio Managers. Fifteen percent of responses were in this group.
- *Mid-level management.* Here we include Solution Architects, QA Managers, and Program Managers. Eleven percent belonged to this group.
- *Owner/Founder:* Here, we include company Owners, Founders, co-Owners. Eight percent of the responses were owners of companies.
- *Consultants:* Five percent of responses were consultants.
- *Other:* This category includes a number of different roles, such as Head of Training, Agile Product Specialist, Commercial Manager, and so on. Five percent of responses belong to this category.

The majority of the companies had small, collocated teams. As shown in Figure 2, as many as 69% of the companies studied had small collocated teams. Twenty seven percent of the respondents had distributed teams, and 3% had large collocated teams.

Regarding the Agile methods used, one method strongly dominates all the other methods. As many as 54% of companies studied use Scrum. Scrum with XP (32%) was the second most popular choice to be soon followed by XP (11%) and Kanban (9%). The methods that were used the least are TDD (2.5%), Crystal (2.5%),

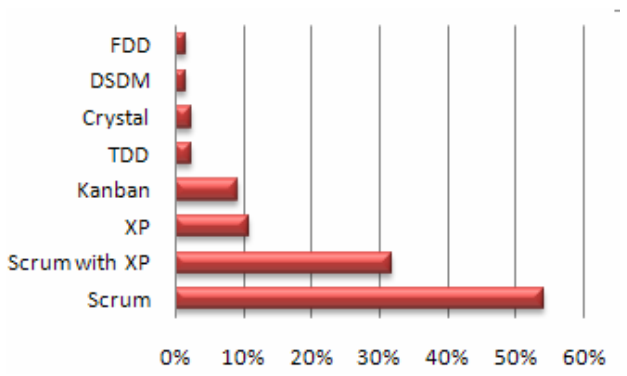

Figure 3. Agile methods used

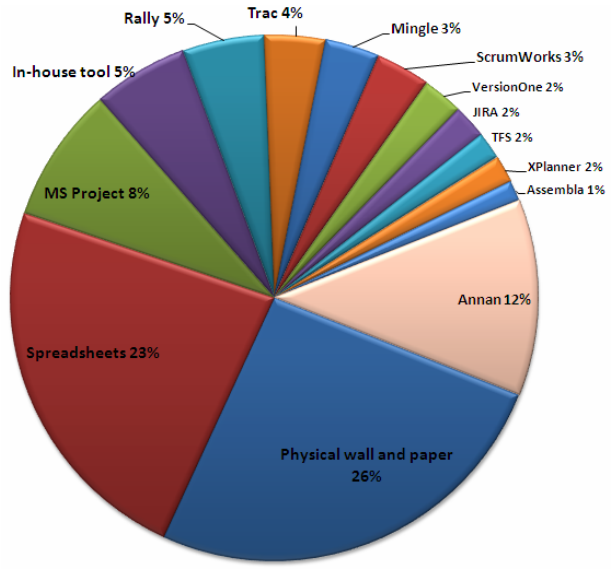

Figure 4. Agile project management tool usage.

DSDM (2%) and FDD (2%). Summing up the percentages of the Agile methods used results in 114%. This implies that some organizations followed more than one Agile method. A summary of the Agile methods used is shown in Figure 3.

Figure 4 shows the tools used at the companies in a pie chart. While we had provided 16 different options to be checked, many respondents checked 'Other' and filled in additional tools. These tools were *OutSystem*, *AgileZen*, *Redmine*, *TinyPM*, *Urban Turtle*, *Agile Tracking tool*, *Agilito*, *Agilo*, *Conchango Scrum*, *Digite*, *EmForge*, *Axsoft*, *WoodRanch*, *KLL Software*, *LeanKitKanban*, *Polarion*, *ScrumPad*, *Seenowdo*, *EMC*, and *Silver Catalyst*. They are all group under Other in the pie chart in Figure 4.

The most commonly used tool within the companies studied is physical wall and paper. Up to 26% of the companies use it. The second most common tool is spreadsheet (23%) to be followed by *MS project* [18] (8%), in-house tools (5%), *Rally* [19] (5%), *Trac* [20] (4%), *Mingle* [21] (3%), *ScrumWorks*[22] (3%), *VersionOne* [15] (2%), *JIRA* [23] (2%), *MS Team Foundation Server* [24] (2%), *XPlanner* [25] (2%) and *Assembla* [26] (1%). Finally, it is interesting to note that a total of 31 different Agile project management tools were mentioned in the survey results, not counting the different in-house tools.

We distinguish between five different types of tools. These are:

(1) *Agile project management tools:* tools specially developed for managing Agile projects, either open-source or supplied by tool vendors. Examples are *ScrumWorks* and *Agilo*.

(2) *Physical wall and paper:* we use this term to represent all basic tools used in Agile development. Examples

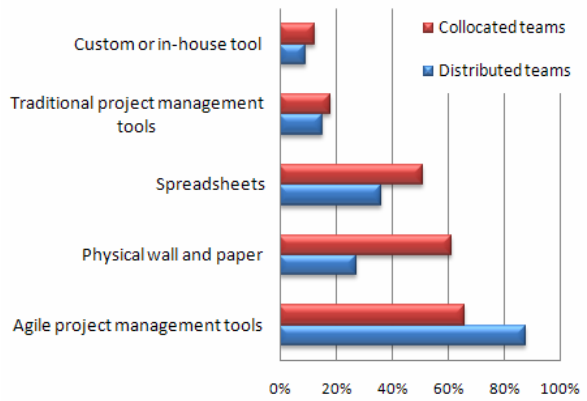

Figure 5. Categories of tools used in collocated and distributed teams

include sticky notes used for putting up tasks on walls, and whiteboards and markers used for drawing burndown charts.

(3) *Spreadsheets:* this category includes all spreadsheets such as *MS Excel*. In our survey we do not distinguish between different vendors of spreadsheets, since this information is not relevant for our study.

(4) *Traditional project management tools:* this category includes all tools used in traditional project management. One popular example is *MS Project*.

(5) *Custom of in-house tools*: tools created and maintained by the companies.

Using the above-listed tool categories, we have grouped the survey responses by two team types collocated and distributed teams. The resulting chart is shown in Figure 5. We can observe that in distributed teams, Agile project management tools were used more than in collocated teams.. It can also be seen that physical tools were used in over half as many collocated teams as in distributed teams. Spreadsheets are also used more in collocated teams.

Another interesting result is that 61% of the survey respondents with collocated teams use tangible tools, 65% with collocated teams use Agile project management tools, and 31% use both. This is shown in the Venn diagram in Figure 6. Thus, nearly half of all collocated teams using Agile project management tools also use tools such as physical walls and paper.

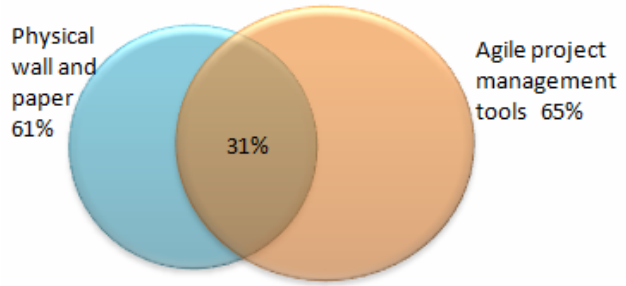

Figure 6: The overlap of tangible and Agile project management tools in collocated teams

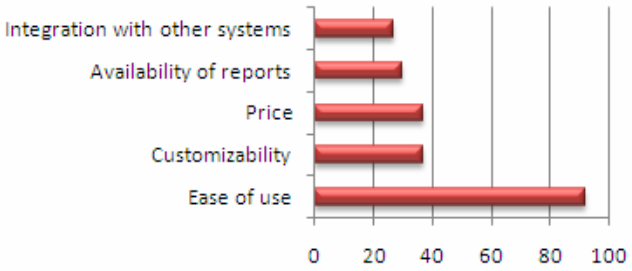

Figure 7. Most satisfactory aspects of the tools used

All the respondents (100%) have provided feedback on the satisfactory aspects of Agile tools. As can be seen in Figure 7, 41% of the respondents were of the opinion that the most satisfactory aspect is the ease of use. The second and third most satisfactory aspects are price (17%) and customizability (17%).

As many as 93% of all the replies provided feedback on the least satisfactory aspects of their tools. As shown in Figure 8, the least satisfactory aspects are lack of integration with other systems (36%) and lack of custom reports (27%). Please note that in many cases the responses regarding the most and the least satisfactory aspects included more than one tool. In these cases, the mentioned aspects refer to all the tools used in conjunction.

Figure 9 shows a simple pie chart with the percentages of responses which included at least one negative aspect of the used tools, and the responses which did not mention any negative aspects.

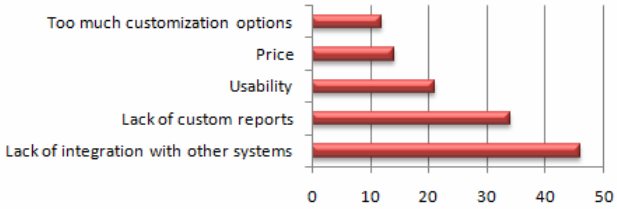

Figure 8. Least satisfactory aspects of the tools used

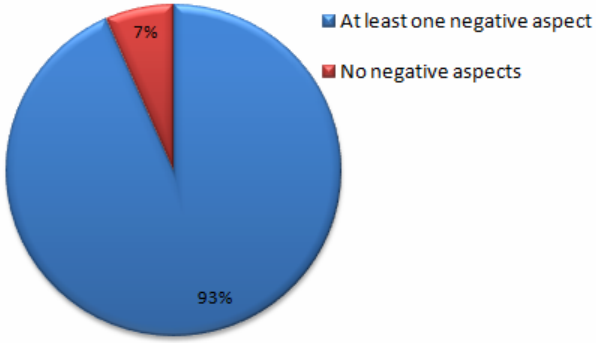

Figure 9: Summary of percentages of mentioned negative aspects

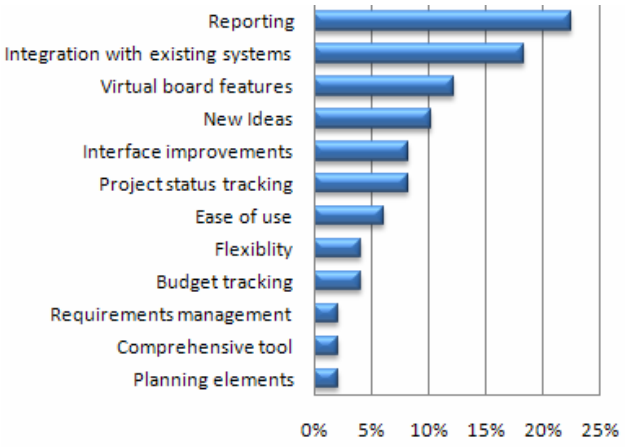

Figure 10: Groups of comments by percentage

As many as 42% of the respondents (51 respondents) provided additional comments on features needed in the tools. Due to space restrictions, we cannot list them all herein. However, we have grouped them into classes of features. As shown in Figure 10, our respondents expressed their needs for the following features:

(1) Reporting: This group (22%) of comments addressed the need for better reports. In particular, the respondents mentioned the need for customizable, Agile-oriented reports which are easier to use and more user-friendly. One response mentioned the need to print a simple, compact list of completed items at the end of each Sprint. Other responses mentioned the need for better bottom-up reporting, particularly to meet the needs of stakeholders. The need for a simple report showing actual versus estimated work was also mentioned. One complaint from a company using *VersionOne* was that it was not possible to post standard report data to a web page that could be viewed by non-licensed users. The respondent was required to manually generate the report and email to individuals, which was inconvenient and time-consuming. One respondent wrote that creating charts using *MS Team Foundation Server 2010* required extensive customization, which took time and resources.

(2) *Integration with other systems*. This was the most commonly mentioned negative tool aspect. Two respondents mentioned their specific integration needs - integration with version management tools, integration with build systems, and the ability to view end-to-end project status.

(3) *Virtual taskboard* features were desired by 12% of the respondents who wished for tools to adequately replicate physical taskboards. The taskboard provided by the *Mingle* tool was mentioned to be cumbersome to use, since it did not support the creation of rows. Moreover, adding many tasks to one column made it necessary to scroll down, which was not desirable. Other comments wished for the possibility to virtually transfer tasks from one taskboard to another. Other respondents mentioned better Kanban board support, the ability to update task status by means of dragging and dropping, as well as the possibility to print taskboards.

(4) *New ideas*. This group of comments, which includes 10% of the responses, was the most interesting in that the respondents made suggestions for new ideas in tool development. One comment included the suggestion to create test scenarios from user stories, which, while requiring the use of text mining techniques, would have a great value for QA managers and product owners. Another comment mentioned the need for a more intuitive way of taking notes to replace plain typed text. The need for tools to support process improvements based on data input was also valued. One respondent wrote that Agile development is not about tools. According to the respondent, management tools should take almost the last place in the development process, and that the people themselves constitute the best tool for success.

(5) *Interface improvements.* This group (8%) of comments addressed the need for better, simpler interfaces which do not arbitrarily limit the actions of the user. The need for different views for different user roles was also mentioned. One comment addressed the need to be able to easily switch between project scheduling in *MS Project* and project running/monitoring in other Agile tools.

(6) *Project status tracking.* These comments (8%) addressed the need for various project status tracking options, such as analytics and execution dashboards, progress tracking on different requirement levels, project burndown charts, charts showing epic and story completion rates. More high-level comments mentioned the need to be able to shift from a high-level project status to view more detailed status reports.

(7) *Ease of use*. This was the most frequently mentioned favorable aspect, and 6% of the respondents further stressed the point by commenting on the need for less configurable options. It was mentioned that ease of use is the most important aspect of a tool, and that development should not be swamped with the need to constantly configure different views and options.

(8) *Flexibility* was desired by 4% of the respondents, who wished to have a tool that supported an evolving progress and project structure. The importance of flexibility was underlined by the fact that the Agile concept of retrospectives promoted an improving, changing process, and tools need to be flexible enough to support these changes.

(9) *Budget tracking*. This group of comments (4%) addressed the need for including project budget aspects in tools. It was mentioned that when working with clients with an overall budget, it would be beneficial to see the overall budget status and not only the number of features left to deliver. Project resource tracking in terms of money and time was also mentioned.

(10) *Requirements management*. This group of comments (2%) related to tool features enabling

requirements prioritization, use-case development, as well as the possibility of nesting requirements on several levels (such as epics, stories, tasks).

(11) *Comprehensive tools*. One of respondents mentioned the need for comprehensive tools to replace the combination of tools currently in place - a tool which includes burndown charts, burnup charts, iteration planning, release planning, stories, tasks, virtual boards, collaboration wikis, threading capabilities, and instant messaging to aid in distributed collaboration.

(12) *Planning elements*. These comments (2%) mentioned the need for better planning elements, such as Sprint planning, and better handling of tasks.

V. Conclusions and Future Research

In this paper, we have reported on the results of *Phase I*, during which we made a survey of current Agile tool usage and needs. The survey covers 121 responses from 120 companies coming from 35 countries.

A number of conclusions can be drawn from the data gathered by our survey. The fact that around two-thirds of our respondents came from company management indicates that the choice of Agile tools is highly relevant for both developers and all levels of management. This also indicates that the responses provided in this paper are not skewed towards some specific role.

Our results show that Scrum is the most popular Agile method among the companies studied to be followed by Scrum with XP and XP. Not surprisingly, most of the tools being used supported mainly these methods. However, we received comments regarding the need for more Kanban support, which indicates that companies using less popular Agile methods have less tool choices.

Half of all companies with collocated teams which use Agile project management tools still use physical walls and paper instead of virtual taskboards. This points towards the fact that such simple physical tools are greatly valued and not easy to replace. Spreadsheets are also used more in collocated teams. On the other hand, in distributed teams, Agile project management tools were used more than in collocated teams. This implies that Agile tools aid in breaching communication distances between distributed teams. It can be concluded that in general, simple tools are preferred in collocated teams, while Agile project management tools are the more popular choice in distributed teams.

Ease of use was listed as the most valued aspect of Agile tools, and was even mentioned in several comments. Comments received during our survey also indicated that Agile tools fell into two extremes – on one hand, simple tools with straightforward and pleasant interfaces and limited functionality, and on the other hand, advanced tools with many options and cumbersome interfaces that are difficult to use. The need for something that falls inbetween these categories was clearly expressed.

As many as 93% of the responses included at least one negative aspect of the used tools. It can be concluded from this results that majority of companies are facing certain issues with their Agile tool support.

Further comments confirmed that in many cases existing tools from the market are not flexible enough to accommodate frequent process changes, due to some practices such as Sprint retrospectives. Many comments stressed the importance of human interactions, which are hard to standardize by means of tools. Other comments addressed the need to channel information upwards towards higher management. It was further mentioned that tools limit creativity in the context of Agile development.

Lack of integration with other systems is the most mentioned negative tool aspect. This could have been predicted. After all, no Agile project management tool can include integration for all possible systems used in all companies using Agile methods. Such integration can only be achieved by means of an in-house tool, which can also include custom reports as well as be adapted to the process in place.

In general, many of the received comments were conflicting. Some expressed the need for simpler tools, others, on the other hand, voted for more comprehensive tools including all desired features. Different reports were mentioned, as well as numerous specifically desired features. This result could have been predicted, since different companies have different processes, different stakeholders, different employees, and, all in all, different needs. The attempt to cover all these different needs does not solve the problem, since it leads to decreased usability. This further confirms that the problem of tool adoption requires careful study and assessment adapted to the context of each individual company.

In *Phase II* of our study, which we report on in [3], we use the data and insights gathered during this survey to perform a case study of tool adoption at Ericsson. In particular, we carefully assess the company's needs and perform an evaluation of several tools according to these needs. We conclude with an analysis and identification of six main problems of tool adoption for an existing Agile process. For further information, we cordially invite our reader to study [3].

VI. Epilogue

Although we have not promoted or spread our survey for nearly one year, we still receive responses and comments from companies, as well as questions and advertising offers from tool vendors. In particular, we were contacted by the newly launched *BrixHQ*, inquiring about specific tool integration needs mentioned by the surveyed companies. We were also interviewed and referenced by online development magazines *InfoQ* [27], and *Application Development Trends* [28], which published articles about our survey in [7]. These facts

indicate the interest of the software development community and the need for further research on the subject.

As possible future research, we would deem it valuable to perform a similar objective survey on a much larger scale. Given our limited timeframe and resources, it was not possible to spread this survey amongst thousands of companies. We believe that a similar study of greater proportions would shed more light on the tool usage needs of companies, which would be beneficial for companies, researchers, as well as tool vendors.

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