

Initial Results of the HELENA Survey Conducted in Estonia with Comparison to Results from Sweden and Worldwide

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Abstract. The way how software is developed in industry has considerably changed with the advent of the agile development paradigm about 20 years ago. The HELENA initiative tries to investigate the current state of practice in software and system development. This paper reports about initial results of an online survey that was conducted in 26 countries simultaneously, focusing on results from Estonia and comparing these results with results from Sweden as well as with the joint results from all participating countries worldwide.

Keywords: Agile Software Development, HELENA, Survey

1 Introduction

The acronym HELENA stands for Hybrid Software and System Development Approaches. The associated project aims to investigate the use of hybrid development approaches in software system development - from emerging and innovative sectors to regulated domains. For this purpose an online survey form was created³. The overall goal of this survey is to investigate the current state of the practice in software and systems development. In particular, researchers involved in the HELENA project are interested to collect data about the types of development approaches (traditional, agile, main-stream, or home-grown) used in practice and how those approaches are combined, how such combinations were developed over time, and if and how standards (e.g., safety standards) affect the used development processes. This information will help push forward systematic process design and improvement activities resulting in more effective and efficient software development.

HELENA has been designed as a 3-staged international research endeavor. The first stage, which has been completed (cf. [1]), aimed at preparing the data collection and to test the survey instrument. The project is now in the second

³ HELENA Survey - <https://www.soscisurvey.de/HELENA/>

stage, i.e., international "mass data" collection using a revised survey instrument. The second stage is conducted in a large international consortium that comprises more than 60 partners from more than 30 countries. More details can be found in the official web site⁴. The results of the second stage will fuel the third project stage by focusing follow-up in-depth research on particularly interesting outcomes of the second stage.

In this paper we present first results from the second stage of the survey for Estonia and compare it to the joint results from all countries as well as to the results from Sweden. We picked Sweden as a point of comparison since Sweden is similar to Estonia in terms of being a Nordic country with a highly digitalized society but at the same time very different from Estonia in terms of the type of software industry.

2 Initial Results

Table 1 shows the communication channels used in Estonia and Sweden. In both countries, most effort was invested in direct emailing, with comparable response rates. Data collection in Estonia was mostly done through emailing contact persons in software development companies in the time period May 20 to June 20 (one reminder was sent). In addition, we posted the survey in a blog of a community of software testers as well as in a mailing list. In total, we received 12 responses by June 20, 2017, all responses coming from the direct mailing initiative (30.8% response rate). Similarly, data collection in Sweden was mainly based on direct emails to existing contacts, complemented by posting the survey in social media such as Twitter. All 13 responses received in Sweden are accounted for through direct mailing, leading to a response rate of 37%. Overall, i.e. across all 26 participating countries, 513 responses were collected until August 23, 2017, when we conducted our analyses.

Table 1: Communications channels used.

Channel	Estonia			Sweden		
	requests	answers	response rate	request	answers	response rate
Personal contact	39	12	30.8%	35	13	37%
Mailinglist	1	0	0%	0	-	-
Twitter	0	-	-	1	0	0%
Blog post	1	0	0%	0	-	-
Other	0	-	-	2	0	0%
Total	41	12	-	38	13	-

The differences of company sizes reported by Estonian respondents as compared to Swedish respondents was roughly as we expected, i.e., many of the

⁴ HELENA Web Site - <https://helenastudy.wordpress.com>

Estonian respondents (41.7%) work in small companies (11-50 employees) while most of the Swedish respondents work in large companies (251-2499 employees), compared to only 7.7% who work in small companies. The difference of company size becomes even more explicit when merging the numbers for respondents working in small and medium size companies (11-250 employees) and those for respondents working in large and very large companies (above 250 employees). While the number of respondents is equally distributed over both classes, i.e., 50% in each class, only about 15% of the Swedish respondents work in small and medium size companies while about 85% work in large or very large companies.

When comparing the company size distributions of the Estonian and Swedish respondents one can observe that the two countries are either balanced with regards to company size (Estonia) or strongly leaning towards larger companies (Sweden). The distribution of company sizes among the responses from all participating countries can be placed somewhere between the Estonian and Swedish distributions. In addition, worldwide, 11.6% of the respondents work in micro companies (<10 employees). None of the respondents from Estonia and Sweden works in such small companies.

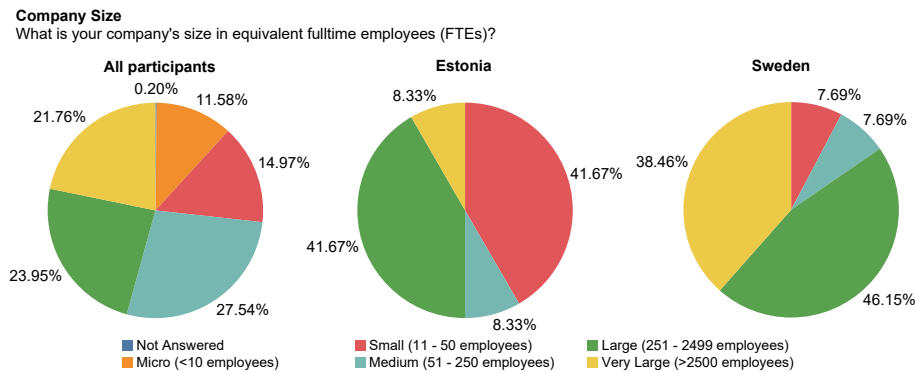


Fig. 1: Distribution of company sizes among the responses from all the participants, Estonia, and Sweden.

In the following, we discuss two main results of the survey, i.e., to what extend specific development frameworks/methods are used, and to what extend certain development practices are used.

Figures 2 to 4 show the usage profiles of development frameworks/methods in Estonia, Sweden, and overall, respectively. Each respondent had to rate 24 different frameworks/methods on a 5-point scale from 'we never use it' to 'we always use it'. In addition, respondents could check the box 'Do not know the framework' or 'Do not know if we use it'.

With regards to the Estonian responses (Figure 2) one can see a clear preference for a small set of agile development frameworks, clearly lead by Scrum which is 'always used' by 58% of the respondents. It is also interesting that only

three of the 24 listed frameworks (Scrum, Classic Waterfall Process, eXtreme Programming) are known by all respondents.

When looking at the responses from Sweden (Figure 3) one can again see a frequent use of Scrum but only 8% of the respondents use it always. Similarly often used as Scrum are Iterative Development, Kanban - and the Classic Waterfall Process. Only 46% of the respondents said that they use eXtreme Programming 'rarely' or 'sometimes', nobody said they use it 'often' or 'always'.

When comparing the results from Estonia and Sweden with the overall results from all participating countries (Figure 4), one can see that the three most frequently used frameworks (Scrum, Iterative Development, and Kanban) are the same as in Sweden. However, one can observe that the usage frequency of Scrum is between those of Estonia and Sweden.

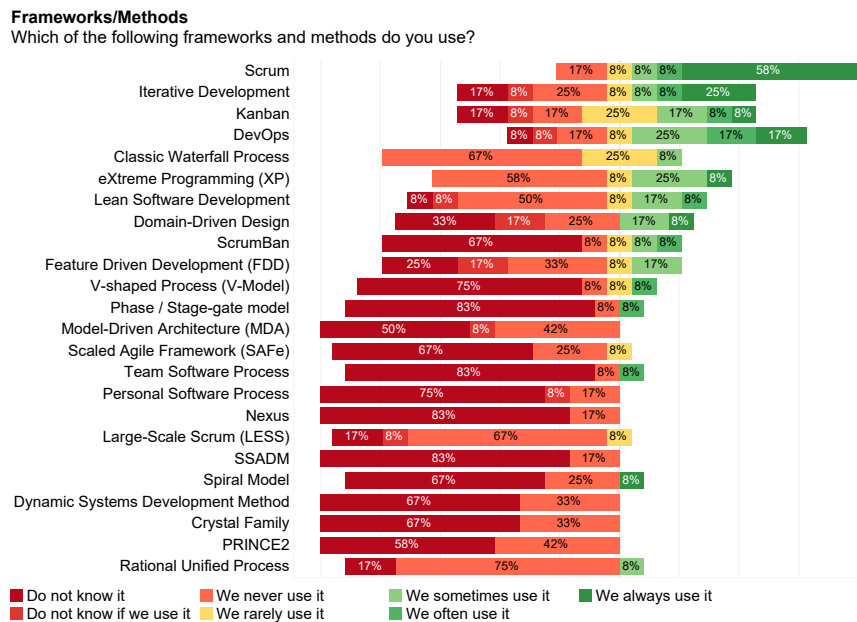


Fig. 2: Distribution of responses according to the use of frameworks/methods in Estonia.

Figures 5 to 7 show the usage profiles of specific development practices in Estonia, Sweden, and overall, respectively. Each respondent had to rate 36 different practices, again using a 5-point scale from 'we never use it' to 'we always use it'. In addition, respondents could check the box 'Do not know the framework' or 'Do not know if we use it'.

When looking at Figures 5 to 7 it sticks out that 'Coding Standards' and, in particular, 'Code Review' are popular in Estonia as well as Sweden and overall. One difference between the responses from Estonia and Sweden is that in

Frameworks/Methods

Which of the following frameworks and methods do you use?

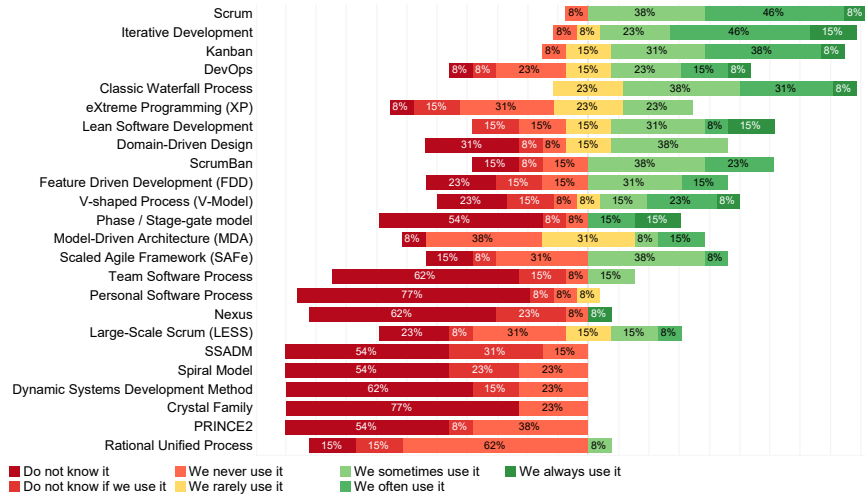


Fig. 3: Distribution of responses according to the use of frameworks/methods in Sweden.

Frameworks/Methods

Which of the following frameworks and methods do you use?

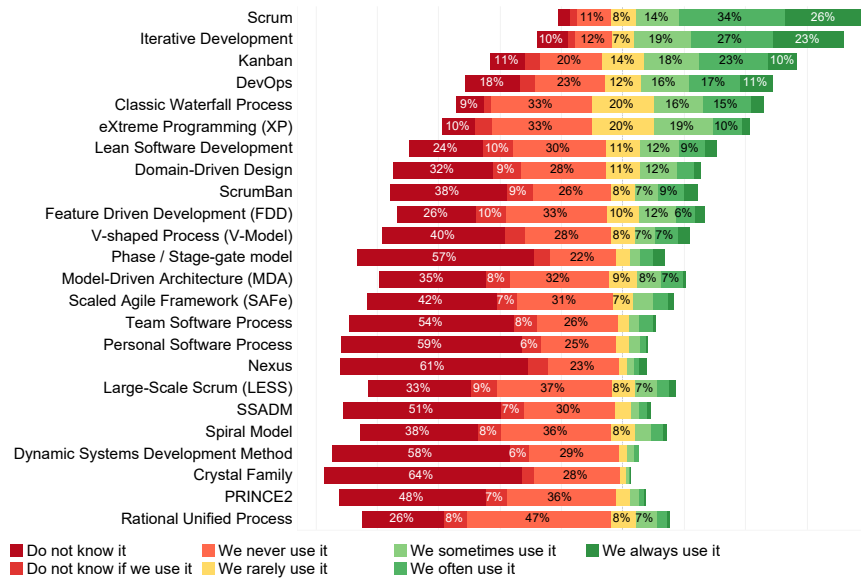


Fig. 4: Distribution of responses according to the use of frameworks/methods in all the countries.

Estonia twelve practices are always used by more than 40% of the respondents. In contrast, in Sweden, with the exception of 'Code Review', which is used by 38% of the respondents always, none of the practices is used more than 23% always. As could be expected, the project usage profile of development practices aggregated over all survey participants lies in-between Estonia and Sweden.

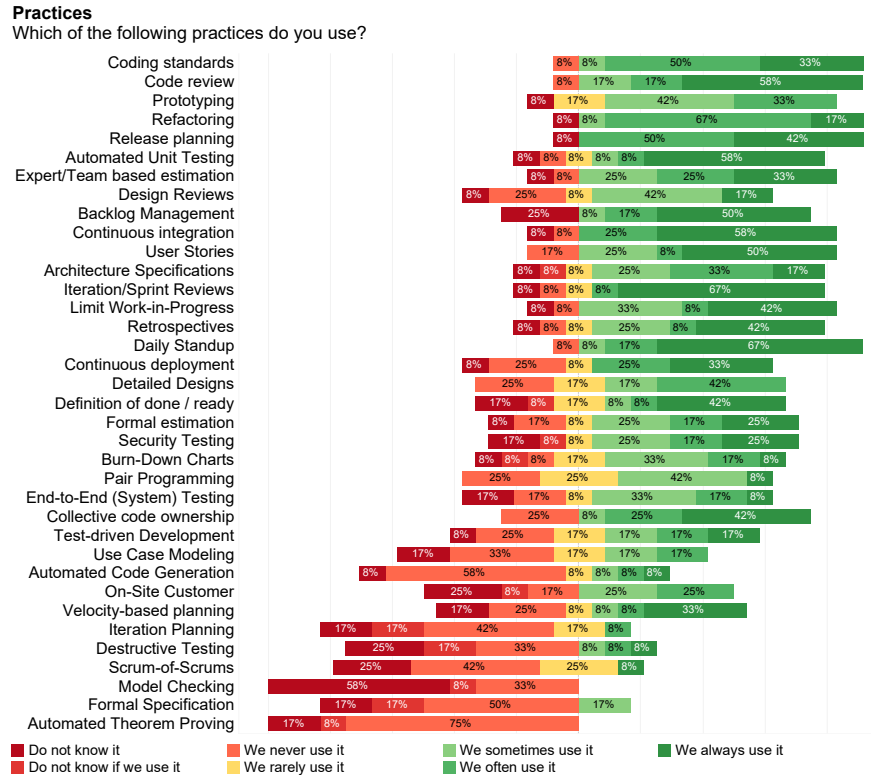


Fig. 5: Distribution of responses according to the use of practices in Estonia.

3 Discussion

Initial results of the second stage of the HELENA project show interesting similarities and differences between the usages of development frameworks/methods and practices when comparing responses from Estonia and Sweden.

One clear similarity is, for example, that Scrum is the most used development framework/method in both Estonia and Sweden, as well as overall. A similar statement could be made regarding the use of the practices 'Coding standards' and 'Code review'. An explanation for the high popularity of agile approaches and techniques could be that both countries have very competitive software

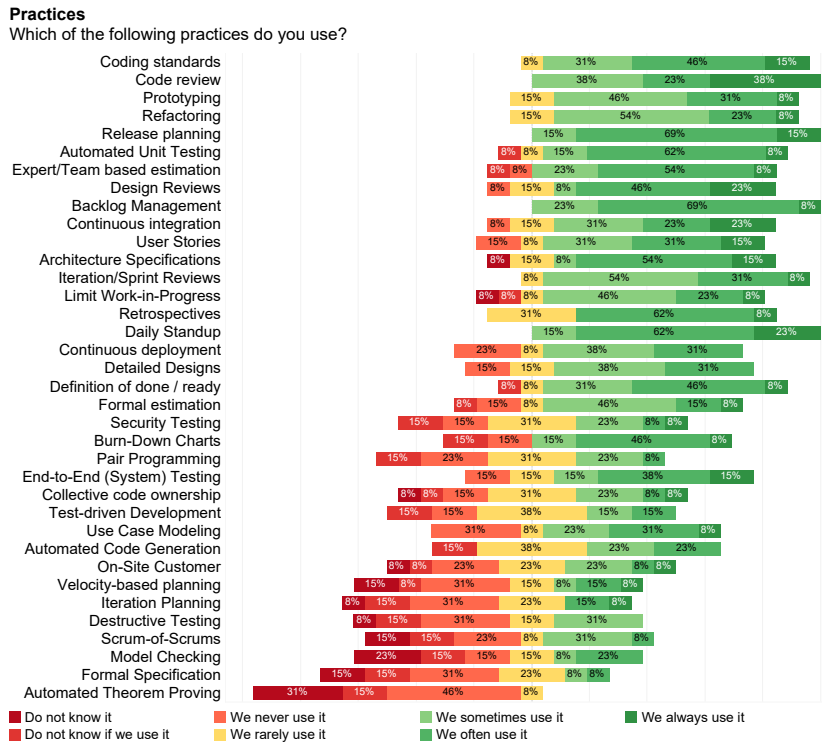


Fig. 6: Distribution of responses according to the use of practices in Sweden.

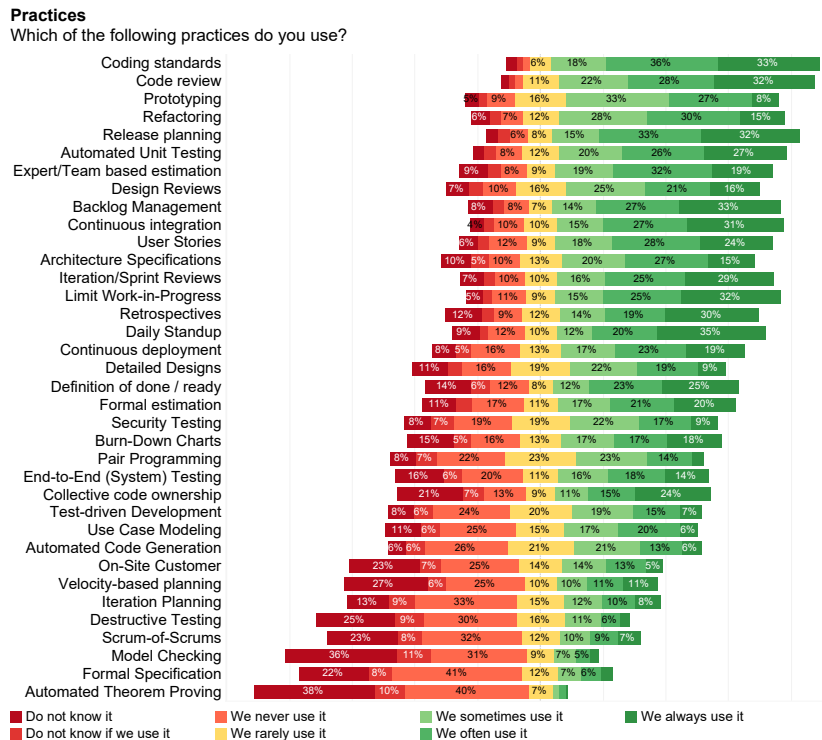


Fig. 7: Distribution of responses according to the use of practices in all the countries.

industries that are constantly striving to improve their processes and adopt effective techniques.

One of the main differences between Estonian and Swedish responses is related to the popularity of non-agile framework/methods - they seem to be used more often in Sweden than in Estonia. One possible explanation for this could be that Sweden has not only young, small and medium-sized software houses that mainly build web-applications and business software but, in addition, a well-established software industry producing a large amount embedded and safety-critical software in larger companies and within larger and complexer projects.

In future work, it would also be interesting to study whether the high number of companies that claim to always use a practice in Estonia is correlated to the high number of small companies in the Estonian data set. Open questions are: Are these numbers due to the small companies? Are small companies stricter with their process? Do small companies simply have less diverse use of methods and processes, due to the lower number of teams?

4 Conclusions

In this paper, we only presented partial results from the HELENA survey, with focus on the usage of software development frameworks/methods and practices. The analysis of the related data brought up some interesting insights about the similarities and differences between Estonia and Sweden. We expect even more interesting insights from a broader analysis of the responses to all questions asked as well as a more systematic comparison between the results from all 26 participating countries. From follow-up surveys and focused case studies during the third stage of the HELENA project we hope to be able understand better and give advice on what combination of practices and frameworks/methods works best in a certain context.

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References

1. Marco Kuhrmann, Philipp Diebold, Jürgen Münch, Paolo Tell, Vahid Garousi, Michael Felderer, Kitija Trektare, Fergal McCaffery, Oliver Linssen, Eckhart Hanser, et al. Hybrid software and system development in practice: waterfall, scrum, and beyond. In *Proceedings of the 2017 International Conference on Software and System Process*, pages 30–39. ACM, 2017.