Author(s): Kettunen, Petri; Gustavsson, Tomas; Laanti, Maarit; Tjernsten, Andreas; Mikkonen, Tommi; Mannisto, Tomi

Title: Agile Enterprise Transformations : Surveying the Many Facets of Agility for the Hybrid Era

Year: 2022

Version: Accepted version (Final draft)

Please cite the original version:

Kettunen, P., Gustavsson, T., Laanti, M., Tjernsten, A., Mikkonen, T., & Mannisto, T. (2022). Agile Enterprise Transformations : Surveying the Many Facets of Agility for the Hybrid Era. In G. M. Callico, R. Hebig, & A. Wortmann (Eds.), SEAA 2022 : 48th Euromicro Conference on Software Engineering and Advanced Applications (pp. 157-160). IEEE. Euromicro Conference on Software Engineering and Advanced Applications. https://doi.org/10.1109/seaa56994.2022.00032

Agile Enterprise Transformations: Surveying the Many Facets of Agility for the Hybrid Era

Petri Kettunen
Department of Computer Science
University of Helsinki
Helsinki, Finland
petri.kettunen@helsinki.fi

Tomas Gustavsson
Karlstad Business School
Karlstad University
Karlstad, Sweden
tomas.gustavsson@kau.se

Maarit Laanti
Nitor Delta
Helsinki, Finland
maarit.laanti@nitor.com

Andreas Tjernsten
Nitor Agile AB
Stockholm, Sweden
andreas.tjernsten@nitor.com

Tommi Mikkonen
Faculty of Information Technology
University of Jyväskylä
Jyväskylä, Finland
tommi.j.mikkonen@jyu.fi

Tomi Männistö
Department of Computer Science
University of Helsinki
Helsinki, Finland
tomi.mannisto@helsinki.fi

***Abstract*—Agile companies are not uniform. Consequently, agile transformations are conceived broadly, ranging from adopting agile methods and practices in software development teams or functions to building all-encompassing enterprise agility. Moreover, the targeted effects of agility may vary, and the success of transformations and the attainment of agility are measured in various ways. In this paper, based on a recent industrial survey study, we scrutinize holistically why companies want to transform, what types of agility they are aiming at, and how they gauge transformations. The survey data was collected during the COVID-19 pandemic in 2020. Most of the respondents were in large or very large companies in Finland and Sweden in diverse industry domains. The main findings indicate that there are many reasons for companies to transform both to improve external outcomes (fore mostly responsiveness) and to develop internal capabilities (adaptability, organizational learning). Companies seemed to have aims and goals with respect to all types of agility, including business agility. As the nature of transformations and the companies' aims and goals vary, the transformations follow various means and measures. As a conclusion, for the hybrid era, we advise companies to consider how agility has benefited during the pandemic era, how hybrid work possibly affects the goals for agile transformations and the different facets of agility, and how to sustain agility in hybrid work.**

***Keywords*— agile transformation, business agility, enterprise agility, large-scale agile, hybrid work, industry-academia research**

I. Introduction

Our research aimed to explore and comprehend industrial agile development scoping in the Nordic countries. We wanted to understand why different companies want to change—even transform—with agile means and how beneficial and successful their particular changes have been. For that, we have been conducting annual surveys since 2018 in industry-academia collaboration. In this paper, we focus on the agile transformation aspects of the survey. Markedly the data was collected during the first year of the COVID-19 pandemic period in 2020. At that time large-scale working-from-home arrangements were in place while currently (June 2022) various hybrid work organizations are emerging.

With that line of thinking, our research questions (RQ) in this paper are as follows:

- RQ1. Why do companies want to transform into agility?
- RQ2. What types of agility are they aiming at and on what organizational levels?
- RQ3. How do companies perform the transformations and gauge the attainment of the targeted benefits?

II. Background

Although agile software development has been practiced for more than two decades now, there is no universal agreement on all the concepts and terminology—not even in academic research. Laanti et al. [1] collected a range of definitions about agile software development and agility presented in the literature. They conclude that different definitions emphasize different aspects such as adaptability, speed and feedback. There are different types of agility relevant for software companies and organizations including enterprise, strategic, business, organizational and operational agility. For instance, the Scaled Agile Framework (SAFe) defines the terms "business agility", "organizational agility" and "team and technical agility" [2].

There are many drivers and reasons for companies to pursue agility and conduct agile transformations. For instance, in the agile transformation model proposed by Laanti [3] the focus is the business value. There are many ways of conducting agile transformations in practice. Enterprise agile transformations should be comprehended holistically.

Agile organizations need to understand their value creation and measure accordingly. Correspondingly, Laanti [3] asserts that business success should be the only measure for measuring agile transformations and few models measure the results the organization gains with its agility.

Agile transformations during the pandemic period have not been investigated extensively so far. Some companies may have started the transformations during this period, possibly because of the pandemic. Notably, we have explored agile transformations previously in our survey research but prior to the pandemic era [4]. During and following the pandemic era, various hybrid work arrangements have been emerging. It follows that some types of agility may be either amplified or challenged in hybrid work organizations.

III. Research Method

The research started in 2018 from an industrial stance. We were interested in refreshing, how companies currently use agile methods and how agile they are nowadays. The research method was a descriptive survey (rather than exploratory or explanatory). We compiled a versatile questionnaire by referring to selected prior surveys (e.g., RO in [5]) and deriving from our own industrial experiences and previous research. In 2018 and 2019, we conducted two survey rounds, the first year in Finland and the second in Sweden. We have reported those results in our prior publications [4].

In 2020, we revised the questionnaire based on the experiences of the 2018–2019 survey results and experiences. The questionnaire was distributed through a Finnish consulting company newsletter to people (~300) as well as shared through several social media channels, especially by posting links to the survey in agile user-groups on LinkedIn and Facebook. In addition, we advocated it to certain software research interest groups. The survey was open for seven weeks during October–November 2020. We have published the pandemic topic research results previously [6]. In addition, there is an open industrial report of some of the basic results [7].

In this paper, we use the 2020 response data of a selected subset of the questions in the survey questionnaire holistically to address the research questions RQ1–RQ3 as framed in Table TABLE I. .

TABLE I. Research Frame

RQ1: Q4: *What are the main reasons behind the agile transformation?* Q5: *What goals does the company attempt to achieve by agile means?*
RQ2: The predefined answer choices (20 items, e.g., 'Customer satisfaction') for two of the questions (Q4, Q5) are organized under the different types of agility (enterprise, strategic, business, organizational and team/technical agility). For the analysis and discussion, we have used the SAFe definitions for the agility types [2].
RQ3: Q1: *When have you started agile transformation in Your company?* Q2: *How does Your company do the transformation?* Q3: *What has been the biggest obstacle of the agile transformation?*
Q6: *How widely does Your company use agile methods?* Q7: *What has been the most significant benefit of agile transformation?* Q8: *How do you see that Your company's overall agility has changed during the past year?* Q9: *Is the company as agile as it should be?* Q10: *What particular (agile) measurements does Your company follow up?* Q11: *To what extent is Your company culture supporting agile ways of working, methods and practices?* Q12: *How do you see that your team's agility has changed during the past year?* Q13: *Is the team agile enough?*

IV. Results

In the 2020 survey round we received 137 responses. Finland and Sweden were the main country locations (54% and 43%). Most of the respondents (66%) were from large or very large companies. Notably, a majority (67%) of the respondents were from other sectors than core ICT businesses. Software development, software process/organizational development, and architecture and systems design roles were the most frequent ones (multi choice allowed). The most frequently reported work arrangement was 'in an agile team' (34%). The questionnaire did not define any team size or what an "agile team" is.

A. *Why do companies want to transform*

Considering the RQ1, Fig. 1 shows the response data distributions for the question Q4 (c.f., Table TABLE I.). Note that we include all respondents (n=130) regardless of their Q1 replies.

Responsiveness and speed are typical reasons for the transformations. Building adaptability is also often reported, while customer satisfaction did not rank high. Markedly, no 'Other' response pointed to the pandemic.

The response distribution (n=134) for the question Q5 aligned with the above. Responsiveness, building adaptability and operational change for speed were the most frequently replied goals. However, business oriented goals ('Competitive and desirable products', 'New business') were reported significantly more often, and so was 'Customer satisfaction'. Markedly, 'Enhance resilience' was also much more frequent.

B. *What types of agility companies are aiming at and on what levels*

Regarding the RQ2, the questionnaire did not include direct questions about the type of agility. Instead, we use indirectly (proxy) the same response data as for the RQ1 (Q4). Fig. 2 reorganizes the response distributions in Fig. 1 according to the types in Table TABLE I. . Overall, it indicates that companies seem to have drivers and targets with respect to all types of agility and not just operational ones. Normalizing the number of the answer choices in the type groups, enterprise agility is the less weighted area.

C. *How companies perform the transformations and realize the attainment of the targeted benefits*

In the former part of the RQ3, we use the response data of the following survey questions: Q1, Q2, Q3 (see Table TABLE I.). For the latter part of the RQ3, we use holistically a broad set of questions (Q6–Q13). Note that we include all respondents in Q2–Q13.

1) *Performing the transformations*

The respondents (n=132) replied (Q1) that the transformations have started for 2–5 years (37%) or more than five years (29%) ago (at the time of the survey). Only 7% reported about a year ago (i.e., just before the pandemic period). 6% had not done/planned transformation and 12% did not know. In the Q2, companies were reported (n=132) to implement transformations mainly by themselves (41%) and by building their own competencies with external consultancies (22%).

In addition, we also enquired about the perceived obstacles of the agile transformations (Q3, open question). We categorized the responses (66 respondents) in themes. The most common ones were old (traditional) practices / habits / mindset / culture and leadership (e.g., lack of management commitment and support). Full-scale, foundational enterprise transformations seemed to be hard to achieve. Markedly, only a few responses pointed to the pandemic and the current situation.

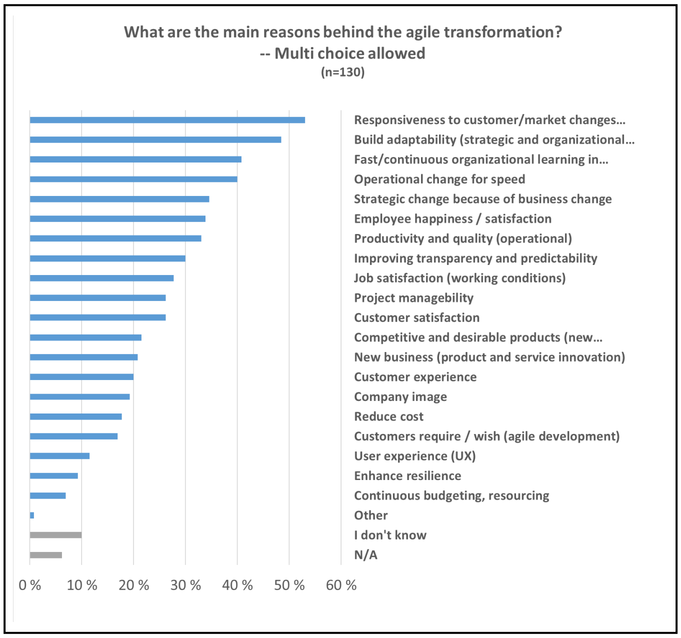

Fig. 1. Reasons behind the agile transformations (RQ1).

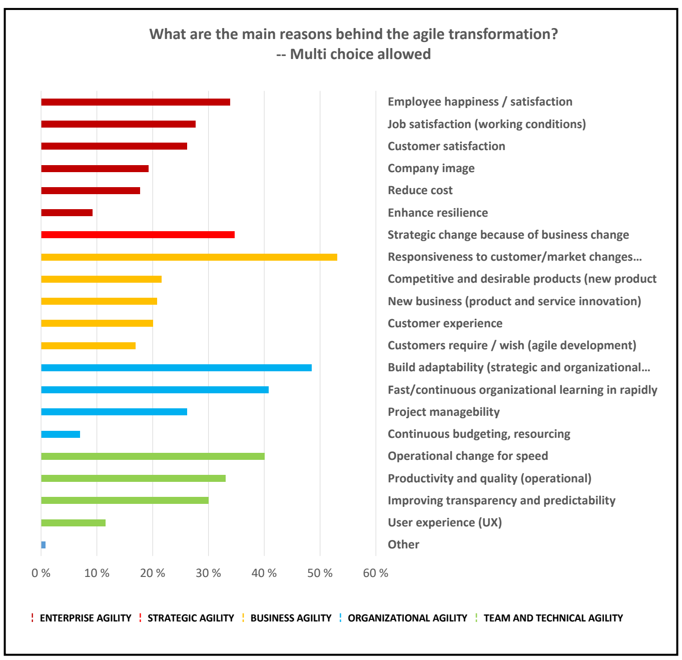

Fig. 2. Reasons behind the agile transformations with respect to types of agility (RQ2).

2) Realizing the attainment

In general, agile transformations are evolutionary endeavors and "journeys" rather than distinct events. One of the basic measures and indicators is the extent of agile method usage in organizations. The response distributions for the mandatory question Q6 indicated that about one-third (28%, N=137) of the respondents observed their companies use them across the entire company. In contrast, only very few (4%) reported no usage at all. Note that neither the question setting nor the answer choices were limited to software.

In addition, we queried the overall perceptions of the benefits of agile transformations with an open question (Q7). The most frequently reported ones (64 respondents) were transparency (25%), speed/getting faster (17%) and focus on value (14%). Responsiveness was not significantly often reported.

Principally, agile transformations should improve companies' agility. In the Q8, we enquired how the respondents recently perceived the overall change of agility in their companies during the past year (at that time of the survey). There were considerable improvements (17% significantly, 42% a little; n=132) and but also some (little or significant) declines were reported (8%). In addition, 23% reported that it has remained the same. Note the data set was collected during the pandemic era in 2020.

In view of the performance, the survey included a principal question (Q9): Is the company as agile as it should be? 18% of the respondents (n=132) reported that it is always or usually so, while as many as 78% reported that it is (sometimes) not. There appeared to be variations in grasping this controversial question, though. The open-text rationales indicated for example, that some parts in companies are not (yet) agile.

Measurements and metrics are necessary to gauge agile transformations and the achievement of their targeted goals and benefits. The question Q10 asked how typically common performance metrics (OKRs, customer satisfaction, business value and lead/cycle time) are measured and followed up (multi-choice allowed). Customer satisfaction was the most commonly reported (n=136) one (59%), and business value was slightly more (37%) than the lead times (32%). Notably, the OKRs (32%) may differ for respondents in different companies.

Complementing the company level perceptions presented above (Q8), the question Q12 asked about team level perceptions of the recent agility evolution. The majority of the respondents (n=47) reported improvements (38% a little, 34% significantly) during the past (pandemic) year. 15% reported that is has remained the same while 6% indicated decreasing. Note that this question was presented in the questionnaire only to those respondents who replied to be working in 'agile teams'. In addition, the questionnaire included a complementing question (Q13): Is the team agile enough? 64% of the respondents (n=47) reported that it is always or usually so while 17% reported that it is sometimes not and 19% plainly no.

Finally, as the organizational culture is one of the key elements of successful agile enterprise transformations, in the question Q11 we enquired about its conduciveness. Most of the respondents (n=132) perceived the company culture to be at least to some extent supportive (64%) than opposing (22%).

V. Discussion

A. Insights and Implications

Considering the RQ1, the main finding is the overall diversity of the transformation motives (Fig. 1). Companies want to transform both to improve external agility outcomes (e.g., 'Responsiveness to customer/market changes') and to develop internal agile capabilities (e.g., 'Build adaptability', 'Fast/continuous organizational learning') and leanness. Interestingly, 'Customer satisfaction' was not among the prime reasons. One explanation could be that respondents have considered it more as a consequent outcome rather than a reason as it was ranked higher in the question Q5.

With respect to the RQ2, the transformation aims mapping in Fig. 2 indicates that, overall, companies have quests related to all types of agility. Notably, all the top (6) items in Fig. 1 are in this categorization in different types of agility. Taking into account the different number of the answer choices in each type group, organizational and team agility were weighted more than business and enterprise agility. It is also important to bear in mind that agile transformations are in general long-term "journeys" and the goals may evolve over time. In this survey, the majority reported that the transformations have started for several years ago. That could explain the differences of the weighting of business agility related goals reported in Q4 vs. Q5.

Regarding the RQ3, the principal finding is that, as the nature of transformations and the companies' aims (Fig. 1) and goals vary, the transformations follow various means and measures. In this sample, the results that the transformations have mostly been started already years ago (Q1) and that agile methods are widely used (Q6) suggest that transformations have advanced substantially. However, the reports that there are obstacles with company-level issues (Q3) suggest that large-scale enterprise transformations are not yet fully realized. Teams were well agile (Q13), but the companies were perceived to be not so agile (Q9). This could indicate that agile transformations are still to be scaled from the team levels. Overall, within the company, we would expect the aims/goals (Q4, Q5), achieved benefits (Q7) and the measurements (Q10) be in alignment (e.g., customer satisfaction).

Notably, in the survey questionnaire, we did not directly ask about the different types of agility (RQ2). However, those very terms may be ambiguous and not equally interpreted in different companies. In a similar vein, the direct questions about how agile teams and companies are (RQ3, Q9 and Q13) may be challenging to answer unambiguously in industrial practice.

The survey data was collected during the pandemic period in 2020. However, no respondents reported it as a reason behind the transformation and just few respondents indicated that it has been an obstacle for their transformations. In our previous work, we did not discover particular impacts on agile transformations [6]. Altogether, it may be so that the pandemic era has not significantly affected agile transformations in companies—or that the effects have not yet been fully realized. Markedly, enhancing resilience was not often reported to be a reason behind the transformations (see Fig. 1).

All that should be considered for future agile transformations for and in the era of hybrid work. Especially, the different reasons and goals (Q4, Q5) should be assessed from the perspective of hybrid work organizations and whether their priorities (Fig. 1) are the same as before. Hybrid work affects particularly team agility and organizational agility.

B. Related Work

The global annual State Of Agile survey [8] comprises many analogous questions to our survey. One comparison point is its question "What were the most important reasons for adopting agile within your team or organization?" (c.f., Q4).

Paasivaara et al. [9] investigated a large-scale industrial case motives (c.f., Fig. 1, RQ1). Kupiainen et al. [10] reported the most often occurring metrics, and Korpivaara et al. [11] investigated how scaled agile development organizations measure performance (c.f., Q10, RQ3). Olszewska et al. [12] examined in an industrial company case, how the changes in the development process introduced by the agile transformation can be measured (c.f., Q7, RQ3).

C. Limitations and Threats to Validity

One design choice was that we did not ask the anonymous respondents to identify their organizations. A threat to construct validity is how similarly the respondents have interpreted and conceived the terms in the questionnaire (e.g., "agility"). Due to the company-specific call-out of the survey, sampling bias is a potential threat. The response rate is unspecified.

D. Further Research

A future research question is to assess how extensively and deeply companies have progressed in their agile transformations (c.f., Q6, Q9 and Q11). It would also be intriguing to examine, how the agility profiles (Fig. 2) have possibly developed over the years until now. Currently, it seems that various kinds of hybrid work settings will be commonplace in the future. A relevant further research avenue is then to investigate further, what can be learned from this pandemic era to achieve and sustain the benefits of agility in hybrid work. Overall, the research could be advanced conceptually. The research frame in Table TABLE I. is just one way of discerning the agility research space.

References

[1] M. Laanti, J. Similä, and P. Abrahamsson, "Definitions of agile software development and agility," in Proc. EuroSPI 2013, CCIS 364, F. McCaffery, R. V. O'Connor, and R. Messnarz, Eds. Springer, 2013, pp. 247–258.

[2] SAFe Glossary, https://www.scaledagileframework.com/glossary/, last accessed 2022/01/13.

[3] M. Laanti, "Agile transformation model for large software development organizations," in Proc. of the Scientific Workshops of XP2017, Association for Computing Machinery, New York, NY, United States, 2017, Article No.: 19.

[4] P. Kettunen, M. Laanti, F. Fagerholm, T. Mikkonen, and T. Männistö, "Industrial agile transformations lacking business emphasis: results from a Nordic survey study," in Proc. ICSOB 2020, LNBIP, vol. 407, E. Klotins, and K. Wnuk, Eds. Springer, 2021, pp. 46–54.

[5] S. Stavru, "A critical examination of recent industrial surveys on agile method usage," The Journal of Systems and Software, vol. 94, pp. 87–97, 2014.

[6] P. Kettunen, T. Gustavsson, M. Laanti, A. Tjernsten, T. Mikkonen, and T. Männistö, "Impacts of COVID-19 pandemic for software development in Nordic companies—agility helps to respond," in Proc. XP 2021 Workshops, LNBIP, vol. 426, P. Gregory, and P. Kruchten, Eds. Springer, 2021, pp. 33–41.

[7] Nordic Agile Survey, https://www.nordicagilesurvey.com/survey-results

[8] 15th State of Agile Report, https://digital.ai/resource-center/analyst-reports/state-of-agile-report, last accessed 2021/11/27.

[9] M. Paasivaara, B. Behm, C. Lassenius, and M. Hallikainen, "Large-scale agile transformation at Ericsson: a case study," Empir Software Eng, vol. 23, pp. 2550–2596, 2018.

[10] E. Kupiainen, M. V. Mäntylä, and J. Itkonen, "Using metrics in agile and lean software development—a systematic literature review of industrial studies," Information and Software Technology, vol. 62, pp. 143–163, 2015.

[11] I. Korpivaara, T. Tuunanen, and V. Seppänen, "Performance measurement in scaled agile organizations," in Proc. HICSS 2021, T. Bui, Ed. University of Hawai'i at Manoa, 2021, pp. 6912–6921.

[12] M. Olszewska, J. Heidenberg, M. Weijola, K. Mikkonen, and I. Porres, "Quantitatively measuring a large-scale agile transformation," The Journal of Systems and Software, vol. 117, pp. 258–273, 2016.