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Adopting SAFe to Scale Agile in a Globally Distributed Organization

Maria Paasivaara
School of Science
Aalto University
POB 15400, 00076 Aalto, Finland
Email: {firstname.lastname}@aalto.fi

***Abstract*—Large software development organizations adopting agile methods need solutions and models to help scale agile to fit their needs. During recent years, several frameworks for scaling agile have been created by consultants, including the Scaled Agile Framework (SAFe), Large-scale Scrum (LeSS) and Disciplined Agile Delivery (DAD). However, research on how these frameworks are adopted in practice is seriously lacking. In this paper we describe how Comptel, a globally distributed software development company, adopted the SAFe framework in two business lines. Based on eleven interviews we present why and how the organization adopted SAFe, and discuss related challenges and success factors. The comparison of the two adoptions showed that investing in SAFe trainings, engaging people and change agents, hiring a coach, investing in a full-time release train engineer, preparing well for the first planning event and continuously improving and customizing SAFe led to good results.**

I. Introduction

Agile methods have become commonplace in software development organizations around the world, both small and large. Originally, the methods were designed for small, collocated projects [1]. However, during recent years many large organizations have made the transition from traditional, plan-driven waterfall type methods towards agile. Examples include Nokia [2], Ericsson [3] [4], Amazon [5] and British Telecom [6]. According to the largest reoccurring survey on agile adoption, the State of Agile Survey [7], 43% of the self-selected respondents worked in development organizations with more than 50% of teams using agile, and 62% of almost 4000 respondents came from an organization with over a hundred people in software development. While this survey is not scientific, it indicates that a significant number of big organizations use agile.

Scaling agile is not easy, as large projects often are globally distributed, and have a large number of teams that need to collaborate and coordinate. Literature has lacked both proven models and research results on how to do a large-scale agile transformation, as well as what the end result should look like. A recent systematic literature review [8] revealed the lack of systematic studies on large software development organizations adopting agile methods. The review found only six scientific studies on large-scale agile transformations, while almost 90% of the included papers were experience reports.

Agile consultants helping in agile adoptions have proposed several frameworks for scaling agile, such as Large-scale Scrum (LeSS) [9], the Scaled Agile Framework (SAFe) [10] and Disciplined Agile Delivery (DAD) [11]. The experience reports presented on the home pages of these frameworks present fabulous success stories. However, independent empirical studies on how the scaling frameworks and practices work in practice, what kinds of challenges there are, and how to overcome the challenges are still scarce.

According to the State of Agile Survey [7], the Scaled Agile Framework (SAFe) seems to be the most popular framework for scaling agile. Therefore, we decided to empirically study how SAFe has been adopted in a challenging large-scale set-up: two business lines in a highly distributed software development organization. In this paper we will help alleviate the lack of empirical studies on scaling agile by presenting the initial results of a case study on adopting SAFe.

II. The Scaled Agile Framework

The Scaled Agile Framework, SAFe [10] claims to provide a recipe for adopting agile at the enterprise scale. It contains the levels of teams, programs, and portfolio, as well as the optional value stream level. At the team level, it adopts Scrum [12] with XP engineering practices, but using Kanban is also possible. At the program level, it defines the concept of an *agile release train (ART)*, which is the analogy to Sprints at the team level, working at a slower time frame. The program level contains additional roles, e.g., system team, product manager, system architect, release train engineer (RTE) and release management team. At the portfolio level, planning is done as epics that define large development initiatives. The optional value stream level supports the development of large and complex solutions, which require multiple, synchronized ARTs.

For adopting SAFe, the SAFe 4.0 Whitepaper suggests "Implementing SAFe 1-2-3" pattern, which includes the following three steps: 1) train implementers and Lean-Agile change agents, 2) train all executives, managers, and leaders, and 3) train teams and launch agile release trains.

III. Research Method

We present a qualitative single case study [13] on how Comptel, a globally distributed software development company, took the SAFe framework into use in two business lines. Case study was chosen as a method as we wanted to understand in-depth the adoption SAFe framework in a

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TABLE I
NUMBER OF INTERVIEWEES

Role	Case 1 Finland + Malaysia	Case 2 Finland + Malaysia
Team Members/SMs	2	1
Product Owner[a]	1	1
Release Train Engineers	0 + 1	1
Managers	2	2+1
Total	**6**	**6**

[a] Note: A single person from the platform organization supporting both business lines.

real industrial setting. The case organization was selected purposefully, i.e., by choosing an information rich case [14]: a large company that had recently adopted SAFe and thus had the transformation in recent memory. In addition, the organization had taken SAFe into use slightly differently in the two business lines, thus the case provided a very interesting possibility to compare two adoptions inside the same company. In this paper we focus on the adoption differences and aim to answer the following research question:

RQ: How did the SAFe adoption differ between the business lines?

We collected data by interviewing eleven persons at two sites. The researchers and the case company representatives discussed the criteria for choosing the interviewees. To get a good overview of the adoption, we first interviewed managers from both business lines. We then interviewed the release train engineers (RTEs) of both business lines, as well a few Scrum Masters, who worked part-time as developers, as well as a representative of the platform organization, a Product Owner. The platform developed by this organization was used by both business lines. For budgetary reasons we were not able to travel to distributed sites to perform the interviews. Nine of the interviewees were located at the main site in Finland. To get a view of the other main site located in Malaysia, we interviewed two people from that site using a videoconference connection, a release train engineer and a release manager, each representing different business lines. Table I shows the roles interviewed at both sites.

Two researchers were present in all interviews, one being the main interviewer and the other asking clarifying questions and taking detailed notes. All interviews were recorded and later transcribed by a professional transcription company. The interviews lasted 1–2 hours each.

The interviews were loosely structured and conversational in order to maintain adaptability to the roles and individual experiences of the interviewees in different roles. The interviewees were asked to describe their own experiences of the SAFe adoption, and the challenges faced and the success experienced related to SAFe. The transcribed interviews were analyzed by qualitative coding.

IV. RESULTS

A. The Case Organization

Comptel is a global telecommunications company with hundreds of employees and about 30 offices worldwide. The company processes mobile usage data, serving over 300 customers—mostly communications service providers with over 1,2 billion end users. The solutions provided form the link between the operators' physical telecommunications networks and the software layer built on top of them, allowing the operators to both bill users correctly and to develop more advanced services and earnings logic. The company consists of two globally distributed business units.

Earlier, Comptel had used a traditional, waterfall type, stage gate model in software development. In 2008 the company started to move towards agile by adopting Scrum in the software development teams. However, product management still remained in the waterfall world with 1–1,5 year plans, clear milestones and yearly software releases. The SAFe adoption followed seven years later: One of the business lines (*Case 1*) started the SAFe adoption in the middle of 2015 and the other business line (*Case 2*) followed half a year later, in the end of 2015.

Case 1 was distributed between Finland (several teams at the main location, and a few persons in another location), Malaysia (several teams), Norway (one team), UK (a few persons). Altogether this case had 14 agile teams, most collocated, and a spanning multiple sites. Case 2 had three main sites: Finland (four teams), Malaysia (four teams) and Bulgaria (three teams). In addition, one team was distributed between Russia and Finland. Besides the teams belonging to one of the business lines, the company had two platform teams located in Finland and serving both business lines. All teams were cross-functional and had 5-10 team members. Team members had rather clear roles, being developers, testers, documenters, architects etc. Product Managers and Product Owners were located at different sites, the majority residing in Finland. Each Product Owner worked with 1-2 teams.

The offerings the company was developing consisted of a few products, partially using each other. Development teams had specialized in specific products.

B. The SAFe Adoption

In both business lines the SAFe adoption was initiated top down, i.e., product development management recognized the need to change, and SAFe was the only solution considered, there was no comparison to other frameworks. Both business lines chose SAFe independently.

The previous model combining product specific agile teams with waterfallish product management was noticed to have several challenges: a lot of surprises emerged when approaching release, especially features spreading across teams were easily delayed, while at the portfolio level Product Managers were concentrating on their own roadmaps whereas products offered to the customers were always combined from several products. Thus, collaboration was clearly lacking both inside

the software development and the product management, as well as between these organizations. The high level prioritization of the product offering had been partially missing, as Product Managers had focused on their own silos. SAFe was expected to alleviate these challenges. In addition, the company hoped that SAFe would make it possible to react faster to the changes in the markets.

While starting the SAFe adoption, all development teams remained the same to avoid too many simultaneous changes. Later on the teams were slightly modified.

In both business lines, the first major change was the introduction of program increment planning (PI planning) events. In Case 1, the first PI planning took place in June 2015. The length of the increment was chosen to be 10 weeks, which would include five synchronized 2-week sprints for all teams in the business line. In Case 2, the first PI planning took place in January 2016. At the time of our interviews, the 8th increment was about to end in Case 1 and the 5th increment in Case 2. Each business line had one agile release train. The two platform teams participated in both PI planning events, as they served both business lines.

The aim of the PI planning events was to plan the next 10-week program increment with all stakeholders, prioritize work, create visibility across the teams and products belonging to the same release train, as well as solve dependencies across the teams. The PI planning events were organized as 2-day events. In the beginning, they closely followed SAFe's instructions and later on were somewhat customized. Day one started by business vision presentations and architecture plans, followed by more detailed plans presented by the Product Managers. The rest of the day was spent in team-specific planning with one or two Scrum-of-Scrum (SoS) meetings to check the status and coordinate the planning. During the second day, the planning continued, the plans were presented and site-specific retrospective meetings regarding the previous PI including this PI planning event were arranged.

As both business lines were globally distributed, the planning events were organized in the main locations simultaneously, with a real-time Skype for Business connection between the sites. During the first events only voice and screen sharing was used, but later a video connection was added. From the smaller sites (Russia and the other Finnish site) participants travelled to the main Finnish site. Due to the time difference of up to 8 hours (between the UK and Malaysia), the events started early in the morning in Europe and in the afternoon in Asia, continuing for ca 5–6 hours, after which the Asian site finalized from the day. The final retrospective meeting in the end of the second day was site-specific, which allowed the Asian site to have it the next morning.

Besides the planning events, the other major changes to the previous ways of working were closer collaboration and communication both between the development teams and between the Product Managers and Product Owners (PO). Besides ad-hoc communication to solve problems, teams having dependencies started to arrange regular Scrum-of-Scrum meetings, supported by the RTEs. For PO's RTEs arranged regular PO community meetings. Our interviewees in both business lines felt that communication and collaboration had increased tremendously after the SAFe adoption. The biggest changes the adoption had brought to the Product Managers, as for them the mindset had changed from long term plans to shorter term plans, as well as towards finding priorities at the business line level, instead of concentrating on separate silos.

Even though the SAFe framework includes three levels (as well as an optional fourth level) the case company implemented only two: the team level, as well as a combined portfolio/program level.

C. Comparison of the Cases

In this section we answer our research question by comparing how the SAFe adoption differed between the two business lines. Case 2, the business line adopting SAFe later on could benefit from the experiences of Case 1, and thus was able to better prepare for the transformation and avoid facing all the same challenges. Our interviewees evaluated the Case 2 SAFe transformation as much more successful in several ways than the adoption in Case 1. Some Case 2 interviewees even mentioned that still, at the time of the interviews, Case 1 could benefit from learning good practices from Case 2. In Table II we present the most significant differences between the cases.

1) SAFe Trainings: In Case 1 SAFe trainings were not arranged before the SAFe adoption, but a few months after the adoption when facing problems. First, the Product Managers and POs were sent to SAFe trainings to understand both SAFe and agile. Teams received some training only after a couple of increments. The lack of early trainings was mentioned by several interviewees. In Case 2 all managers, Product Managers and POs, from all sites, participated in a few day SAFe trainings arranged by a SAFe consulting company. These trainings were experienced as highly useful. The team members were trained internally in half-day trainings just before the first PI planning event, and SAFe refresher trainings were arranged a few months later to all teams by the RTE, who visited all the sites.

2) Change resistance and engaging people: In Case 1 the change started from the R&D management and neither product management nor teams were involved and engaged early enough, which led to change resistance, e.g., even agreeing the dates with the Product Managers for the first PI planning event was hard, as finding suitable time slots from everyones' calendar was not easy, which shows that the importance of this event was not yet understood. Strong change resistance arose also from the teams. Several interviewees felt that everybody should have been communicated properly on why the SAFe adoption was initiated in the first place. The lack of knowledge on SAFe and communication about the change and its reasons increased the change resistance.

In Case 2 our interviewees had expected change resistance towards SAFe, especially from the teams, based on the experiences they had heard from Case 1. Surprisingly, there was less resistance than expected. According to the interviews there were several reasons for this: everybody was trained in

SAFe and understood the reasons of its adoption before the first PI planning event; the first PI planning was successful; if problems or improvement items regarding the adoption emerged, they were solved right away, which kept people satisfied; and finally the team members did not experience big changes compared to their previous way of working.

3) Change agents: Case 1 had a couple of change agents, a manager in Finland and an RTE in Malaysia who were leading the change. However, both were doing this only part-time and thus not could give this role as much time as they would have liked to. More, and more visible change agents were hoped for. Case 2 had several change agents, e.g., the head of the R&D, external coaches and an RTE, who were visibly pushing the change forward, giving trainings, and contributing to the customization of SAFe and to the continuous improvement. The RTE in Case 2 worked full-time in leading the change.

4) External coaches: In Case 1 no external coaches were helping in the beginning. Half a year after the adoption an external coach was invited to workshop with the teams and give feedback, which was experienced as useful. Our interviewees mentioned that more coaching would have been useful. In Case 2 an external SAFe consulting company supported the adoption by arranging SAFe trainings and workshops for the managers and the POs, as well as by coaching the RTE in planning and arranging the first PI planning event.

> *The reason why this succeeded surprisingly well was that we had a really good consultant to coach our Product Managers, beforehand. We had workshops where we did different kinds of exercises [...] she made us to do exercises during which we would understand by ourselves what we should improve.*
>
> — Manager, Case 2

5) Release train engineers: In Case 1 the RTE took care of this role part-time. Even though his efforts and help was very much appreciated, he could not put as much effort to this role as he could have, had it been a full-day role. Some interviewees mentioned that he had not been able to take actions as much as needed to push the recognized improvement items forward. They felt that nobody was systematically leading and supporting the continuous improvements. In Case 2 the RTE concentrated on her role full-time, which was mentioned as one of the success factors of the adoption. Besides preparing and leading the PI planning events, she lead the coordination by arranging and leading, e.g., the SoS meetings, as well as taking care of the improvement items and metrics.

6) The first PI planning events: In Case 1 the SAFe adoption started by the first PI planning event, which, according to our interviewees had been somewhat chaotic. People would have liked to know more about the event beforehand, and how to prepare for it. Now, it was a surprise to many, which they felt as uncomfortable.

> *The facilitation [of the PI planning] and those practices, they should be planned in detail beforehand so that the PI planning will start running smoothly and people will get a good picture and everything works.* — Manager, Case 1

In Case 2, besides giving all participants a SAFe training before the first PI planning event, the RTE prepared well for the first event with help of an external coach, by creating agendas and instructions for the participants on how to prepare. Several interviewees commented that while they expected the first event to be chaotic, partly due to rumors they had heard from Case 1, to their surprise it turned out to be a successful event. This positively affected on the attitude of the participants towards SAFe in general.

7) Continuous improvement: In Case 1 people were somewhat unhappy with SAFe and one concern seemed to be that even though improvement issues were raised, not much was really improved.

> *We issue some retro concerns, [...] but then nothing is really done about them. [...] there's a lack of drive.*
>
> — Interviewee, Case 1

In Case 2 the RTE had concentrated on improving the ways of working as soon as the improvement items were raised either in retrospectives or otherwise. She created action plans, assigned responsible persons and followed implementation. People were quite happy, as even though they faced problems, they knew that improvement work was ongoing.

8) Satisfaction: In Case 1 the work satisfaction, measured by employee surveys, had decreased after the SAFe adoption and several mentioned SAFe as the reason. Our interviewees suspected that people had not yet seen the benefits of SAFe, instead, they had experienced most changes as negative, e.g., teams felt lack of autonomy, as they could no longer decide some things on their own, such as the sprint length. With fixed increments they felt moving backward, towards the old waterfall. Some interviewees commented that team members see SAFe more like an overhead to them.

> *If you ask people they will just say that this is one more process [...] I don't think they perceive that their work has changed so much. [...] I don't think they've seen much benefit.*
>
> — Interviewee, Case 1

In Case 2 the employee survey of fall 2016 showed that 70% of the team members found SAFe good. All the interviewees from this case described the adoption as highly successful.

D. Future steps

The SAFe adoption not yet over. Future improvement targets include creating separate program and portfolio levels and including the whole company into SAFe, including finances and human resources, e.g., budgeting still follows the old traditional way based on separate products instead of the high level priorities across the products. After the interviews, the company was moving to new agile development discussions and rewarding system to support agile development.

V. Discussion and Conclusions

We compared the adoption of the SAFe framework in two business lines of the same globally distributed case organization. The business line adopting SAFe later was, based on the interviews, clearly more successful in its' transformation, which can be partially explained by learning from the experiences of the first case. General change management related factors seemed to explain most of the differences in success between the cases. We identified the following success factors: 1) training the personnel well in advance, 2)

TABLE II
COMPARISON OF THE SAFE ADOPTIONS

	Case 1	Case 2
SAFe training	No trainings in the beginning, but only after problems emerged	Managers, Product Managers and POs trained in SAFe training courses, developers internally
Change resistance and engaging people	SAFe was felt as given top-down, lack of communication and training led to change resistance	Trainings, involvement, communication and the successful first PI planning event engaged people
Change agents	A couple of internal change agents, but leading the change only part-time	Several internal change agents and an external coach, RTE leading the change full-time
External coaches	No external coach in the beginning	External coaches supported in the beginning
Release train engineers	Part-time RTE (located in Malaysia)	Full-time RTE (located in Finland)
The first PI planning events	Light preparation, chaotic event	Intense preparation, event supported by an external coach, successful event
Continuous improvement	Improvement items found in retros, but not much reacted	Improvement items collected, responsibilities given and followed up with the help of the RTE
Satisfaction	Work satisfaction declined after the SAFe adoption	70 % of team members satisfied with SAFe in fall 2016

informing and engaging people, 3) involving change agents, 4) hiring an experienced external consultant to train, advice and support, 5) preparing well for the first PI planning event, 6) having a full-time RTE and 7) taking recognized improvement items seriously by assigning responsibilities and monitoring their implementation. Comparing these findings to the success factors of large-scale agile transformations in general [8], the four first mentioned items are high on the literature review list. Thus, these seem to be success factors for all kinds of large-scale agile transformations, not only for SAFe transformations.

As the case organization was globally distributed, the main SAFe events, the 2-day PI planning events were organized using an electronic communication solution between the main sites and timing the events to enable synchronous participation from all sites. The leader of the PI planning, RTE, was located in one case in Malaysia and in another case in Finland. Even though distributed events are often challenging, our interviewees found these events quite successful and did not mention global distribution as a problem, but instead felt that communication channels worked well. We were positively surprised of this finding.

Due to budgetary restrictions we were able to visit only the main development site in Finland, as well as perform two video interviews with persons from the other big development site in Malaysia, which is a limitation of this initial study. In the future, we aim to continue the study by interviewing a few more persons from the distributed sites to be able to better confirm our findings related to distributed sites.

We encourage other researchers to conduct case studies on the usage of SAFe and other scaling frameworks. That way we can provide practitioners objective pieces of advice on what kind of scaling frameworks and practices suit to different situations and what are the challenges and successful practices when scaling agile to large and distributed organizations.

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